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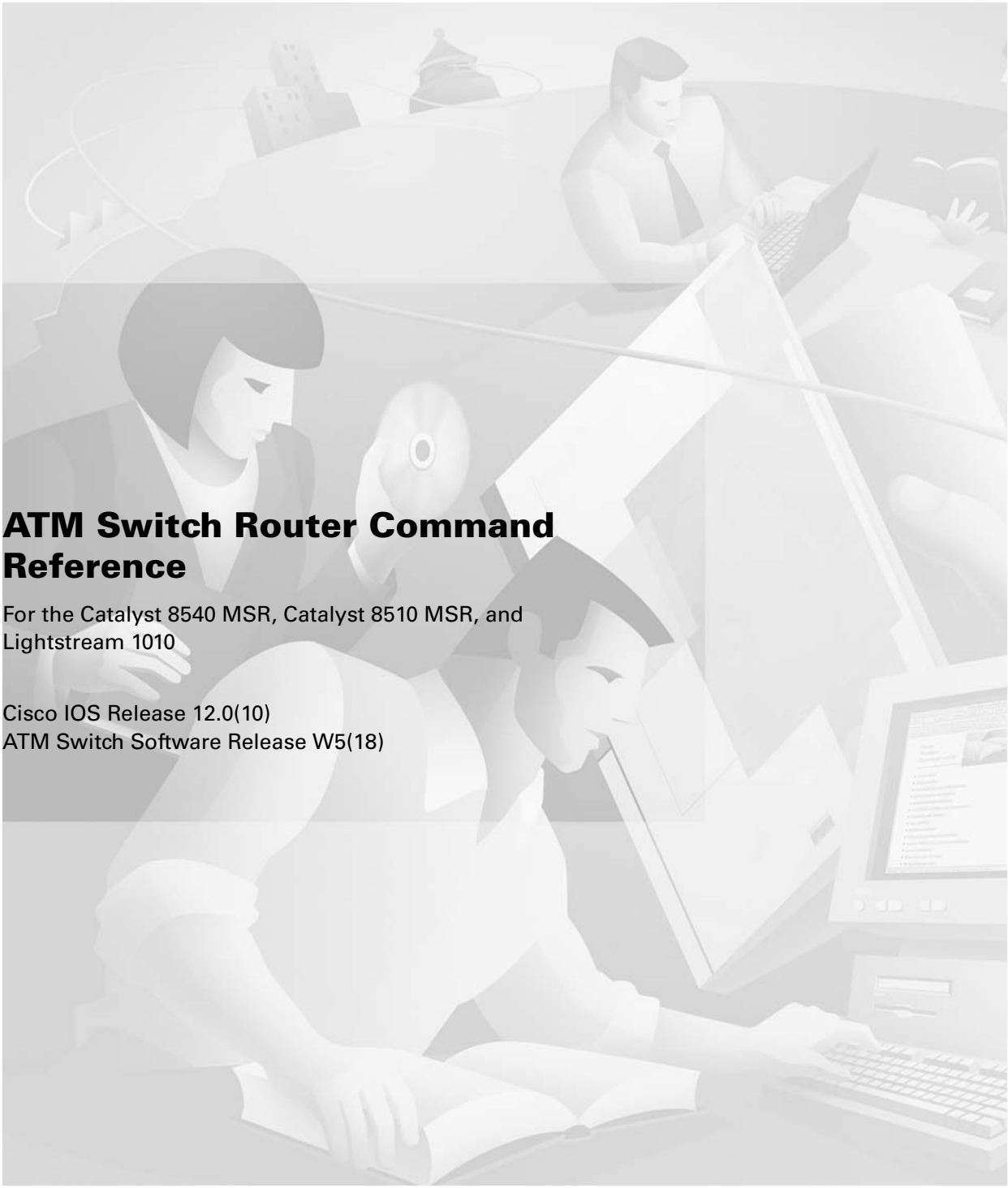

ATM Switch Router Command Reference

For the Catalyst 8540 MSR, Catalyst 8510 MSR, and Lightstream 1010

Cisco IOS Release 12.0(10)
ATM Switch Software Release W5(18)

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CONTENTS

CHAPTER 4

Preface

This preface defines the audience for the *ATM Switch Router Command Reference*, and describes how this publication should be used. Specific new or modified commands, as well as the features these commands represent, are found in the "New and Changed Information" section. This preface also explains the document conventions, and provides information on how to obtain related documentation.

Audience

This publication is intended as a stand alone document for experienced network administrators who will be configuring and maintaining switches or switch routers, and who would also like to reference the commands. For less-experienced users who need to understand the tasks as well as the commands, it is intended as a companion guide to the *ATM Switch Router Software Configuration Guide*.

New and Changed Information

Feature	Commands	Chapter
Inverse Multiplexing over ATM (IMA)	**ima active-links-minimum** **ima clock-mode** **ima differential-delay-maximum** **ima frame-length** **ima group** **ima test**	Chapter 9
	show ima interface	Chapter 18
Online switch router diagnostics	**diag online** **diag online access freq** **diag online oir pktsize** **diag online snake timer**	Chaper 5
	show diag online	Chapter 18

Organization

The *ATM Switch Router Command Reference* is organized alphabetically. Each chapter covers all commands that start with a particular letter, with the exception of Chapter 2, "ATM Commands," and Chapter 18, "Show Commands." Appendixes A through D contain information as described in the following table.

Chapter Number	Chapter Title	Description
Chapter 1	A Commands	Commands beginning with the letter "a."
Chapter 2	ATM Commands	All commands beginning with "atm."
Chapter 3	B Commands	All commands beginning with the letter "b."
Chapter 4	C Commands	All commands beginning with the letter "c."
Chapter 5	D Commands	All commands beginning with the letter "d."
Chapter 6	E Commands	All commands beginning with the letter "e."
Chapter 7	F Commands	All commands beginning with the letter "f."
Chapter 8	H Commands	All commands beginning with the letter "h."
Chapter 9	I Commands	All commands beginning with the letter "i."
Chapter 10	K Commands	All commands beginning with the letter "k."
Chapter 11	L Commands	All commands beginning with the letter "l."
Chapter 12	M Commands	All commands beginning with the letter "m."
Chapter 13	N Commands	All commands beginning with the letter "n."
Chapter 14	O Commands	All commands beginning with the letter "o."
Chapter 15	P Commands	All commands beginning witht he letter "p."
Chapter 16	R Commands	All commands beginning with the letter "r."
Chapter 17	S Commands	Commands beginning with the letter "s."
Chapter 18	Show Commands	All commands beginning with "show."
Chapter 19	T Commands	All commands beginning with the letter "t."
Chapter 20	U Commands	All commands beginning with the letter "u."
Chapter 21	V Commands	All commands beginning with the letter "v."
Chapter 22	Y Commands	All commands beginning with the letter "y."
Appendix A	Acronyms	An up-to-date list of the acronyms used in this publication.
Appendix B	References and Recommended Reading	Contains lists of publications related to networks and networking.
Appendix C	Regular Expressions	Explains regular expressions and how to use them in ATM switch router configuration.
Appendix D	Removed and Changed Commands	Tables listing commands that have been removed, replaced, renamed; or commands that no longer function as expected in ATM environments.

Related Documentation

This publication provides an in-depth description of the commands necessary for configuring and maintaining your ATM switch. It describes tasks only in the context of using a particular command; it does not describe how the tasks interrelate nor does it provide comprehensive configuration examples.You can use this publication as a standalone reference manual or in conjunction with the *ATM Switch Router Software Configuration Guide*.

Not all of the **debug** commands are included in this publication. For a complete guide to the debug commands, refer to the *Debug Command Reference* publication.

Some Cisco IOS commands are not currently supported on the ATM switch router, hence these commands and/or some of their parameters might not function as expected. In this document these commands can be found in Table D-5 of Appendix D, where they are listed in alphabetical order. Wherever possible, a reference document has been listed for further information on these commands.

Document Conventions

Unless otherwise noted, all information in this document is relevant to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where certain information relates exclusively to specific switch routers, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Command descriptions use the following conventions (see Figure 1 for an example):

boldface font	Commands and keywords are in **boldface**.
italic font	Arguments for which you supply values are in *italics*. In contexts that do not allow italics, arguments are enclosed in angle brackets (< >).
[ ]	Elements in square brackets are optional.
{ x | y | z }	Required alternative keywords are grouped in braces and separated by vertical bars.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string, otherwise the string will include the quotation marks.

Screen examples use the following conventions:

`screen` font	Terminal sessions and information the system displays are in `screen` font.
`boldface screen` font	Information you must enter is in **`boldface screen`** font.
italic screen font	Arguments for which you supply values are in *italic screen* font.
→	`This pointer highlights an important line of text in an example.`
^	The symbol ^ represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the **Control** key while you press the **D** key.
< >	Nonprinting characters, such as passwords, are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Notes use the following conventions:

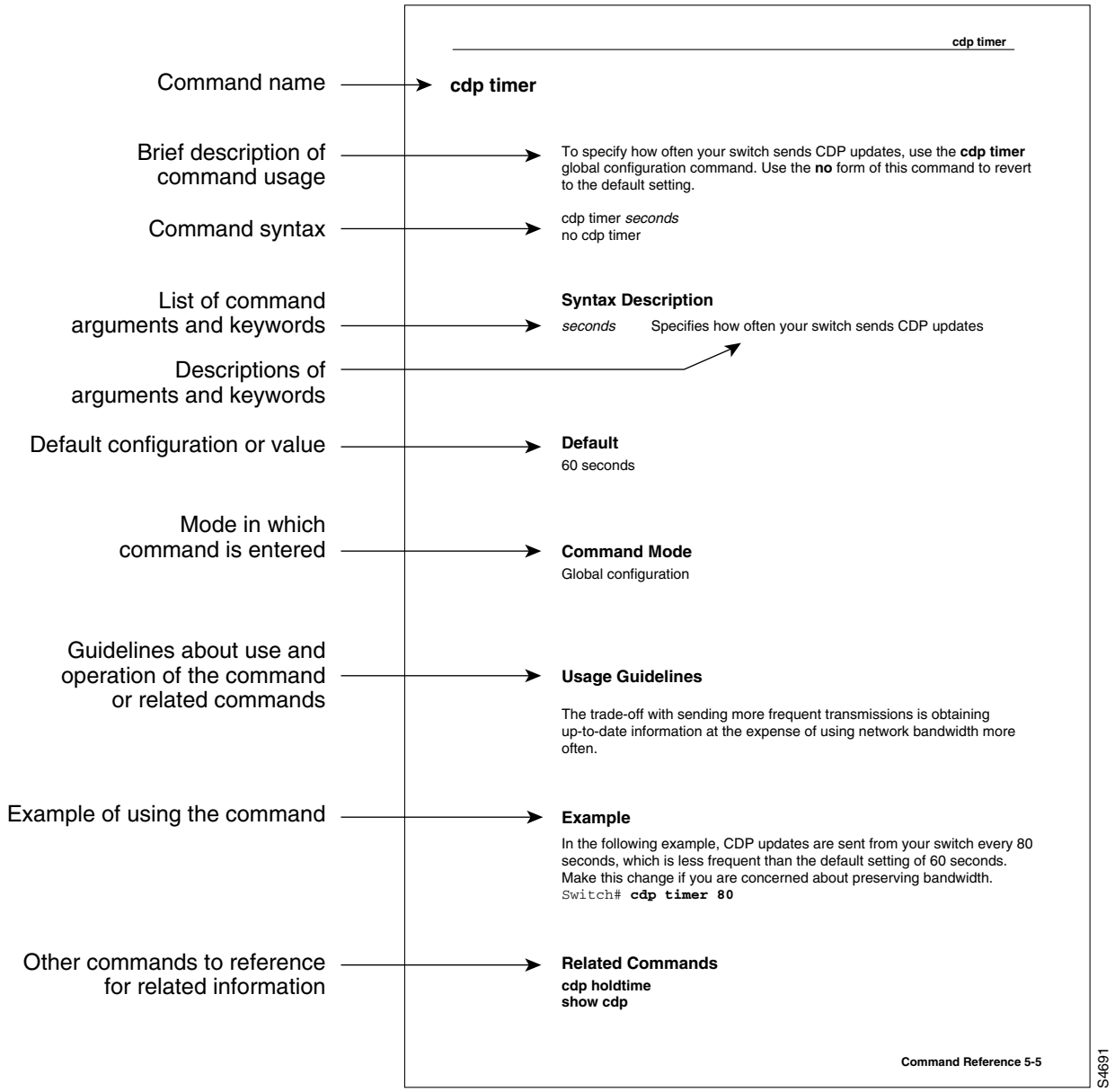
Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

Cautions use the following conventions:

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Figure 1 on the following page explains the fields of a typical command reference page.

Figure 1 Typical Command Reference Page



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CHAPTER 1

A Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

access-list (extended)

Currently, this command only supports the IP host. To define an extended IP access list, use the extended version of the **access-list** global configuration command. To remove the access lists, use the **no** form of this command.

access-list *access-list-number* [**dynamic** *list-name* [**timeout** *value*]] {**deny** | **permit**} *protocol source source-wildcard destination destination-wildcard* [**precedence** *precedence*] [**tos** *tos*] [**log| log-input**]

no access-list *access-list-number*

For ICMP, you can also use the following syntax:

access-list *access-list-number* [**dynamic** *list-name* [**timeout** *value*]] {**deny** | **permit**} **icmp** *source source-wildcard destination destination-wildcard* [*icmp-type* [*icmp-code*] | *icmp-message*] [**precedence** *precedence*] [**tos** *tos*] [**log | log-input**]

For TCP, you can also use the following syntax:

access-list *access-list-number* [**dynamic** *list-name* [**timeout** *value*]] {**deny** | **permit**} **tcp** *source source-wildcard* [*operator port* [*port*]] *destination destination-wildcard* [*operator port* [*port*]] [established] [**precedence** *precedence*] [**tos** *tos*] [**log | log-input**]

For UDP, you can also use the following syntax:

access-list *access-list-number* [**dynamic** *list-name* [**timeout** *value*]] {**deny** | **permit**} **udp** *source source-wildcard* [*operator port* [*port*]] *destination destination-wildcard* [*operator port* [*port*]] [**precedence** *precedence*] [**tos** *tos*] [**log | log-input**]

Syntax Description

access-list-number	Number of an access list. This is a decimal number from 100 through 199.
list-name	Name of a dynamic access list.
deny	Denies access if the conditions are matched.
permit	Permits access if the conditions are matched.
protocol	Name or number of an Internet protocol. It can be one of the keywords eigrp, gre, icmp, igmp, igrp ip, ipinip, nos, ospf, tcp, udp, or an integer in the range 0 through 255 representing an IP protocol number. To match any Internet protocol, including ICMP, TCP, and UDP, use the keyword ip. Some protocols allow further qualifiers described below.
source	Number of the network or host from which the packet is being sent. There are three ways to specify the source: Use a 32-bit quantity in 4-part dotted-decimal format. Use the keyword any as an abbreviation for a source and source-wildcard of 0.0.0.0 255.255.255.255. Use host source as an abbreviation for a source and source-wildcard of source 0.0.0.0.

source-wildcard	Wildcard bits to be applied to source. There are three ways to specify the source wildcard: Use a 32-bit quantity in 4-part dotted-decimal format. Place ones in the bit positions you want to ignore. Use the keyword any as an abbreviation for a source and source-wildcard of 0.0.0.0 255.255.255.255. Use host source as an abbreviation for a source and source-wildcard of source 0.0.0.0.
destination	Number of the network or host to which the packet is being sent. There are three ways to specify the destination: Use a 32-bit quantity in 4-part dotted-decimal format. Use the keyword **any** as an abbreviation for the *destination* and *destination-wildcard* of 0.0.0.0 255.255.255.255. Use **host** *destination* as an abbreviation for a *destination* and *destination-wildcard* of *destination* 0.0.0.0.
destination-wildcard	Wildcard bits to be applied to the destination. There are three ways to specify the destination wildcard: Use a 32-bit quantity in 4-part dotted-decimal format. Place ones in the bit positions you want to ignore. Use the keyword **any** as an abbreviation for a *destination* and *destination-wildcard* of 0.0.0.0 255.255.255.255. Use **host** *destination* as an abbreviation for a *destination* and *destination-wildcard* of *destination* 0.0.0.0.
precedence *precedence*	Packets can be filtered by precedence level, as specified by a number from 0 to 7, or by name, as listed in the section "Usage Guidelines."
tos *tos*	Packets can be filtered by type of service level, as specified by a number from 0 to 15, or by name, as listed in the section "Usage Guidelines."
icmp-type	ICMP packets can be filtered by ICMP message type. The type is a number from 0 to 255.
icmp-code	ICMP packets which are filtered by ICMP message type can also be filtered by the ICMP message code. The code is a number from 0 to 255.
icmp-message	ICMP packets can be filtered by an ICMP message type name or ICMP message type and code name. The possible names are listed in the section "Usage Guidelines."
igmp-type	IGMP packets can be filtered by IGMP message type or message name. A message type is a number from 0 to 15. IGMP message names are listed in the section "Usage Guidelines."
operator	Compares source or destination ports. Possible operands include **lt** (less than), **gt** (greater than), **eq** (equal), **neq** (not equal), and **range** (inclusive range). If the operator is positioned after the *source* and *source-wildcard*, it must match the source port. If the operator is positioned after the *destination* and *destination-wildcard*, it must match the destination port. The **range** operator requires two port numbers. All other operators require one port number.

port	The decimal number or name of a TCP or UDP port. A port number is a number from 0 to 65535. TCP and UDP port names are listed in the section "Usage Guidelines." TCP port names can only be used when filtering TCP. UDP port names can only be used when filtering UDP.
established	For the TCP protocol only; indicates an established connection. A match occurs if the TCP datagram has the ACK or RST bits set. The nonmatching case is that of the initial TCP datagram to form a connection.
log	Causes an informational logging message about the packet that matches the entry to be sent to the console. (The level of messages logged to the console is controlled by the **logging console** command.) The message includes the access list number; whether the packet was permitted or denied; the protocol, whether it was TCP, UDP, ICMP or a number; and, if appropriate, the source and destination addresses and source and destination port numbers. The message is generated for the first packet that matches the entry and then at 5-minute intervals, including the number of packets permitted or denied in the prior 5-minute interval.
log-input	Log matches against this entry, including input interface.

Defaults

An extended access list defaults to a list that denies everything. An extended access list is terminated by an implicit deny statement.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

You can use access lists to control the transmission of packets on an interface, control virtual terminal line access, and restrict contents of routing updates. The switch stops checking the extended access list after a match occurs.

Fragmented IP packets, other than the initial fragment, are immediately accepted by any extended IP access list. Extended access lists used to control virtual terminal line access or restrict contents of routing updates must not match against the TCP source port, the type of service value, or the packet's precedence.

Note After an access list is created initially, any subsequent additions (possibly entered from the terminal) are placed at the end of the list. In other words, you cannot selectively add or remove access list command lines from a specific access list.

The following is a list of precedence names:

- **critical**
- **flash**

- **flash-override**
- **immediate**
- **internet**
- **network**
- **priority**
- **routine**

The following is a list of TOS names:

- **max-reliability**
- **max-throughput**
- **min-delay**
- **min-monetary-cost**
- **normal**

The following is a list of ICMP message-type names and ICMP message-type and code names:

- **administratively-prohibited**
- **alternate-address**
- **conversion-error**
- **dod-host-prohibited**
- **dod-net-prohibited**
- **echo**
- **echo-reply**
- **general-parameter-problem**
- **host-isolated**
- **host-precedence-unreachable**
- **host-redirect**
- **host-tos-redirect**
- **host-tos-unreachable**
- **host-unknown**
- **host-unreachable**
- **information-reply**
- **information-request**
- **log in-put**
- **mask-reply**
- **mask-request**
- **mobile-redirect**
- **net-redirect**
- **net-tos-redirect**
- **net-tos-unreachable**
- **net-unreachable**

- **network-unknown**
- **no-room-for-option**
- **option-missing**
- **packet-too-big**
- **parameter-problem**
- **port-unreachable**
- **precedence**
- **precedence-unreachable**
- **protocol-unreachable**
- **reassembly-timeout**
- **redirect**
- **router-advertisement**
- **router-solicitation**
- **source-quench**
- **source-route-failed**
- **time-exceeded**
- **timestamp-reply**
- **timestamp-request**
- **tos**
- **traceroute**
- **ttl-exceeded**
- **unreachable**

The following is a list of TCP port names that can be used instead of port numbers. Refer to the current Assigned Numbers RFC to find a reference to these protocols. Port numbers corresponding to these protocols can also be found by entering a **?** in the place of a port number.

- **bgp**
- **chargen**
- **cmd**
- **daytime**
- **discard**
- **domain**
- **echo**
- **exec**
- **finger**
- **ftp**
- **ftp-data**
- **gopher**
- **hostname**

- **ident**
- **irc**
- **klogin**
- **kshell**
- **lpd**
- **nntp**
- **pop2**
- **pop3**
- **smtp**
- **sunrpc**
- **syslog**
- **tacacs-ds**
- **talk**
- **telnet**
- **time**
- **uucp**
- **whois**
- **www**

The following is a list of UDP port names that can be used instead of port numbers. Refer to the current Assigned Numbers RFC to find a reference to these protocols. Port numbers corresponding to these protocols can also be found by entering a **?** in the place of a port number.

- **biff**
- **bootpc**
- **bootps**
- **discard**
- **dns**
- **dnsix**
- **echo**
- **mobile-ip**
- **nameserver**
- **netbios-dgm**
- **netbios-ns**
- **ntp**
- **rip**
- **snmp**
- **snmptrap**
- **sunrpc**
- **syslog**

- **tacacs-ds**
- **talk**
- **tftp**
- **time**
- **who**
- **xdmcp**

Examples

In the following example, serial interface 0 is part of a Class B network with the address 128.88.0.0, and the mail host's address is 128.88.1.2. The keyword **established** is used only for the TCP protocol to indicate an established connection. A match occurs if the TCP datagram has the ACK or RST bits set, which indicate that the packet belongs to an existing connection.

```
Switch(config)# access-list 102 permit tcp 0.0.0.0 255.255.255.255 128.88.0.0 0.0.255.255
established access-list 102 permit tcp 0.0.0.0 255.255.255.255 128.88.1.2 0.0.0.0 eq 25
interface serial 0 ip access-group 102 in
```

The following example also permits DNS packets and ICMP echo and echo reply packets.

```
Switch(config)# access-list 102 permit tcp any 128.88.0.0 0.0.255.255 established
Switch(config)# access-list 102 permit tcp any host 128.88.1.2 eq smtp
Switch(config)# access-list 102 permit tcp any any eq domain
Switch(config)# access-list 102 permit udp any any eq domain
Switch(config)# access-list 102 permit icmp any any echo
```

Related Commands

Command	Description
access-list (extended)	Used to define an extended IP access list, and only supports an IP host.
access-list (standard)	Cisco IOS command removed from this manual. Refer to Appendix D.
interface	Used to configure an interface type and enter interface configuration mode.
logging console	Cisco IOS command removed from this manual. Refer to Appendix D.
show access-lists	Used to display information about the access list.
show ip access-lists	Used to display the contents of all current IP access lists.

access-template

To create a temporary access list entry to the connected switch, use the **access-template** EXEC command.

access-template {*access-list-number* | *dynamic-name*} *temp-list source-addr dest-addr*
timeout *minutes*

Syntax Description

access-list-number	Number of the dynamic access list (100 to 199).
dynamic-name	Name of the dynamic access list.
temp-list	Name of the temporary list within the access list.
source-addr	Source address in the dynamic access list. The keywords **host** and **any** are allowed. All other attributes are inherited from the original access list entry.
dest-addr	Destination address in the dynamic access list. The keywords **host** and **any** are allowed. All other attributes are inherited from the original access list entry.
minutes	Specifies a maximum time limit for each entry in the dynamic list. It is the absolute time that an entry can reside in the list. The default is an infinite time limit and allows an entry to remain permanently (1 to 9999).

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command provides a way to enable the lock-and-key access feature.

You should always define either an absolute timeout (with the **timeout** keyword in this command) or an idle timeout (with the **timeout** keyword in the **access-class** command). Otherwise, the dynamic access list remains, even after the user has terminated the session.

Examples

In the following example, IP access is enabled on incoming packets in which the source address is 171.69.1.129 and the destination address is 172.21.52.12. All other source and destination pairs are discarded.

```
Switch# access-template 101 payroll host 171.69.1.129 host 172.21.52.12 timeout 2
```

Related Commands

Command	Description
access-list (extended)	Used to define an extended IP access list.
autocommand	Cisco IOS command removed from this manual. Refer to Appendix D.
clear access-template	Cisco IOS command removed from this manual. Refer to Appendix D.

administrative-weight

To configure the mode of default administrative weight assignment for PNNI interfaces, use the **administrative-weight** ATM router PNNI configuration command. To return to the default value, use the **no** form of this command.

administrative-weight {**linespeed** | **uniform**}

no administrative-weight

Syntax Description

linespeed	The default value of the administrative weight is based on the linespeed or MaxCR of an interface.
uniform	Assigns the weight of 5040 to interfaces that were not configured.

Defaults

uniform

Command Modes

ATM router configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Administrative weight is used as the primary routing metric to minimize use of network resources. In the absence of other constraints, this causes PNNI routing to minimize the number of hops. Basing administrative weight on **linespeed** allows path selection to prefer paths along higher bandwidth interfaces. Higher speed links have lower administrative weights and are preferred during routing. The value set in this command becomes the default for the **atm pnni admin-weight** command.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following script shows how to access the **administrative-weight** ATM router PNNI configuration command.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# administrative-weight uniform
```

Related Commands

Command	Description
atm pnni admin-weight	Used to specify the administrative weight of the ATM PNNI interface.
show atm pnni interface	Used to display specific information about an interface or to list the interfaces running on a PNNI node.
show atm pnni local-node	Used to display information about a PNNI logical node running on the switch.

aggregation-mode

To specify the mode that is used to calculate the combined metrics from multiple lower-level PNNI links into individual aggregated links to be advertised by this node, use the **aggregation-mode** PNNI node configuration command.

aggregation-mode {**link** | **node**} {**abr** | **cbr** | **ubr** | **vbr-rt** | **vbr-nrt** | **all**} {**aggressive** | **best-link**}

Syntax Description

link	Specifies the aggregation mode service category for a link.
node	Specifies the aggregation mode service category for a node with complex node representation.
abr	Specifies the ABR service category.
cbr	Specifies the CBR service category.
ubr	Specifies the UBR service category.
vbr-rt	Specifies the VBR-RT service category.
vbr-nrt	Specifies the VBR-NRT service category.
all	Specifies all service categories.
aggressive	When specified for links, selects the best values for each individual metric from all links or paths that are being aggregated. In this mode, there might be no single lower-level link that is as good as the higher-level link for all of the metrics. When specified for complex nodes, the radius, spoke, and bypass paths are based on a single calculation between each pair of border nodes, which optimizes a single parameter.
best-link	When specified for links, one of the lower-level links is chosen as the best link based on one or two metrics. All metrics from the selected lower-level link are copied to the higher-level aggregated link. In this mode, there is at least one lower-level link with metrics matching the higher-level link. When specified for complex nodes, the radius, spoke, and bypass paths are based on the best values from two path calculations for each pair of border nodes, which optimize different parameters.

Defaults

best-link for all service categories

Command Modes

PNNI node configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

In the PNNI hierarchy, link aggregation is used to represent several parallel links between two peer groups as a single higher-level link. The aggregation modes control how the metrics for the higher level links are derived from the individual parallel links that have the same aggregation token.

Examples

The following example shows how to enter PNNI node configuration mode and specify a node.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)#
```

The following example shows how to specify aggressive mode aggregation for the VBR-RT service category on links.

```
Switch(config-pnni-node)# aggregation-mode link vbr-rt aggressive
```

Related Commands

Command	Description
show atm pnni aggregation node	Used to show the PNNI nodal aggregation tables for a complex node.
nodal-representation	Used to specify the type of PNNI LGN representation.

arp (global)

To add a permanent entry in the ARP cache, use the **arp** global configuration command. To remove an entry from the ARP cache, use the **no** form of this command.

arp *ip-address hardware-address type interface-type card/subcard/port* [**alias**]

no arp *ip-address hardware-address type interface-type card/subcard/port* [**alias**]

Syntax Description

ip-address	IP address in four-part dotted-decimal format corresponding to the local data interface address.
hardware-address	Local data interface address (a 48-bit address).
type	Encapsulation description (**arpa**, **sap**, **smds**, or **snap**). For Ethernet interfaces, this is typically the **arpa** keyword.
interface-type	Type of interface to which this entry applies.
card/subcard/port	Specifies the card, subcard, and port numbers for the interface.
alias	Indicates that the switch should respond to ARP requests as if it were the owner of the specified address.

Defaults

No entries are permanently installed in the ARP cache.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The switch uses ARP cache entries to translate 32-bit IP addresses into 48-bit hardware addresses.

Because most hosts support dynamic resolution, you generally do not need to specify static ARP cache entries.

Examples

The following is an example of a static ARP entry for a typical Ethernet host.

```
Switch(config)# arp 192.31.7.19 0800.0900.1834 arpa
```

Related Commands

Command	Description
show arp	Used to display the entries in the ARP table.

arp (interface)

To control the interface-specific handling of IP address resolution into 48-bit Ethernet, use the **arp** interface configuration command. To disable an encapsulation type, use the **no** form of this command.

arp {**arpa** | **frame-relay** | **probe** | **snap**}

no arp {**arpa** | **frame-relay** | **probe** | **snap**}

Syntax Description

arpa	Standard Ethernet-style ARP (RFC 826).
frame-relay	ARP for a Frame Relay interface.
probe	HP Probe protocol for IEEE-802.3 networks.
snap	ARP packets conforming to RFC 1042.

Defaults

Standard Ethernet-style ARP

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Arguments to the **arp** command are not mutually exclusive. Each command enables or disables a specific type of ARP. For example, if you enter the **arp arpa** command followed by the **arp probe** command, the switch sends three packets (two for **probe** and one for **arpa**) each time it needs to discover a MAC address.

The **arp probe** command allows the switch to use the Probe protocol (in addition to ARP) whenever attempting to resolve an IEEE-802.3 or Ethernet local data interface address. The subset of Probe that performs address resolution is called Virtual Address Request and Reply. Using Probe, the switch communicates transparently with Hewlett-Packard IEEE-802.3 hosts using this type of data encapsulation.

Note All interfaces that use Probe must be explicitly configured for **arp probe**.

The **show ima interface** EXEC command displays the type of ARP being used on a particular interface. To remove all nonstatic entries from the ARP cache, use the **clear atm pnni** privileged EXEC command.

auto-summary

To allow default summary addresses to be generated based on the switch's ATM address, use the **auto-summary** PNNI node configuration command. To disable generation of default summary addresses, use the **no** form of this command.

auto-summary

no auto-summary

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

PNNI node configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

By default, lowest level PNNI nodes advertise 13-byte summary address prefixes based on the switch address or addresses. The summary address prefix or prefixes cover all end system addresses determined via ILMI address registration from the ILMI address prefix or prefixes, based on each switch's address. They do not cover end-system addresses determined via ILMI address registration from per-interface ILMI address prefixes (configured using the **atm pvc** command).

Using the **no** form of the **auto-summary** command causes PNNI to advertise all end-system addresses separately (unless other summary addresses matching the end system addresses were configured).

Higher level PNNI nodes (LGNs) have a single default address configured. The length of that summary for any LGN is equal to the level of the child peer group, and its value is equal to the first level bits of the child peer group identifier.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following example shows how to access the **auto-summary** node-level subcommand.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)# auto-summary
```

Related Commands

Command	Description
atm address	Used to assign a 20-byte ATM address to the switch.
atm prefix	Used to configure an ILMI address prefix for an ATM interface.

Command	Description
show atm route	Used to display all local or network-wide reachable address prefixes in a switch router's ATM routing table.
summary-address	Used to configure summary address prefixes on a PNNI node.

CHAPTER 2

ATM Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

atm abr-mode (Catalyst 8510 MSR and LightStream 1010)

To select **efci** marking, **relative-rate** marking, or both, use the **atm abr-mode** global configuration command on ABR connections. To assign the default value to ABR mode, use the **no** form of this command.

atm abr-mode {**efci** | **relative-rate** | **all**}

no atm abr-mode

Syntax Description

efci	When cells arrive on ABR connections to a congested (as indicated by the **efci** threshold) output queue on the interface, the **efci** bit in the cell header is set.
relative-rate	When a backward RM cell is received on an ABR connection on an interface (from outside the switch), its congestion bit is set if the forward-direction interface is congested (as indicated by the **abr relative-rate threshold**).
all	Indicates both **efci** and **relative-rate** modes of congestion notification.

Defaults

relative-rate

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command
12.0(3c)W5(9)	Modified: **(Catalyst 8510 MSR and LightStream 1010)** added

Usage Guidelines

This configuration command changes the global type of notification used on ABR connections to send a congestion alert to the end stations. This change can be made if the switch connects to a network or end station that uses the new technique. The use of **all** causes both **efci** and **relative-rate** marking to be used.

Examples

In the following example, the ABR mode of the switch is set to **efci**.

```
Switch(config)# atm abr-mode efci
```

Related Commands

Command	Description
show atm resource	Displays global resource manager configuration and status.

atm access-group

To subscribe an interface or subinterface to an existing ATM address pattern-matching filter expression, use the **atm access-group** interface configuration command. To delete an address access filter subscription on a specified interface of subinterface, use the **no** form of this command.

atm access-group *name* [**in** | **out**]

no atm access-group *name* [**in** | **out**]

Syntax Description

name	The filter expression or filter set.
in	Specifies that the filter should be applied to an incoming SETUP message.
out	Specifies that the filter should be applied to an outgoing SETUP message.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command affects ATM signalling SETUP requests received or transmitted by the switch on an interface.

You should use the **atm filter-set** command prior to using this command. For descriptions of filter sets and expressions, see the **atm filter-expr**, and **atm filter-set** global configuration commands.

Each interface has only one access group. If you create a new access group, it overrides any existing group.

Examples

The following is sample output from the **atm access-group** command.

```
Switch(config-if)# atm access-group atm_filter_expr1 in
Switch(config-if)# atm access-group atm_filter_expr2 out
```

Related Commands

Command	Description
atm filter-expr	Configures an ATM address filter that matches patterns.
atm filter-set	Creates an ATM address filter set.
show atm filter-expr	Displays a specific ATM filter expression or a summary ATM filter expression.
show atm filter-set	Displays a specific ATM filter set or a summary ATM filter set.

atm accounting (interface)

To enable ATM accounting on a specific interface, use the **atm accounting** interface configuration command. To disable ATM accounting on a specific interface, use the **no** form of the command.

atm accounting

no atm accounting

Syntax Description

This command has no keywords or arguments.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

When accounting is disabled for an interface, accounting stops keeping track of the VCs on that interface and treats the interface as if it were shut down. For the VCs that satisfy the selection criteria, accounting writes records to the active file; however, the VCs are not affected.

Use the **show atm accounting** EXEC command to determine which interfaces are using ATM accounting.

Examples

The following example shows how to enable ATM accounting on interface ATM 1/0/0.

```
Switch(config)# interface atm 1/0/0
Switch(config-if)# atm accounting
```

Related Commands

Command	Description
interface	Configures an interface type and enters interface configuration mode.

atm accounting collection

To control collection of ATM accounting data into a specific file, use the **atm accounting collection** EXEC command.

atm accounting collection {**collect-now** | **swap**} *filename*

Syntax Description

collect-now	Immediately captures ATM accounting information for all connections that meet the **min-age** criteria.
swap	Stops the data collection in the active file and activates the passive file so it collects data. The new passive file is now available for downloading.
filename	Specifies the name for the ATM accounting file.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use the **collect-now** option to return a message with the number of records that were written.

Use the **swap** option to return a message with the number of records that were written.

Use the **show atm accounting** EXEC command to show the active and ready file sizes and the number of records.

Examples

The following example shows how to perform an on-demand collection to the file *acctng_file1*.

```
Switch# atm accounting collection collect-now acctng_file1
Switch# Collect-now found 12 SVCs with life longer than min-age
```

The following example shows how to perform a swap operation on the file *acctng_file1*.

```
Switch# atm accounting collection swap acctng_file1
Switch# File Swap Done. New Ready File 4999702 bytes (#records 28796); Active File 65
bytes (#records 0)
```

Note The only filename currently allowed is *acctng_file1*.

Related Commands

Command	Description
atm accounting file	Used to enable an ATM accounting file and to enter the accounting file configuration mode.

atm accounting enable

To enable the ATM VC accounting feature globally, use the **atm accounting enable** global configuration command. To disable this feature, use the **no** form of this command.

atm accounting enable

no atm accounting enable

Syntax Description

This command has no keywords or arguments.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command (originally **atm accounting (global)**
11.2(8.0.1)	Modified: **enable** added: **atm accounting enable (global)**
11.3(3a)	Modified: **(global)** taken out

Usage Guidelines

Accounting is enabled globally for the switch on interfaces where accounting is configured. An error message is given if memory is fragmented and ATM accounting cannot get two memory chunks of 5 MB each. The switch needs 32 MB of memory or it returns an error message.

The switch must have this command saved in the NVRAM configuration file. Use the following steps to enable ATM accounting:

Step 1 Enable ATM accounting in global configuration mode.

Step 2 Exit global configuration mode.

Step 3 Use the **copy running-config startup-config** command to save the command in NVRAM.

Step 4 Reboot the switch.

Examples

The following example shows how to enable ATM accounting.

```
Switch(config)# atm accounting enable
```

Related Commands

Command	Description
atm accounting (interface)	Enables ATM accounting on a specific interface.

atm accounting file

To enable an ATM accounting file and enter the accounting file configuration mode, use the **atm accounting file** global configuration command. To disable an ATM accounting file, use the **no** form of this command.

atm accounting file *filename*

no atm accounting file *filename*

Note The **atm accounting file** global configuration command changes the configuration mode to ATM accounting, and the new prompt appears: `Switch(config-acct-file)#`

To modify the fields in the ATM accounting file, use the following ATM accounting mode configuration subcommands. To set the fields to their default values, use the **no** form of these subcommands.

collection-modes [**periodic**] [**on-release**]
default {**collection-modes** | **description** | **enable** | **failed-attempts** | **interval** | **min-age**}
description *string*
enable
failed-attempts [**none** | [**regular** | **soft**]]
interval *seconds*
min-age *seconds*
remote-log [**only**] **primary-host** {*hostname* | *ip-address* | *tcp-port#}* [**alternate-host** *{alt-host-name* | *alt-ip-address* | *alt-tcp-port#}*]

no collection-modes [**periodic**] [**on-release**]
no description *string*
no enable
no failed-attempts [**none** | [**regular** | **soft**]]
no interval
no min-age
no remote-log

Syntax Description

filename	Specifies the filename of the accounting file. The only filename currently allowed is *acctng_file1*.

Defaults

See "Syntax Description."

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

The ATM accounting configuration mode subcommands are described in Table 2-1.

Table 2-1 ATM Accounting Configuration Mode Subcommands

Subcommand	Description
collection-modes	Initializes the collection mode and allows you to specify at what time accounting data is recorded in the file: on the release of a connection (**on-release**), or periodically (**periodic**).
default	Sets a parameter to its defaults.
description	Configures a description of the ATM accounting file with a limit of 64 characters.
enable	Activates ATM accounting data collection to a specified file.
failed-attempts	Configures the writing of records for initial connection attempts, as follows: • **regular**—Records regular SVC/SVP numbers that originate or terminate at the switch interface. • **soft**—Records soft PVC/PVP numbers that originate or terminate at the switch interface. • **none**—Does not record failed attempts. Default is **regular** and **soft**.
interval	Sets the period for periodic collection of accounting records. The default is 3600 seconds.
min-age	Configures the value of the minimum age of the VC for on-release or periodic collection of accounting records. The default is 3600 seconds.
remote-log	Establishes a TCP connection from the switch to a PC or workstation, as follows: • **only**—When you specify **only**, no local storage of accounting occurs. • **host-name/ip-address**—Host name or IP address of the accounting records receiving host computer. • **tcp port#**—The server communicates with the TCP port to connect to the accounting agent in the switch. • **alt-host-name/alt-ip-address**—Host name or IP address of a standby accounting records receiving host computer. • **alt-tcp-port#**—Alternate TCP port with which the server communicates to connect to the accounting agent in the switch.

To change the fields, you can either provide new values, or use the **no** form of the command.

Changes made to the list affect the file format. The change takes effect only for the next collection, for example, after using the **atm accounting collection swap** global configuration command. Changes to the connection types take effect immediately.

The ATM selection table is created using the default value of one. You can only modify the following fields in the file:

- **description**
- **failed-attempts**
- **min-age**

Note The only filename currently allowed is *acctng_file1*.

Examples

The following example shows how to enter the ATM accounting file configuration mode.

```
Switch# configure terminal
Switch(config)# atm accounting file acctng_file1
Switch(config-acct-file)#
```

The following example shows how to enter the ATM accounting file configuration mode and configure a description that is displayed in the header of the file when using the **show atm accounting** command.

```
Switch(config)# atm accounting file acctng_file1
Switch(config-acct-file)# description Main accounting file for engineering
```

The following example shows how to enter the ATM accounting file configuration mode and configure **failed-attempts** to record failed attempts for SVC/SVP connections in the accounting file.

```
Switch(config)# atm accounting file acctng_file1
Switch(config-acct-file)# failed-attempts regular
```

The following example shows how to enter the ATM accounting file configuration mode and configure **remote-log**.

```
Switch(config)# atm accounting file acctng_file1
Switch(config-acct-file)# remote-log 172.20.52.3 6001 alternate-host cisco-lab 7001
```

Related Commands

Command	Description
atm accounting collection	Controls collection of ATM accounting data into a specific file.
atm accounting selection	Enables ATM accounting selection and enters the ATM accounting selection configuration mode.

atm accounting selection

To enable ATM accounting selection and enter the ATM accounting selection configuration mode, use the **atm accounting selection** global configuration command. To disable ATM accounting selection, use the **no** form of this command.

atm accounting selection *index*

no atm accounting selection *index*

Note The **atm accounting selection** global configuration command changes the configuration mode to ATM accounting selection mode, and the following new prompt appears:
`Switch(config-acct-sel)#`

To configure the ATM accounting selection, use the following ATM accounting configuration mode subcommands. To set the selection parameters to their defaults, use the no form of these commands.

connection-types [*type*] **default** {**connection-types** | **list**}**list**

no connection-types [*type*]

no list

Syntax Description

index	Configures the ATM accounting selection index number.

Defaults

No default selection index. See the individual subcommand defaults.

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This release supports only one ATM selection table entry which cannot be deleted.

Examples

The following example specifies the ATM accounting selection index as 1 and restores the default connection types.

```
Switch# configure terminal
Switch(config)# atm accounting selection 1
Switch(config-acct-sel)# default connection-types
```

Related Commands

Command	Description
atm accounting collection	Controls collection of ATM accounting data into a specific file.
atm accounting file	Enables an ATM accounting file and enters the accounting file configuration mode.
connection-types	Sets types of connections for atm accounting selection.

atm accounting trap threshold

To configure the threshold value which controls the generation of an ATM accounting SNMP trap, use the **atm accounting trap threshold** global configuration command. To restore the default value of the trap threshold, use the **no** form of the command.

atm accounting trap threshold *percent-value*

no atm accounting trap threshold

Syntax Description

percent-value	Specifies the value as a percent of the maximum file size.

Defaults

The default value for the trap threshold is 90.

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command (originally **atm accounting trap**)
11.2(8.0.1)	Modified: Added **threshold**

Usage Guidelines

To see the file size, threshold value, and trap statistics, use the **show atm accounting** EXEC command.

Examples

The following example changes the ATM accounting trap threshold to 80.

```
Switch(config)# atm accounting trap threshold 80
```

Related Commands

Command	Description
connection-types	Sets types of connections for atm accounting selection.

atm address

To assign a 20-byte ATM address to the switch, use the **atm address** global configuration command. To delete a specific ATM address, use the **no** form of this command.

atm address *address-template*

no atm address *address-template*

Syntax Description

address-template	The address template can be a full 20-byte address or a partial 13-byte. When a partial address is assigned, this command automatically sets one of the switch's 6-byte MAC addresses in the ESI part, and puts a 0 in the selector part.

Defaults

When **no atm address** has been configured, an autoconfigured ATM address is assigned. Refer to the *ATM Switch Router Software Configuration Guide* for more information.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

You can have multiple ATM addresses. The first address in the list is the active ATM address for this switch router. When you delete the current active ATM address, the next address in the list becomes the active ATM address.

In autoconfiguration mode, the switch router establishes an address according to the format specified in the *ATM Switch Router Software Configuration Guide*.

The first 13-byte prefixes of all of the addresses are used by ILMI to assign addresses to end stations connected to the UNI ports (unless there is a prefix assigned per port). PNNI also summarizes all of the address prefixes automatically in reachable address advertisements. Refer to the **auto-summary** command for more information.

The active ATM address determines which address is advertised by PNNI as the ATM address of the PNNI local-nodes. Each local-node uses the active ATM address with the selector byte modified to match the local-node index.

In addition, the active ATM address is used as the source prefix for generating the PNNI peer group IDs and node IDs. However, the peer group IDs and node IDs are only updated after the local-node is disabled and reenabled. Therefore, it is recommended that a change to the active ATM address should be followed by a disable and enable of PNNI local-node 1, which will also update the identifiers for all higher local-nodes.

For two switches to belong to the same PNNI peer group, they need to have the same peer group identifier. Peer group identifiers must be prefixes of private ATM addresses, which means the organization that administers the peer group has assignment authority over that prefix. For more information, refer to the *ATM Switch Router Software Configuration Guide.*

In autoconfiguration mode, all switche routers have the same peer group identifier based on the first seven bytes of the autoconfigured ATM address.

The first 13-byte prefix of the active address is also used to automatically generate ATM addresses for each ATM interface that can be used for soft PVCs and PVPs to identify the destination ATM interface.

Examples

The following example shows how to assign a 20-byte ATM address to the switch.

```
Switch# configure terminal
Switch(config)# atm address 47.009181000000000000000001
```

The following example shows how to change the active ATM address for the switch and to update the PNNI local-node identifiers based on the new active ATM address prefix.

Step 1 Configure the desired new address or prefix to be added to the list of ATM addresses for the switch.

```
Switch# configure terminal
Switch(config)# atm address 47.00918100002
```

Step 2 Determine the current active ATM address by using the **show atm addresses** command. Then remove the current active ATM address, so that the desired new address will be the first in the list. If desired, the removed ATM address(es) can then be readded to appear later in the list.

```
Switch(config)# no atm address 47.009181000000000400B003081.00400B003081.00
```

Step 3 (Optional) Update all PNNI local-node identifiers by disabling and reenabling local-node 1.

```
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1 disable
Switch(config-pnni-node)# node 1 enable
```

Step 4 (Optional) Save the running configuration to be used as the startup configuration in the event of a reboot.

```
Switch# copy running-config startup-config
```

Related Commands

Command	Description
atm prefix	Configures an ILMI address prefix for an ATM interface.
auto-summary	Allows default summary addresses to be generated based on the switch router's ATM address.
show atm addresses	Displays the active ATM addresses on a switch router.

atm address-registration

To enable the switch to engage in address registration on an interface using the ILMI protocol, and to enable the optional per-interface access filters on ILMI address registration, use the **atm address-registration** interface configuration command. To disable ILMI address registration functions on an interface, use the **no** form of this command.

atm address-registration [**permit** {**all** | **matching-prefix** [**wellknown-groups** | **all-groups**]}]

no atm address-registration

Syntax Description

all	Permit all AESAs registered by attached end systems.
matching-prefix	Permit AESAs where the first 13 bytes of the address match an ILMI prefix used on the interface. These ILMI prefixes can be configured using the global **atm address** command or the per-interface **atm prefix** command. The ILMI prefixes used on the interface can be shown using the **show atm ilmi-status** command.
wellknown-groups	Permit well-known group addresses assigned by the ATM Forum and AESAs that match an ILMI prefix used on the interface. The well-known group addresses include the old LECS address (47.0079.0000.0000.0000.0000.0000.00A0.3E00.0001.00) and any address matching the ATM Forum address prefix for well-known addresses. (C5.0079.0000.0000.0000.0000.0000.00A0.3E)
all-groups	Permit all group addresses, including the well-known group addresses, and the AESAs that match an ILMI prefix used on the interface.

Defaults

ILMI address registration is enabled by default. If no optional keywords are configured, the global default access filter for ILMI address registration is used, as specified through the **atm ilmi default-access permit** global configuration command.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **atm address-registration** command does not apply to the ATM 0 interface.

The **atm address-registration** command enables a switch to participate in ILMI address registration. When the switch is on the network side of a UNI, the switch sets one or more network prefixes on the peer IME and accepts addresses registered by the peer IME. If the interface does not come up as a UNI, then ILMI address registration is not active, even if it was previously configured to be enabled.

The optional keywords allow configuration of per-interface access filters, in order to allow or deny certain ILMI registered addresses. If specified, the per-interface access filter overrides the global default access filter for ILMI address registration.

Note If the Cisco SSRP for LAN Emulation is used in this network, ILMI registration of well-known group addresses should be permitted. The SSRP allows the active LECS to register the well-known LECS address with the switch router. Either the **permit all**, **permit matching-prefix wellknown-groups**, or **permit matching-prefix all-groups** option should be configured.

In order to allow certain addresses to be registered via ILMI, while also restricting them from being advertised through PNNI, the PNNI suppressed summary address feature should be used instead of the access filters for ILMI address registration (see the **summary-address** command for additional information).

The access filters option of this command allows configuration of per-interface access filters for ILMI registration to override the global defaults of the access filters.

Examples

The following example shows how to disable ILMI address registration on ATM interface 1/0/0.

```
Switch(config)# interface atm 1/0/0
Switch(config-if)# no atm address-registration
```

The following example enables ILMI address registration on ATM interface 1/0/0 and configures the per-interface access filter for ILMI address registration to allow well-known group addresses and addresses with matching prefixes.

```
Switch(config)# interface atm 1/0/0
Switch(config-if)# atm address-registration permit matching-prefix wellknown-groups
%ATM-5-ILMIACCFILTER: New access filter setting will be applied to registration of new
addresses on ATM1/0/0.
```

Related Commands

Command	Description
atm address	Assigns a 20-byte ATM address to the switch router.
atm ilmi default-access permit	Sets the global default access filter for ILMI-registered addresses on all interfaces.
atm ilmi-enable	Enables the ILMI on a port.
atm prefix	Configures an ILMI address prefix for an ATM interface.
show atm ilmi-status	Displays the ILMI-related status information.
summary-address	Configures summary address prefixes on a PNNI node.

atm aesa gateway

To configure an AESA gateway address on an ATM switch interface that connects to a service provider maintaining a separate ATM addressing plan, use the **atm aesa gateway** interface configuration command. To restore the default (disabled), use the **no** form of this command.

atm aesa gateway *aesa-address*

no atm aesa gateway

Syntax Description

aesa-address	Specifies a forwarding 20-octet AESA that is used when a call matching the ATM address prefix is forwarded across the specified interface.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

When outgoing calls are configured to use the forwarding AESA address as the called party address (see the **atm route** command), this AESA is used as the forwarding calling party address.

When incoming calls are received on the interface that specifies the forwarding AESA as the called party address, the called and calling party addresses are removed from the signalling message and replaced by the new called and calling party subaddresses.

This new address is not registered with routing because it is used only as this switch's address for this interface. It is not used as the address of destination from this interface.

The combination of the **atm aesa gateway** command and the **atm-aesa** option of the **atm route** command provides a general mechanism for interconnection of private ATM networks across an ATM service provider. This combination allows one AESA for the interface to the ATM service provider network, with many AESA addresses present in the private network behind the interface.

Examples

The following example shows how to configure the AESA gateway address:

```
Switch(config)# interface atm 0/1/2
Switch(config-if)# atm aesa gateway 91.999999999999999999999999.111111111111.00
```

Related Commands

Command	Description
atm route	Specifies a static route to a reachable address prefix.
show atm interface	Displays ATM-specific information about an ATM interface.
show atm vc	Displays the ATM layer connection information about the virtual connection.
show interfaces	Displays the interface configuration, status, and statistics.

atm arp-server

To identify an ARP server for the IP network, or set TTL values for entries in the ATM ARP table, use the **atm arp-server** interface configuration command. To disable an ARP server process, use the **no** form of this command.

atm arp-server [**self** [**time-out** *minutes*] | **nsap** *nsap-address*]

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

Syntax Description

self	Specifies the current switch as the ATM ARP server.
minutes	Number of minutes a destination entry listed in the ATM ARP server's ARP table is kept before the server takes any action to verify or time out the entry.
nsap-address	NSAP address of an ATM ARP server.

Defaults

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

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command applies only to route processor and IP interfaces.

If an NSAP address is specified, the ARP client on this interface uses the specified host as an ARP server.

Multiple ATM ARP servers can be specified by repeating the command. The **no** option is used to remove the definition of an ATM ARP server. If **self** is specified, this interface acts as the ARP server for the logical IP network.

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

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

This implementation follows RFC 1577, "Classical IP over ATM."

Related Commands

Command	Description
show atm arp-server	Displays the ATM ARP server table.

atm auto-configuration

To enable or disable ILMI autoconfiguration, use the **atm auto-configuration** interface configuration command. To disable this feature, use the **no** form of this command.

atm auto-configuration

no atm auto-configuration

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command enables or disables ILMI autoconfiguration procedures, as specified in Section 8.3.3 of the ATM Forum ILMI 4.0 Specification.

Among the variables covered by ILMI autoconfiguration are the interface protocol and version, interface side (user or network), UNI type (public or private), and the maximum number of VPI bits and VCI bits. Configuration of the **atm auto-configuration** command on an interface overwrites any previous configuration of the **atm iisp**, **atm nni**, **atm maxvci-bits**, and **atm maxvpi-bits** commands.

When autoconfiguration is enabled, ATM signalling and ILMI are restarted automatically on the interface. When ATM signalling is restarted, all switched virtual connections across the interface are cleared; permanent virtual connections are not affected.

When the peer switch has a device type of **node** but responds to *GetRequest* messages for *atmfAtmLayerNniSigVersion* with **noSuchName**, the default NNI protocol depends on the ATM routing mode (see the **atm routing-mode** command). When the ATM routing mode is set to **static**, the default NNI protocol is IISP. Otherwise, the default NNI protocol is PNNI 1.0. These defaults are relevant when the peer switch is a LightStream 1010 ATM with software version 11.1.

Examples

The following example shows how to enable ILMI autoconfiguration on interface ATM 0/1/2.

```
Switch(config)# interface atm 0/1/2
Switch(config-if)# atm auto-configuration
Switch(config-if)#
%ATM-5-ATMSOFTSTART:Restarting ATM signalling and ILMI on ATM0/1/2
```

Related Commands

Command	Description
atm iisp	Configures ATM IISP on the specified physical or logical (VP tunnel) port.
atm ilmi-enable	Enables the ILMI on a port.
atm maxvci-bits	Configures the maximum number of active bits of VCI supported on an ATM interface.
atm maxvpi-bits	Configures the maximum number of active VPI bits supported on an ATM interface.
atm nni	Configures an ATM NNI on the specified physical or logical (VP tunnel) port.
atm routing-mode	Restricts the mode of ATM routing on an ATM switch router.
show atm ilmi-status	Dispays the ILMI-related status information.
show atm interface	Displays ATM-specific information about an ATM interface.

atm backward-max-burst-size-clp0

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

atm backward-max-burst-size-clp0 *cell-count*

no atm backward-max-burst-size-clp0

Syntax Description

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

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command. Originally **cellmax-burst**
11.2(8.0.1)	Changed named from **cellmax-burst**

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

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

Examples

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

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm backward-max-burst-size-clp0 800
```

atm backward-max-burst-size-clp1

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

atm backward-max-burst-size-clp1 *cell-count*

no atm backward-max-burst-size-clp1

Syntax Description

cell-count	Maximum number of the aggregate of low- and high-priority cells coming from the destination at the burst level.

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command. Originally **cellmax-burst**.
11.2(8.0.1)	Modified: Command changed to **atm backward-max-burst-size-clp1**

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp1** applies to the cumulative flow of CLP 0 and CLP 1 cells (high-priority and low-priority cells).

Examples

The following example sets the maximum number of the aggregate of low- and high-priority cells coming from the destination switch at the burst level to 100000.

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm backward-max-burst-size-clp1 100000
```

atm backward-peak-cell-rate-clp0

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

atm backward-peak-cell-rate-clp0 *rate*

no atm backward-peak-cell-rate-clp0

Syntax Description

rate	Maximum rate in kbps that this SVC can receive high-priority cells from the destination switch router. Maximum upper range is 7113539 (limited by 0xffffff cells per second).

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp0** indicates this command affects *only* high-priority cells with a CLP of 0.

Examples

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

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm backward-peak-cell-rate-clp0 8000
```

atm backward-peak-cell-rate-clp1

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

atm backward-peak-cell-rate-clp1 *rate*

no atm backward-peak-cell-rate-clp1

Syntax Description

rate	Maximum rate in kbps that this SVC can receive of the aggregate of low- and high-priority cells from the destination switch router. Maximum upper range is 7113539 (limited by 0xffffff cells-per-second).

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp1** applies to the cumulative flow of CLP 0 and CLP 1 cells (high-priority and low-priority cells).

Examples

The following example sets the peak rate of the aggregate of low- and high-priority cells from the destination switch router to 7000 kbps.

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm backward-peak-cell-rate-clp1 7000
```

atm backward-sustainable-cell-rate-clp0

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

atm backward-sustainable-cell-rate-clp0 *rate*

no atm backward-sustainable-cell-rate-clp0

Syntax Description

rate	Sustainable rate in kbps that this SVC can receive high-priority cells from the destination switch. Maximum upper range is 7113539 (limited by 0xffffff cells per second).

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp0** indicates this command affects only high-priority cells with a CLP of 0.

Examples

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

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm backward-sustainable-cell-rate-clp0 800
```

atm backward-sustainable-cell-rate-clp1

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

atm backward-sustainable-cell-rate-clp1 *rate*

no atm backward-sustainable-cell-rate-clp1

Syntax Description

rate	Sustainable rate in kbps that this SVC can receive of the aggregate of low- and high-priority cells from the destination. Maximum upper range is 7113539 (limited by 0xffffff cells per second).

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp1** applies to the cumulative flow of CLP 0 and CLP 1 cells (high-priority and low-priority cells).

Examples

The following example sets the sustainable rate of the aggregate of low- and high-priority cells from the destination switch to 700 kbps.

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm backward-sustainable-cell-rate-clp1 700
```

atm cac best-effort-limit

To change or set the interface limit on the number of best-effort connections, use the **atm cac best-effort-limit** interface configuration command. To restore the default, use the **no** form of this command.

atm cac best-effort-limit *conn-value*

no atm cac best-effort-limit

Syntax Description

conn-value	The number of best-effort connections allowed on the interface, in the range of 0 to 327680.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

This command places a limit on the total number of ABR and UBR connections on the interface.

This command also supports subinterface configuration.

Examples

In the following example, the number of best effort connections allowed on the interface is limited to 200.

```
Switch(config-if)# atm cac best-effort-limit 200
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cac framing overhead

To instruct CAC to consider framing overhead, use the **atm cac framing overhead** interface configuration command. To restore the default (disabled), use the **no** form of this command.

atm cac framing overhead [**force**]

no atm cac framing overhead

Syntax Description

force	Including framing overhead while calculating the maximum cell rate of an interface can reduce the maximum equivalent bandwidth that can actually be allocated for guaranteed services on this interface to a value below the currently allocated bandwidth guarantees. If this occurs, this keyword must be used for the change to take effect. This option forces the CAC to account for framing overhead on this interface.

Defaults

Framing overhead is not considered in calculating the MaxCR of an ATM interface.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

This command directs CAC to consider framing overhead in calculating the MaxCR of an ATM interface. For example, without this configuration, an OC-3 interface has a cell rate of 155,519 kbps. With the **atm cac framing overhead** command in effect, the actual cell rate (subtracting SONET framing overhead) is 149,759 kbps.

Note Once this configuration command is in effect, subsequent SVC establishment and PVC creation can be altered as compared to the default state (less bandwidth is available, and lower traffic parameter values are allowed).

Note Commands that change the framing in effect on an interface (such as those available on a DS-3 interface) can cause corresponding changes in the maximum cell rate of the interface.

Examples

The following example forces CAC to account for framing overhead on this interface.

```
Switch(config-if)# atm cac framing overhead force
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cac link-sharing

To change the resource management interface controlled link-sharing parameters, use the **atm cac link-sharing** interface configuration command. To reset the parameter values to the default, use the **no** form of this command.

atm cac link-sharing max-bandwidth {**abr** | **cbr** | **ubr** | **vbr**} {**receive** | **transmit**} *percent*
atm cac link-sharing max-guaranteed-service-bandwidth {**receive** | **transmit**} *percent*
atm cac link-sharing min-bandwidth {**abr** | **cbr** | **ubr** | **vbr**} {**receive** | **transmit**} *percent*

no atm cac link-sharing max-bandwidth {**abr** | **cbr** | **ubr** | **vbr**} {**receive** | **transmit**}
no atm cac link-sharing max-guaranteed-service-bandwidth {**receive** | **transmit**}
no atm cac link-sharing min-bandwidth {**abr** | **cbr** |**ubr** | **vbr**} {**receive** | **transmit**}

Syntax Description

abr	The available bit rate connection.
cbr	The constant bit rate connection.
ubr	The unspecified bit rate connection.
vbr	The variable bit rate connection.
receive	The configured parameter applies to the flow of traffic into the switch on the interface (or from the route processor 0 interface).
transmit	The configured parameter applies to the flow of traffic out of the switch on the interface (or to the route processor 0 interface).
percent	The percent of interface bandwidth, from 0 to 95 percent.

Defaults

No limits configured. All minimums are defined as 0 percent, maximums as 95 percent.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

On a 25-Mbps port adapter you can configure the **atm cac link-sharing** parameter only on physical ports 0 or 6. The following rules apply:

- The parameter configured on port 0 applies to ports 0 through 5.
- The parameter configured on port 6 applies to ports 6 through 11.

This command does not support subinterface configuration.

The **atm cac link sharing** command specifies the minimum and maximum bandwidth that can be allocated to guaranteed service (CBR, VBR, ABR, or UBR+) connections. (UBR+ is UBR with MCR specified.)

Maximums can be individually specified for CBR, VBR, ABR, or UBR+, and also the AGG of this bandwidth. Minimums can be individually specified for CBR, VBR, ABR, and UBR+. These parameters, for a direction, are interrelated as follows (assuming these parameters are defined):

- min(CBR) + min(VBR) + min(ABR) + min(UBR) <= 95 percent
- min(CBR) <= max(CBR) <= 95 percent
- min(VBR) <= max(VBR) <= 95 percent
- min(CBR) <= max(AGG) <= 95 percent
- min(VBR) <= max(AGG) <= 95 percent
- max(CBR) <= max(AGG) <= 95 percent
- max(VBR) <= max(AGG) <= 95 percent
- min(ABR) <= max(ABR) <= 95 percent
- min(UBR) <= max(UBR) <= 95 percent
- min(ABR) <= max(AGG) <= 95 percent
- min(UBR) <= max(AGG) <= 95 percent
- max(ABR) <= max(AGG) <= 95 percent
- max(UBR) <= max(AGG) <= 95 percent

Examples

In the following example, the maximum bandwidth that can be allocated to VBR connections in the transmit direction on the interface is limited to 61 percent of the total bandwidth.

```
Switch(config-if)# atm cac link-sharing max-bandwidth vbr transmit 61
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cac max-cdvt

To configure the maximum CDVT (per service category and direction) allowed for a connection on an interface by CAC, use the **atm cac max-cdvt** interface configuration command. To remove the configuration setting for **atm cac max-cdvt**, use the **no** form of this command.

atm cac max-cdvt {**abr** | **cbr** | **ubr** | **vbr**} {**receive** | **transmit**} *cdvtval*

no atm cac max-cdvt {**abr** | **cbr** | **ubr** | **vbr**} {**receive** | **transmit**}

Syntax Description

abr	The available bit rate connection.
cbr	The constant bit rate connection.
ubr	The unspecified bit rate connection.
vbr	The variable bit rate connection.
receive	The configured parameter applies to the flow of traffic into the switch router on the interface (or from the route processor 0 interface).
transmit	The configured parameter applies to the flow of traffic out of the switch router on the interface (or to the route processor 0 interface).
cdvtval	The CDVT value, in the range of 0 to 2147483647, expressed in cell times (2.72 microseconds at 155.2 Mbps).

Defaults

None

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

This command configures a maximum for the CDVT that is allowed at connection setup. These can be specified independently by service category and traffic direction.

This command also supports subinterface configuration.

Examples

The following example configures the maximum CDVT allowed by CAC in traffic parameters for the incoming direction of an ABR connection on the interface to 21354.

```
Switch(config-if)# atm cac max-cdvt abr receive 21354
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cac max-mbs

To change the interface maximum for incoming and outgoing MBS at connection startup, use the **atm cac max-mbs** interface configuration command. To reset the maximum value to the default, use the **no** form of this command.

atm cac max-mbs {**receive** | **transmit**} *mbsval*

no atm cac max-mbs {**receive** | **transmit**}

Syntax Description

receive	The configured parameter applies to the flow of traffic into the switch on the interface (or from the route processor 0 interface).
transmit	The configured parameter applies to the flow of traffic out of the switch on the interface (or to the route processor 0 interface).
mbsval	The MBS value, in the range of 0 to 2147483647, expressed as the number of cells.

Defaults

None

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

This command configures a maximum for the MBS that is allowed at connection setup. These can be specified independently by traffic direction.

This command also supports subinterface configuration.

Examples

The following example configures the MBS allowed by CAC in traffic parameters for the outgoing direction of an VBR connection on the interface to 2345 cells.

```
Switch(config-if)# atm cac max-mbs transmit 2345
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cac max-min-cell-rate

To configure the maximum MCR for ABR and UBR service category traffic flowing into and out of the switch router, use the **atm cac max-min-cell-rate** interface configuration command. To remove these values, use the **no** form of this command.

atm cac max-min-cell-rate {**abr** | **ubr**} {**receive** | **transmit**} *rate*

no atm cac max-min-cell-rate {**abr** | **ubr**} {**receive** | **transmit**}

Syntax Description

abr	The available bit rate connection.
ubr	The unspecified bit rate connection.
receive	The configured parameter applies to the flow of traffic into the switch router on the interface (or from the route processor 0 interface).
transmit	The configured parameter applies to the flow of traffic out of the switch router on the interface (or to the route processor 0 interface).
rate	A positive integer, measured in kbps, in the range of 0 to 910533065.

Defaults

None

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

This command configures a maximum for the MCR that is allowed at connection setup. These can be specified independently by service category and traffic direction.

This command also supports subinterface configuration.

Examples

The following example configures the maximum MCR allowed by CAC in traffic parameters for the outgoing direction of an ABR connection on the interface to 1340 kbps.

```
Switch(config-if)# atm cac max-min-cell-rate ubr transmit 1340
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cac max-peak-cell-rate

To configure the maximum PCR for specific service categories and traffic directions, use the **atm cac max-peak-cell-rate** interface configuration command. To restore the default value, use the **no** form of this command.

atm cac max-peak-cell-rate {**abr** | **cbr** | **ubr** | **vbr**} {**receive** | **transmit**} *rate*

no atm cac max-peak-cell-rate {**abr** | **cbr** | **ubr** | **vbr**} {**receive** | **transmit**}

Syntax Description

abr	The available bit rate connection.
cbr	The constant bit rate connection.
ubr	The unspecified bit rate connection.
vbr	The variable bit rate connection.
receive	The configured parameter applies to the flow of traffic into the switch router on the interface (or from the route processor 0 interface).
transmit	The configured parameter applies to the flow of traffic out of the switch router on the interface (or to the route processor 0 interface).
rate	A positive integer, measured in kbps, in the range of 0 to 910533065.

Defaults

None

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

This command configures the maximum PCR that is allowed at connection setup. These can be specified independently by service category and traffic direction.

For UBR connections, cell rate is not checked in CAC. By specifying a **peak-cell-rate** limit, CAC rejects connections that exceed the limit.

This command also supports subinterface configuration.

Examples

The following example configures the maximum PCR allowed by CAC in traffic parameters for the incoming direction of an ABR connection on the interface to 3001 kbps.

```
Switch(config-if)# atm cac max-peak-cell-rate abr receive 3001
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cac max-sustained-cell-rate

To configure the maximum SCR for traffic flow in either direction, use the **atm cac max-sustained-cell-rate** interface configuration command. To restore the default value, use the **no** form of this command.

atm cac max-sustained-cell-rate {**receive** | **transmit**} *rate*

no atm cac max-sustained-cell-rate {**receive** | **transmit**}

Syntax Description

receive	The configured parameter applies to the flow of traffic into the switch router on the interface (or from the route processor 0 interface).
transmit	The configured parameter applies to the flow of traffic out of the switch router on the interface (or to the route processor 0 interface).
rate	A positive integer, measured in kbps, in the range of 0 to 910533065.

Defaults

None

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

This command specifies a maximum for the SCR that is allowed at connection setup. These can be specified independently by traffic direction.

This command also supports subinterface configuration.

Examples

The following example configures the maximum SCR allowed by CAC in traffic parameters for the outgoing direction of a VBR connection on the interface to 2201 kbps.

```
Switch(config-if)# atm cac max-sustained-cell-rate transmit 2201
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cac overbooking

To configure overbooking on an ATM or IMA interface, use the **atm cac overbooking** interface configuration command. To restore the default, use the **no** form of this command.

atm cac overbooking *percent*

no atm cac overbooking

Syntax Description

percent	The overbooking percentage of the MaxCR of the interface being configured, from 100 to 10000. 100 percent = disabled.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

This command determines whether overbooking is enabled on an ATM or IMA interface, and specifies the extent of overbooking if enabled. Overbooking causes CAC to expand its concept of the amount of bandwidth available on an interface (receive and transmit) by the percentage specified. This applies to the aggregate bandwidth available on the interface; individual traffic parameters are still limited by the maximum cell rate of the interface in a given direction. Also, the normal limit of 95 percent of MaxCR for guaranteed cell rates (or the appropriate controlled link sharing percentages) applies to the overbooked MaxCR of the interface. The overbooking is expressed as a percentage of the MaxCR of the interface being configured.

An interface must be shut down before any change in the overbooking configuration can be made. (See "Example.") If the overbooking change results in a maximum guaranteed services bandwidth that is below the currently allocated bandwidth guarantees on this interface, then the configuration will be rejected.

Overbooking cannot be configured on regular VP tunnel interfaces and is configurable only on shaped and hierarchical VP tunnel interfaces.

Enabling overbooking is recommended only for advanced users. Enabling overbooking forfeits the protection for guaranteed cell rates provided by the CAC algorithm and hardware.

Examples

In the following example, ATM overbooking is configured for 159 percent of the MaxCR of the interface.

```
Switch(config-if)# shutdown
Switch(config-if)# atm cac overbooking 159
Switch(config-if)# no shutdown
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cac service-category

To permit or deny a service category on an ATM physical interface, shaped VP tunnel subinterface, or hierarchical VP tunnel subinterface, use the **atm cac service-category** command. To restore the default configuration of the interface with respect to the service category, use the **no** form of this command.

atm cac service-category {**abr** | **cbr** | **ubr** | **vbr-nrt** | **vbr-rt**} {**deny** | **permit**}

no atm cac service-category {**abr** | **cbr** | **ubr** | **vbr-nrt** | **vbr-rt**}

Syntax Description

abr	The available bit rate connection.
cbr	The constant bit rate connection.
ubr	The unspecified bit rate connection.
vbr-nrt	The variable bit rate in non-real time.
vbr-rt	The variable bit rate in real time.
deny	The specified service category on the interface is denied.
permit	The specified service category on the interface is permitted.

Defaults

For physical interfaces and hierarchical VP tunnel subinterfaces, all service categories are enabled by default. For shaped VP tunnel subinterfaces, only CBR service category is enabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally part of **atm cac**.
12.0(4a)W5(11a)	Modified: Broken out into separate command.

Usage Guidelines

This command specifies which service categories to permit or deny on the interface. Changes from the defaults must be done on a separate line for each service category. On a shaped VP tunnel interface, only one service category is permitted at one time.

To deny a service category in a shaped VP tunnel subinterface, you must delete all user VCs of the service category on the interface.

VBR-RT is used for connections where there is a fixed timing relationship between samples. VBR-NRT is used for connections where there is no fixed timing relationship between samples, but where there is still a need for guaranteed QoS.

This command also supports subinterface configuration.

Examples

In the following example, the CBR service category is prohibited on ATM subinterface 0/0/1.51 before service category UBR is allowed.

```
Switch(config)# interface atm 0/0/1.51
Switch(config-subif)# atm cac service-category cbr deny
Switch(config-subif)# atm cac service-category ubr permit
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.
show running-config	Displays the configuration information currently running on the terminal.

atm cdvt-default

To change the default CDVT to request for UPC of cells received on the interface for connections that do not individually request a CDVT value, use the **atm cdvt-default** interface configuration command. To reset the default CDVT for a particular service category to the default value, use the **no** form of this command.

atm cdvt-default {**cbr** | **vbr-rt** | **vbr-nrt** | **abr** | **ubr**} *number*

no atm cdvt-default {**cbr** | **vbr-rt** | **vbr-nrt** | **abr** | **ubr**}

Syntax Description

cbr	The constant bit rate connection.
vbr-rt	The variable bit rate in real time.
vbr-nrt	The variable bit rate in non-real time.
abr	The available bit rate connection.
ubr	The unspecified bit rate connection.
number	A positive integer, in the range 0 to 2147483647. The CDVT is expressed in cell-times (2.72 microseconds at 155.2 Mbps).

Defaults

1024

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

CDVT is a limit parameter used in the GCRA policing algorithm to monitor PCR. CDVT can be specified for PVCs through a connection traffic table row. If no CDVT is specified in the row, then a per-interface, per-service category default CDVT is applied for purposes of UPC on the connection.

For signalled connections, CDVT cannot be signalled. Use defaults specified on the interface.

Examples

The following example shows changing the default CDVT for received cells on VBR-RT connections.

```
Switch(config-if)# atm cdvt-default vbr-rt 4000
```

Related Commands

Command	Description
atm connection-traffic-table-row	Used to create a table entry.

Command	Description
show atm vc	Displays the ATM layer connection information about the virtual connection.
show atm vp	Displays the ATM layer connection information about the virtual path.

atm connection-traffic-table-row

To create a table entry, use the **atm connection-traffic-table-row** global configuration command. To delete an entry, use the **no** form of this command.

atm connection-traffic-table-row [**index** *row-index*] **cbr pcr** *rate* [**cdvt** *cdvt*]
atm connection-traffic-table-row [**index** *row-index*] {**vbr-rt** | **vbr-nrt**} **pcr** *rate* {**scr0** | **scr10**}*scrval* [**mbs** *mbsval*] [**cdvt** *cdvtval*]

atm connection-traffic-table-row [**index** *row-index*] **abr pcr** *rate* [**cdvt** *cdvtval*] [**mcr** *mcrval*]
atm connection-traffic-table-row [**index** *row-index*] **ubr pcr** *rate* [**cdvt** *cdvtval*] [**mcr** *mcrval*]

no atm connection-traffic-table-row index *row-index* **abr pcr** *rate* [**cdvt** *cdvtval*] [**mcr** *mcrval*]
atm connection-traffic-table-row [**index** *row-index*] **ubr pcr** *rate* [**cdvt** *cdvtval*] [**mcr** *mcrval*]

Syntax Description

cdvt *cdvtval*	The value of the cell delay variation tolerance, in the range of 0 to 2147483647, expressed in cell-times (2.72 microseconds at 155.2 Mbps).
mbs *mbsval*	The value of the maximum burst size, in the range of 0 to 2147483647, expressed in the number of cells.
mcr *mcrval*	The minimum cell rate is a positive integer, measured in kbps, in the range of 0 to 910533065.
pcr *rate*	The peak cell rate is a positive integer, measured in kbps, in the range of 0 to 910533065.
row-index	An integer in the range of 1 to 1073741823.
scr0	Sustained cell rate for the CLP 0 flow.
scr10	Sustained cell rate for the CLP 0+1 flow.
scrval	The sustained cell rate is a positive integer, measured in kbps per second, in the range of 0 to 910533065.

Defaults

Rows 1 through 6 in the table are predefined.

Command Modes

Global configuration

Command History

Release	Modifications
11.1(4)	New command

Usage Guidelines

This command sets up the traffic characteristics used in PVC definition. The characteristics are stored as rows of a table. The row index is referenced when a PVC is created using the **atm pvc** interface command.

When the **atm connection-traffic-table-row** command is issued without the index clause, the software uses a free row-index, which is displayed to the user if the command is successful.

When the CDVT or MBS parameter is not specified in the creation of a row, a configurable interface default value is chosen to use in UPC. For systems that are capable of dual leaky bucket UPC (Catalyst 8540 MSR with feature card, and Catalyst 8510 MSR and LightStream 1010 with FC-PFQ), PCR/CDVT is monitored for service categories other than VBR, and for VBR PCR/CDVT and SCR/MBS. For LightStream 1010 with FC-PCQ, a single leaky bucket provides monitoring for PCR/CDVT for service categories other than VBR, and for VBR SCR/MBS.

Six connection traffic table rows are defined by default and are numbered 1 through 6. Row 1 is the default row used by the **atm pvc** command if no rows are explicitly specified. Rows 2 through 6 might be used for well-known **vcs** on a **vp** tunnel subinterface, depending on the service category of the underlying **vp**. Default rows cannot be deleted.

Row 1 PCR represents the maximum cell-rate (the maximum cell-rate that fits in 24 bits) that you can signal.

When an ABR row is configured, if MCR is not specified, MCR is configured as 0 in the CTT row.

When a VBR CTT row is configured using the **scr0** keyword, the switch processor feature card equipped with a dual leaky bucket polices only the CLP-0 flow of cells to the *scrval*. When the **scr10** keyword is used, the CLP-0+1 flow is policed.

Examples

In the following example, a **CBR** CTT row is defined with an index of 200 and a peak cell rate of 7743 kbps.

```
Switch(config)# atm connection-traffic-table-row index 200 cbr pcr 7743
```

Related Commands

Command	Description
atm pvc	Used to create a PVC.
atm pvp	Used to create a PVP.
show atm connection-traffic-table	Displays a table of connection traffic parameters used by network and connection management.

atm e164 address

To configure the native E.164 address of an ATM interface, use the **atm e164 address** interface configuration command. To disable the ATM E.164 address, use the **no** form of this command.

atm e164 address *e164-address*

no atm e164 address

Syntax Description

e164-address	Specifies a native E.164 address, consisting of 7 to 15 decimal digits. Refer to the ITU-T Recommendation E.164 for more information on the syntax and semantics of native E.164 addresses.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use this command to configure a native E.164 address that is used to connect to public networks.

When outgoing calls are configured to use forwarding E.164 addresses as the called party address (see the **atm route** command), this E.164 address is used as the forwarding calling party address.

When incoming calls are received on the interface that specifies the E.164 address as the called party address, the received called and calling party addresses are removed from the signalling message and replaced by the new received called and calling party subaddresses.

This new address is not registered with routing since it is only used as this switch's address for this interface. It is not used as the address of destinations from this interface.

Note that this address is not used in conjunction with the E.164 translation table feature. The E.164 translation table should only be used when you want a one-to-one correspondence between the NSAP-format ATM end-system address and the native E.164 address, for example, when the public network does not support transport of subaddresses. The combination of the **atm e164 address** command and the **e164 address** option of the **atm route** command provides a general mechanism for interconnection of private networks across a public network. This combination allows one native E.164 address for the interface to the public network, with many NSAP-format ATM end-system addresses present in the private network behind the interface.

Examples

The following example shows setting the native E.164 address of ATM 0/0/1 to 1341457.

```
Switch(config)# interface atm 0/0/1
Switch(config-if)# atm e164 address 1341457
```

Related Commands

Command	Description
atm e164 address	Configure the native E.164 address of an ATM interface.
atm route	Specifies a static route to a reachable address prefix.
show atm addresses	Displays the active ATM addresses on a switchn router.
show atm interface	Displays ATM-specific information about an ATM interface.
show atm vc	Displays the ATM layer connection information about the virtual connection.

atm e164 auto-conversion

To enable autoconversion of E.164 addresses, use the **atm e164 auto-conversion** interface configuration command. To disable E.164 autoconversion, use the **no** form of this command.

atm e164 auto-conversion

no atm e164 auto-conversion

Syntax Description

This command has no keywords or arguments.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

When an interface is configured for E.164 autoconversion, ATM E.164-format addresses are converted to the corresponding native E.164 address for outgoing calls. For incoming calls, native E.164 addresses are converted to the corresponding ATM E.164 format.

Examples

The following example shows how to enable E.164 autoconversion on ATM interface 0/0/1.

```
Switch(config)# interface atm 0/0/1
Switch(config-if)# atm e164 auto-conversion
```

Related Commands

Command	Description
show atm vc	Displays the ATM layer connection information about the virtual connection.

atm e164 translation

To configure an interface to use the ATM E.164 translation table, use the **atm e164 translation** interface configuration command. To disable the ATM E.164 translation, use the **no** form of this command.

atm e164 translation

no atm e164 translation

Syntax Description

This command has no keywords or arguments.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

The ATM E.164 translation table is used when a one-to-one translation between NSAP-format ATM end-system addresses and native E.164 addresses is desired. This method for support of native E.164 addresses might be useful when the ATM interface connects to a public network that does not support transport of subaddresses.

Note that the more general mechanism for interconnection to E.164 public networks involves use of the **atm e164 address** command and the **e164-address** option of the **atm route** command. This other mechanism allows one native E.164 address for the interface to the public network, with many NSAP-format ATM end-system addresses present in the private network behind the interface.

When a signalling message attempts to establish a call from an interface configured for ATM E.164 translation, the called and calling party addresses are initially in NSAP format. Using the ATM E.164 translation table, an attempt is made to find the E.164 addresses corresponding to the NSAP addresses. These E.164 addresses are placed into the called and calling party addresses, and the original NSAP addresses are placed into the called and calling party subaddresses.

When a signalling message is received on an interface configured for ATM E.164 translation, the called and calling party addresses are in E.164 format. If the original NSAP-formatted called and calling addresses have been carried in subaddresses, then those addresses are used to forward the call. If subaddresses are not present, due to the network blocking the subaddresses, or the switch at the entry to the E.164 network does not provide subaddresses, an attempt is made to find a match for the E.164 addresses in the ATM E.164 translation table. If there is a match, the NSAP addresses corresponding to the E.164 addresses are placed into the called and calling party addresses. The call is then forwarded using the NSAP addresses.

Examples

The following example shows setting interface ATM 0/0/1 to use the E.164 translation table.

```
Switch(config)# interface atm0/0/1
Switch(config-if)# atm e164 translation
```

Related Commands

Command	Description
atm e164 auto-conversion	Enables autoconversion of E.164 addresses.
atm e164 translation-table	Enables ATM E.164 translation configuration mode.
atm route	Specifies a static route to a reachable address prefix.
e164 address	Configures an entry in the ATM E.164 translation table.
show atm interface	Displays ATM-specific information about an ATM interface.

atm e164 translation-table

To start ATM E.164 translation configuration mode, use the **atm e164 translation-table** global configuration command. To disable the ATM E.164 translation table, use the **no** form of this command.

atm e164 translation-table

no atm e164 translation-table

Note The **atm e164 translation-table** global configuration command changes the configuration mode to ATM E.164 translation table configuration, and the following new prompt appears: `Switch(config-atm-e164)#`

Syntax Description

This command has no keywords or arguments.

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use this command to start ATM E.164 translation configuration mode.

The ATM E.164 translation table is used by all interfaces configured with the ATM E.164 translation functionality. Each entry in the table specifies a one-to-one correspondence between a native E.164 address and an NSAP-format ATM end-system address.

Refer to the **atm e164 translation** command for more information and usage guidelines about the ATM E.164 translation feature.

Examples

The following example shows how to start the ATM E.164 translation configuration mode.

```
Switch(config)# atm e164 translation-table
Switch(config-atm-e164)# e164 address 1112222 nsap-address
11.111122223333444455556666.112233445566.11
```

Related Commands

Command	Description
atm e164 translation	Configures an interface to use the ATM E.164 translation table.
e164 address	Configures an entry in the ATM E.164 translation table.

atm esi-address

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

atm esi-address *esi.selector*

no atm esi-address *esi.selector*

Syntax Description

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

Defaults

No end station ID is defined for this interface.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command only applies to the route processor interface and subinterfaces.

The NSAP-format ATM end-system address of an interface is used by static maps (refer to the section "Configuring an SVC-Based Map List" in the *ATM Switch Router Software Configuration Guide*) and by Classical IP over ATM, as defined in RFC 1577 (refer to the section "Configure Classical IP over ATM in an SVC Environment" in the *ATM Switch Router Software Configuration Guide*).

The NSAP-format ATM end-system address of an interface can be configured using either the **atm esi-address** or the **atm nsap-address** command. Configuring a new address on the interface overwrites the previous address. The **atm esi-address** and **atm nsap-address** commands are mutually exclusive. Configuring the switch with the **atm esi-address** command negates the **atm nsap-address** setting, and vice versa.

The **atm esi-address** command allows you to configure the ATM address by entering the ESI (12 hexadecimal characters) and the selector byte (2 hexadecimal characters). The ATM address prefix (26 hexadecimal characters) is provided by the ATM switch router (refer to the **atm address** and **atm prefix** commands for more information). The resulting ATM address is registered on the ATM switch router using ILMI address registration.

Examples

The following example sets the ESI to 303132333435 and the selector byte to 36 on ATM subinterface 0.1.

```
Switch(config)# interface atm 0.1
Switch(config-subif)# atm esi-address 303132333435.36
```

Related Commands

Command	Description
atm address	Assigns a 20-byte ATM address to the switch router.
atm nsap-address	Configures the NSAP-format ATM end-system address of an ATM interface.
atm prefix	Configures an ILMI address prefix for an ATM interface.

atm filter-expr

To configure an ATM address filter that matches patterns, use one of the forms of the **atm filter-expr** global configuration command. To delete the specified filter, use the **no** form of this command.

atm filter-expr *name term*
atm filter-expr *name* **not** *term*
atm filter-expr *name term* **and** *term*
atm filter-expr *name term* **or** *term*
atm filter-expr *name term* **xor** *term*

no atm filter-expr *name*

Syntax Description

name	The name of the pattern-matching filter expression.
term	Can be any of the following: • A previously defined address pattern-matching expression • A filter set applied to a calling-party address—**source** *filter-set name* • A filter set applied to a called-party address—**destination** *filter-set name*

Defaults

Permit

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The first form (**atm filter-expr** *name term*) defines a simple filter expression that is pattern-matched only if the pattern given by *term* is matched.

The second form (**atm filter-expr** *name* **not** *term*) defines a filter expression that is pattern-matched only if the pattern given by *term* is not matched.

The third form (**atm filter-expr** *name term* **and** *term*) defines a filter expression that is pattern-matched if *either* of the patterns given by the two *terms* are matched.

The fourth form (**atm filter-expr** *name term* **or** *term*) defines a filter expression that is pattern-matched only if *both* of the patterns given by the two *terms* are matched.

The fifth form (**atm filter-expr** *name term* **xor** *term*) defines a filter expression that is pattern-matched only if *one* of the patterns, but *not* both, given by the two *terms* is matched.

For commands with two *term*s—that is, commands using logical operators **or**, **and**, and **xor**—the evaluation sequence is from left to right of the expression. Further, for commands using logical operators **or** and **and**, the evaluation for the second *term* is conducted only when necessary, that is, the evaluation for the second *term* is omitted if the truth or falsehood can already be concluded from the evaluation for the first *term*.

Examples

The following is sample output from the **atm filter-expr** command.

```
Switch(config)# atm filter-expr atm_filter_expr1 not source atm_filter_set1
Switch(config)# atm filter-expr atm_filter_expr2 source atm_filter_set1 and destination
atm_filter_set2
```

Related Commands

Command	Description
atm filter-set	Creates an ATM address filter set.

atm filter-set

To create an ATM address filter set, use the **atm filter-set** global configuration command. To delete the specified filter, use the **no** form of this command.

atm filter-set *name* [**index** [*number*]] [**permit | deny**] [*template* |**time-of-day** {**anytime |** *start-time* {*end-time*}}]

no atm filter-set *name* [**index** *number*]

Syntax Description

name	The name of the filter set.
index	Set order in which filters are set. The range is from 1 through 65535. The default is 1.
permit	Permission to accept an incoming call or forward an outgoing call on an interface/subinterface if the address pattern-matching succeeds.
deny	Denial to accept an incoming call or forward an outgoing call on an interface or subinterface if the address pattern-matching succeeds.
template	An ATM address, address template, or ATM address template alias.
time-of-day	Specify the time range in which the filter set takes place. This parameter can be specified as *anytime* or as a specific time. The default is *anytime*.
start-time	Specify the time the filter set starts, in 24-hour format, *hh:mm:ss*.
end-time	Specify the time the filter set ends, in 24-hour format, *hh:mm:ss*.

Defaults

Permit

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

If neither **permit** nor **deny** is specified, **permit** is assumed. If an address does not match any of the filter set entries, an implicit “deny” is returned as the permit/deny action of the filter set.

Filters are set in the same order they were configured. You can change the order (except in a complete NSAP address that has no wildcards) by specifying the optional parameter index.

After you create a filter for a specific interface, associate the filter to that interface by using the **atm access-group** command.

Examples

The following is an example of the **atm filter-set** command.

```
Switch(config)# atm filter-set filter_set1 permit
47.0091.8100.0000.0003.bbe4.aa01.4000.0c80.0000.64
Switch(config)# atm filter-set filter_set3 deny 47.840F...
Switch(config)# no atm filter-set filter_set3
```

Related Commands

Command	Description
atm access-group	Used to subscribe an interface or subinterface to an existing ATM address pattern-matching filter expression.

atm forward-max-burst-size-clp0

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

atm forward-max-burst-size-clp0 *cell-count*

no atm forward-max-burst-size-clp0

Syntax Description

cell-count	The burst size in cells, from 1 to 16777215. This is the maximum number of high-priority cells going from the source switch at the burst level.

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp0** indicates this command affects only high-priority cells with a CLP of 0.

Examples

The following example sets the maximum number of high-priority cells going from the source switch at the burst level to 100000.

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm forward-max-burst-size-clp0 100000
```

atm forward-max-burst-size-clp1

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

atm forward-max-burst-size-clp1 *cell-count*

no atm forward-max-burst-size-clp1

Syntax Description

cell-count	The burst size in cells, from 1 to 16777215. This is the maximum number of the aggregate of low- and high-priority cells going from the source switch at the burst level.

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp1** applies to the cumulative flow of CLP 0 and CLP 1 cells (high-priority and low-priority cells).

Examples

The following example sets the maximum number of the aggregate of low- and high-priority cells going from the source switch at the burst level to 100000.

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm forward-max-burst-size-clp1 100000
```

atm forward-peak-cell-rate-clp0

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

atm forward-peak-cell-rate-clp0 *rate*

no atm forward-peak-cell-rate-clp0

Syntax Description

rate	Maximum rate in kbps that this SVC can send high-priority cells from the source switch router. The maximum upper range is 7113539 (limited by 0xffffff cells per second).

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp0** indicates this command affects *only* high-priority cells with a CLP of 0.

Examples

The following example sets the peak of the high-priority cell rate from the source switch to 1000 kbps.

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm forward-peak-cell-rate-clp0 1000
```

atm forward-peak-cell-rate-clp1

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

atm forward-peak-cell-rate-clp1 *rate*

no atm forward-peak-cell-rate-clp1

Syntax Description

rate	Maximum rate in kbps that this SVC can send the aggregate of low- and high-priority cells from the source. The maximum upper range is 7113539 (limited by 0xffffff cells per second).

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp1** applies to the cumulative flow of CLP 0 and CLP 1 cells (high-priority and low-priority cells).

Examples

The following example sets the peak of the aggregate of low- and high-priority cell rate from the source switch to 100000 kbps.

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm forward-peak-cell-rate-clp1 100000
```

atm forward-sustainable-cell-rate-clp0

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

atm forward-sustainable-cell-rate-clp0 *rate*

no atm forward-sustainable-cell-rate-clp0

Syntax Description

rate	Sustainable rate in kbps that this SVC can send high-priority cells from the source. The maximum upper range is 7113539 (limited by 0xffffff cells per second).

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp0** indicates this command affects *only* high-priority cells with a CLP of 0.

Examples

The following example sets the sustainable rate of high-priority cells from the source switch to 100000 kbps.

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm forward-sustainable-cell-rate-clp0 100000
```

atm forward-sustainable-cell-rate-clp1

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

atm forward-sustainable-cell-rate-clp1 *rate*

no atm forward-sustainable-cell-rate-clp1

Syntax Description

rate	Sustainable rate in kbps that this SVC can send of the aggregate low- and high-priority cells from the source. The maximum upper range is 7113539 (limited by 0xffffff cells per second).

Defaults

The parameter is not specified in the SVC setup request.

Command Modes

Map-class configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command defines a traffic parameter for the SVC connection.

The keyword **clp1** applies to the cumulative flow of CLP 0 and CLP 1 cells (high-priority and low-priority cells).

Examples

The following example sets the sustainable rate of high-priority cells from the source switch to 100000 kbps.

```
Switch(config)# map-class atm high-rate
Switch(config-map-class)# atm forward-sustainable-cell-rate-clp1 100000
```

atm idle-timeout

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

atm idle-timeout *seconds*

no atm idle-timeout

Syntax Description

seconds	Number of seconds the SVC can be inactive before disconnecting.

Defaults

300 seconds

Command Modes

Interface configuration.

Note This command applies only to the route processor interface (ATM 0).

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

To disable idle timeouts, set the value of *seconds* to 0.

Examples

The following example shows setting the timeout to 250.

```
switch(config)# atm idle-timeout 250
```

Related Commands

None

atm iisp

To configure ATM IISP on the specified physical or logical (VP tunnel) port, use the **atm iisp** interface configuration command.

atm iisp [**side** *side* [**version** *ver*]] | [**version** *ver* [**side** *side*]]

Syntax Description

side	Interface side, specified as **user** or **network**. The default is **network**.
version	IISP version, specified as **3.0**, **3.1**, or **4.0**. The default is **3.0**.

Defaults

See "Syntax Description."

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Note Before using this command, ILMI autoconfiguration must be disabled. (Refer to the **atm auto-configuration** command).

When this command is configured and it causes a change in the interface protocol, version, or side, ATM signalling and ILMI are restarted automatically on the interface. When ATM signalling is restarted, all switch virtual connections across the interface are cleared; permanent virtual connections are not affected. Refer to the *ATM Switch Router Software Configuration Guide* for more information about this command.

The **atm auto-configuration**, **atm iisp**, and **atm nni** commands are mutually exclusive. Configuring the **atm iisp** command overwrites any previous configuration of the **atm nni** or **atm uni** commands for this interface. Future configuration of the **atm auto-configuration**, **atm nni**, or **atm uni** command on this interface overwrites the **atm iisp** command.

For calls to be routed from this interface, one or more static routes must be configured. Refer to the **atm route** command.

Examples

The following example configures ATM interface 3/1/2 as an IISP interface, running version 3.0 as the user side.

```
Switch(config)# interface atm 3/1/2
Switch(config-if)# no atm auto-configuration
Switch(config-if)#
%ATM-6-ILMINOAUTOCFG: ILMI(ATM3/1/2): Auto-configuration is disabled, current interface
parameters will be used at next interface restart.
Switch(config-if)# atm iisp side user version 3.0
Switch(config-if)#
%ATM-5-ATMSOFTSTART: Restarting ATM signalling and ILMI on ATM3/1/2.
Switch(config-if)# atm maxvci-bits 12
Switch(config-if)#
%ATM-5-ATMSOFTSTART:# Restarting ATM signalling and ILMI on ATM3/1/2.
Switch(config-if)# end
```

The following example configures subinterface ATM 3/1/3.100 as an IISP interface, and uses the defaults for this command.

```
Switch(config)# interface atm 3/1/3.100
Switch(config-subif)# no atm auto-configuration
Switch(config-subif)#
%ATM-6-ILMINOAUTOCFG: ILMI(ATM3/1/3.100): Auto-configuration is disabled, current
interface parameters will be used at next interface restart.
Switch(config-subif)# atm iisp
Switch(config-subif)#
%ATM-5-ATMSOFTSTART: Restarting ATM signalling and ILMI on ATM3/1/3.100.
```

Related Commands

Command	Description
atm auto-configuration	Used to enable or disable ILMI autoconfiguration.
atm nni	Configures an ATM NNI on the specified physical or logical (VP tunnel) port.
atm route	Specifies a static route to a reachable address prefix.
show atm interface	Displays ATM-specific information about an ATM interface.
show atm route	Displays all local or network-wide reachable address prefixes in the switch router's ATM routing table.

atm ilmi default-access permit

To set the global default access filter for ILMI-registered addresses on all interfaces, use the **atm ilmi default-access permit** global configuration command. To disable the global default access filter, use the **no** form of this command.

atm ilmi default-access permit {**all** | **matching-prefix** [**wellknown-groups** | **all-groups**]}

no atm ilmi default-access permit

Syntax Description

all	Permit all AESAs registered by attached end systems.
matching-prefix	Permit AESAs where the first 13 bytes of the address match an ILMI prefix used on the interface. These ILMI prefixes can be configured using the global **atm address** command or the per-interface **atm prefix** command. The ILMI prefixes used on the interfaces can be shown using the **show atm ilmi-status** command.
wellknown-groups	Permit well-known group addresses assigned by the ATM Forum and AESAs that match an ILMI prefix used on the interface. The well-known group addresses include the old LECS address (47.0079.0000.0000.0000.0000.0000.00A0.3E00.0001.00) and any address matching the ATM Forum address prefix for well known addresses. (C5.0079.0000.0000.0000.0000.0000.00A0.3E)
all-groups	Permit all group addresses, including the well-known group addresses, and AESAs that match an ILMI prefix used on the interface.

Defaults

permit all

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command
11.3(3a)	Added: **permit**

Usage Guidelines

This command allows specification of a global default access filter for ILMI address registration. The access filter feature allows you to permit or deny certain ILMI registered addresses. The global default access filter takes effect when address registration is enabled on an interface, but no per-interface access filter is specified. For additional information, refer to the **atm address-registration** command.

Note If the Cisco SSRP for LAN Emulation is used in this network, ILMI registration of well-known group addresses should be permitted. This allows the active LECS to register the well-known LECS address with the switch. Either the **permit all**, **permit matching-prefix wellknown groups**, or **permit matching-prefix all-groups** option should be configured.

The global default-access filter for ILMI registration can be overridden by a per-interface access filter. (See the **atm address-registration** command.)

You should allow certain addresses to be registered through ILMI; however, to restrict them from being advertised through PNNI, the PNNI suppressed summary address feature should be used instead of the access filters for ILMI address registration. (See the **summary-address** command.)

Examples

The following example shows how to permit all ILMI-registered addresses.

```
Switch(config)# atm ilmi default-access permit all
Switch(config)#
%ATM-5-ILMIDEFACCFILTER: New global default access filter setting will be applied to
registration of new addresses on interfaces using global default access filter.
```

Related Commands

Command	Description
atm address	Assigns a 20-byte ATM address to the switch router.
atm address-registration	Enables the switch router to engage in address registration on an interface using the ILMI protocol.
atm prefix	Configures an ILMI address prefix for an ATM interface.
summary-address	Configures summary address prefixes on a PNNI node.

atm ilmi-enable

To enable the ILMI on a port, use the **atm ilmi-enable** interface configuration command. To disable the ILMI on a port, use the **no** form of this command.

atm ilmi-enable

no atm ilmi-enable

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command does not apply to the ATM 0 interface.

ILMI is enabled by default; however, if the peer does not support ILMI, you should turn off ILMI using this command.

Several components of ILMI can be disabled independently without completely disabling ILMI. Refer to the **atm address-registration**, **atm auto-configuration**, and **atm ilmi-keepalive** commands for more information.

Examples

The following example shows how to disable ILMI on interface ATM 1/0/0.

```
Switch(config)# interface atm 1/0/0
Switch(config-if)# no atm ilmi-enable
```

Related Commands

Command	Description
atm address-registration	Enables the switch to engage in address registration on an interface using the ILMI protocol.
atm auto-configuration	Used to enable or disable ILMI autoconfiguration.
atm ilmi-keepalive	Used to enable or disable ILMI connectivity procedures and to change the ILMI keepalive poll interval.
show atm ilmi-status	Displays the ILMI-related status information.

atm ilmi-keepalive

To enable or disable ILMI connectivity procedures and to change the ILMI keepalive poll interval, use the **atm ilmi-keepalive** interface configuration command. To disable ILMI connectivity procedures, use the **no** form of this command.

atm ilmi-keepalive [*seconds* [**retry** *number*]]

no atm ilmi-keepalive

Syntax Description

seconds	Period in seconds, from 1 to 65,535, when the IME is polled. The default is 5 seconds.
number	Number of retries from 2 to 5. The default is 5 retries.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command does not apply to the ATM 0 interface.

This command enables ILMI connectivity procedures, as described in Section 8.3.1 of the ATM Forum ILMI 4.0 Specification.

Examples

The following example enables ILMI keepalives on ATM interface 1/0/0, with a poll interval set to 4 seconds and the number of retries to 3.

```
Switch(config)# interface atm 1/0/0
Switch(config-if)# atm ilmi-keepalive 4 retry 3
```

Related Commands

Command	Description
atm ilmi-enable	Enables the ILMI on a port.
show atm ilmi-status	Displays the ILMI-related status information.

atm lecs-address

To configure the LECS address advertised by the switch to the end system, use the **atm lecs-address** interface configuration command.

atm lecs-address *lecsaddress* [*sequence#*]

Syntax Description

lecsaddress	Address of the LAN Emulation configuration server.
sequence#	Sequence number of the LECS.

Defaults

If the LECS address is not configured on an interface, the LECS address that was configured using the **atm lecs-address-default** global configuration command is used by default.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The LECS address is provided by the switch to directly connect LANE clients over the ILMI. LECS addresses can be configured on both interface and global levels. The globally configured address is sent to a port only if there is no LECS address configured on that port. The sequence number provides the position of this address in the ordered LECS address table.

Related Commands

Command	Description
atm lecs-address-default	Configures the LECS address advertised by the switch to the end system.
show atm ilmi-configuration	Displays the switch configuration.

atm lecs-address-default

To configure the LECS address advertised by the switch to the end system, use the **atm lecs-address-default** global configuration command.

atm lecs-address-default *lecsaddress* [*sequence #*]

Syntax Description

lecsaddress	Address of the LECS.
sequence #	Sequence number of the LECS.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The LECS address is provided by the switch to directly connected LANE clients over the ILMI. LECS addresses can be configured on both interface and global levels. The globally configured address is sent to a port only if there is no LECS address configured on that port. The sequence number provides the position of this address in the ordered LECS address table.

Related Commands

Command	Description
atm lecs-address	Used to configure the LECS address advertised by the switch to the end system.
show atm ilmi-configuration	Used to display the switch configuration.

atm link-distance

To alter the propagation delay component of the cell-transfer delay offered by an interface, use the **atm link-distance** command. To reset the propagation delay to the default value, use the **no** form of this command.

atm link-distance *p-value*

no atm link-distance

Syntax Description

p-value	Specified in units of kilometers, which is then divided by the speed of light in kbps to derive a propagation delay in microseconds (0 to 65535).

Defaults

0

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The cell-transfer delay is used for the resource connection admission control of a CBR or VBR-RT connection.

This resource management command is supported for interface and subinterface configurations, and when interface metrics are provided to PNNI routing.

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.

atm manual-well-known-vc

To create and delete well-known (reserved) PVCs with non-default connection identifiers, or other nondefault parameters, use the **atm manual-well-known-vc** interface configuration command. To reenable the automatic default well-known VC mode, use the **no** form of this command.

atm manual-well-known-vc [**delete** | **keep**]

no atm manual-well-known-vc

Syntax Description

delete	When specified, the existing automatically created VCs are deleted. If well-known VCs exist, you are prompted to confirm that the VC can be automatically deleted. If you reply with **no**, the command stops abruptly.
keep	When specified, the existing automatically created well-known VCs remain in place and appear in the running configuration.

Defaults

The **keep** option becomes the default on existing automatically created VCs when manual mode is entered.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command does not apply to the route processor interface (ATM 0).

All interfaces default to the **no** form of this command during initial startup. When this command is in effect, well-known VCs are not automatically created at startup. When this mode is enabled on an interface, the allowed range for VCI values is 5 through 16383, instead of 32 through 16383.

The three additional reserved channel encapsulation types added for the CPU PVCs are QSAAL, PNNI, and ILMI. These specify that the interface is a signalling, PNNI, or ILMI reserved channel.

You must enter the **copy running-config** command using the **startup-config** option to disable the automatic creation of default well-known VCs at system startup.

Although the OAM channels for tunnels are well-known channels (VCI 3 and VCI 4), they are not affected by the **atm manual-well-known-vc** status.

Note You should not change the well-known channels to use a VC where the remote end is sending AAL5 messages not intended for this well-known VC. This means you should not swap VC values between two types of well-known VCs.

When using the **no** form of this command, if there are existing non-default reserved channel VCs for this interface, you are prompted to confirm that the VC can be automatically deleted. (If you enter **no**, the command stops abruptly.) Well-known VCs with default configurations are then automatically created for the interface. The default well-known PVCs are no longer shown as part of the running configuration.

Examples

The following example puts an interface into the manual-well-known-vc mode, deletes the existing default signalling PVC, and then creates a signalling PVC using a VCI value of 7.

```
Switch(config-if)# atm manual-well-known-vc keep
Switch(config-if)# no atm pvc 0 5
Switch(config-if)# atm pvc 0 7 interface atm 0 0 any-vci encap qsaal
```

Related Commands

Command	Description
atm pvc	Used to create a PVC.
copy running-config startup-config	Copies the switch's running configuration file to another destination, and further specifies the configuration used for initialization as the destination of the copy operation.

atm maxvc-number

To configure the maximum number of ATM VCs supported on the ATM interface, use the **atm maxvc-number** interface configuration command. To restore the default value, use the **no** form of this command.

atm maxvc-number *max-vc-num*

no atm maxvc-number

Syntax Description

max-vc-num	Maximum number of supported virtual channels. Configures the maximum number of virtual channels supports (0 to 32768).

Defaults

32768 virtual channels

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Before using this command, the interface must be administratively shut down.

Examples

The following example sets the maximum number of ATM virtual channels supported on interface ATM 0/0/0 to 8000.

```
Switch(config)# interface atm 0/0/0
Switch(config-if)# shutdown
Switch(config-if)# atm maxvc-number 8000
```

Related Commands

Command	Description
atm maxvci-bits	Configures the maximum number of active bits of VCI supported on an ATM interface.
atm pvc	Used to create a PVC
show atm interface	Displays ATM-specific information about an ATM interface.
shutdown (interface)	Cisco IOS command removed from this manual.

atm maxvci-bits

To configure the maximum number of active bits of VCI supported on an ATM interface, use the **atm maxvci-bits** interface configuration command. To restore the default value, use the **no** form of this command.

atm maxvci-bits *max-vci-bits*

no atm maxvci-bits

Syntax Description

max-vci-bits	Maximum number of active bits supported on an ATM interface. Configures the maximum number of VCI bits (0 to 14).

Defaults

14 bits

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Before using the **atm maxvci-bits** command, disable the **atm auto-configuration** command. Refer to "Examples" below.

When the **atm auto-configuration** command is configured, it causes a change in the maximum number of active VCI bits, and ATM signalling and ILMI are restarted automatically on the interface. When ATM signalling is restarted, all switched virtual connections across the interface are cleared; permanent virtual connections are not affected.

Examples

The following example sets the maximum number of active VCI bits to 10 for interface ATM 0/0/0.

```
Switch(config)# interface atm 0/0/0
Switch(config-if)# no atm auto-configuration
Switch(config-if)#
%ATM-6-ILMINOAUTOCFG: ILMI(ATM0/0/0): Auto-configuration is disabled, current interface
parameters will be used at next interface restart.
Switch(config-if)# atm maxvci-bits 10
Switch(config-if)#
%ATM-5-ATMSOFTSTART: Restarting ATM signalling and ILMI on ATM0/0/0.
```

Related Commands

Command	Description
atm auto-configuration	Used to enable or disable ILMI autoconfiguration.
atm connection-traffic-table-row	Creates a table entry.

Command	Description
atm maxvc-number	Configures the maximum number of ATM VCs supported on the ATM interface.
atm pvc	Used to create a PVC.
show atm interface	Displays ATM-specific information about an ATM interface.

atm maxvp-number

To configure the maximum number of ATM VPs supported on an ATM interface, use the **atm maxvp-number** interface configuration command. To restore the default value, use the **no** form of this command.

atm maxvp-number *max-vp-number*

no atm maxvp-number

Syntax Description

max-vp-number	Configures the maximum number of virtual paths supported: • For the Catalyst 8540 MSR: 0 to 4095 • For the Catalyst 8510 MSR and LightStream 1010: 0 to 255

Defaults

For the Catalyst 8540 MSR: 4095 virtual paths

For the Catalyst 8510 MSR and LightStream 1010: 255 virtual paths

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Examples

The following example sets the maximum number of ATM virtual paths supported on interface ATM 0/0/1 to 128.

```
Switch(config)# interface atm 0/0/1
Switch(config-if)# atm maxvp-number 128
```

Related Commands

Command	Description
atm maxvpi-bits	Configures the maximum number of active VPI bits supported on an ATM interface.
atm pvp	Used to create a PVP.
show atm interface	Displays ATM-specific information about an ATM interface.
shutdown (interface)	Cisco IOS command removed from this manual.

atm maxvpi-bits

To configure the maximum number of active VPI bits supported on an ATM interface, use the **atm maxvpi-bits** interface configuration command. To restore the default value, use the **no** form of this command.

atm maxvpi-bits *max-vpi-bits*

no atm maxvpi-bits

Syntax Description

max-vpi-bits	Configures the maximum number of active VPI bits supported on an ATM interface: • For the Catalyst 8540 MSR: 0 to 12. • For the Catalyst 8510 MSR and LightStream 1010: 0 to 8.

Defaults

8 bits

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Note Before using this command, ILMI autoconfiguration must be disabled. See the **atm auto-configuration** command.

When this command is configured and it causes a change in the maximum number of active VPI bits, ATM signalling and ILMI automatically restart on the interface. When ATM signalling is restarted, all switched virtual connections across the interface are cleared; permanent virtual connections are not affected.

Note Only 6 interfaces per switch module can have the VPI bits set to more than 8 bits. If an interface with more than 8 bits of VPI is removed (for example, a port adapter is hot-swapped), you can set the VPI bits to more than 8 bits on another interface on the same switch module. If, however, you reinstall the original interface (which had more than 8 bits of VPI), it reconfigures back to 8 bits. If this occurs, the VCs with the VPI set to 255 or higher are sent into a NO HW RESOURCES state. To configure this interface back to a VPI of greater than 8, another interface on the same MSC module must be configured to less than 8 bits. To restore the VC from the NO HW RESOURCES state, toggle the interface using the **shut** or **no shut** command. (Catalyst 8540 MSR)

Examples

The following example sets the maximum number of active VPI bits to 6 for interface ATM 0/0/0.

```
Switch(config)# interface atm 0/0/0
Switch(config-if)# no atm auto-configuration
Switch(config-if)#
%ATM-6-ILMINOAUTOCFG: ILMI(ATM0/0/0): Auto-configuration is disabled, current interface
parameters will be used at next interface restart.
Switch(config-if)# atm maxvpi-bits 6
Switch(config-if)#
%ATM-5-ATMSOFTSTART: Restarting ATM signalling and ILMI on ATM0/0/0.
```

Related Commands

Command	Description
atm auto-configuration	Used to enable or disable ILMI autoconfiguration.
atm connection-traffic-table-row	Creates a table entry.
atm maxvp-number	Configures the maximum number of ATM VPs supported on an ATM interface.
atm pvp	Used to create a PVP.
show atm interface	Displays ATM-specific information about an ATM interface.
show switch fabric (Catalyst 8540 MSR)	Shows the details of the switch fabric for an ATM switch router.

atm mbs-default

To change the default MBS to request for UPC of cells received on the interface for connections that do not individually request an MBS value, use the **atm mbs-default** interface configuration command. To reset the default MBS for a particular service category to the default value, use the **no** form of this command.

atm mbs-default {**vbr-rt** | **vbr-nrt**} *number*

no atm mbs-default {**vbr-rt** | **vbr-nrt**}

Syntax Description

number	A positive integer, in the range of 0 to 2147483647. The MBS is expressed in cells.

Defaults

1024

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

MBS is used to determine the burst tolerance limit parameter used in the GCRA policing algorithm to police SCR.

MBS can be specified for PVCs through a connection traffic table row. If no MBS is specified in the row, then a per-interface, per-service category default MBS is applied for purposes of UPC on the connection. This command allows for changes to the MBS default.

Examples

The following example shows changing the default MBS for received cells on VBR-RT connections.

```
Switch(config-if)# atm mbs-default vbr-rt 4000
```

Related Commands

Command	Description
atm connection-traffic-table-row	Creates a table entry.
show atm vc	Displays the ATM layer connection information about the virtual connection.
show atm vp	Displays the ATM layer connection information about the virtual path.

atm nni

To configure an ATM NNI on the specified physical or logical (VP tunnel) port, use the **atm nni** interface configuration command.

atm nni

Syntax Description

This command has no keywords or arguments.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Note Before using this command, ILMI autoconfiguration must be disabled. See the **atm auto-configuration** command.

When this command is configured and it causes a change in the interface protocol, ATM signalling and ILMI are restarted automatically on the interface. When ATM signalling is restarted, all switched virtual connections across the interface are cleared; permanent virtual connections are not affected.

The PNNI routing and signalling protocol is run over all NNI interfaces, except those interfaces on which signalling was previously disabled (see the **atm signalling enable** command). To configure an IISP interface, use the **atm iisp** command.

The **atm auto-configuration**, **atm iisp**, and **atm nni** commands are mutually exclusive. Configuring the **atm nni** command overwrites any previous configuration of the **atm iisp** command for this interface. Future configuration of the **atm auto-configuration**, and **atm iisp** command on this interface overwrites the **atm nni** command.

Examples

The following example shows configuring an ATM NNI on logical port card 3, subcard 1, and port 3, VPI 99.

```
Switch(config)# interface atm 3/1/3.99
Switch(config-subif)# atm nni
```

Related Commands

Command	Description
atm auto-configuration	Used to enable or disable ILMI autoconfiguration.
atm iisp	Configures ATM IISP on the specified physical or logical (VP tunnel) port.

Command	Description
atm signalling enable	Enables the signalling and SSCOP on a port.
show atm interface	Displays ATM-specific information about an ATM interface.

atm nsap-address

To configure the NSAP-format ATM end-system address of an ATM interface, use the **atm nsap-address** interface configuration command. To remove any configured NSAP-format address for the interface, use the **no** form of this command.

atm nsap-address *nsap-address*

no atm nsap-address

Syntax Description

nsap-address	A 20-octet NSAP address. Specifies the 40-digit hexadecimal NSAP address of this interface (the source address).

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command only applies to the route processor interface and subinterfaces.

The NSAP-format ATM end-system address of an interface is used by static maps (refer to the section "Configuring an SVC-Based Map List" in the *ATM Switch Router Software Configuration Guide*) and by Classical IP over ATM, as defined in RFC 1577 (see the section "Configure Classical IP over ATM in an SVC Environment" in the *ATM Switch Router Software Configuration Guide*).

The NSAP-format ATM end-system address of an interface can be configured using either the **atm esi-address** or the **atm nsap-address** command. Configuring a new address on the interface overwrites the previous address. The **atm esi-address** and **atm nsap-address** commands are mutually exclusive. Configuring the switch with the **atm esi-address** command negates the **atm nsap-address** setting, and vice versa.

NSAP-format ATM end-system addresses have a fixed length of 40 hexadecimal digits. Configure the address using the following dotted format:

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

The dots can be omitted.

Note ATM addresses configured using the **atm nsap-address** command are not automatically registered with ATM routing on the switch. In addition to configuring these addresses using the **atm nsap-address** command, the addresses must be configured as static routes on the route processor interface of the ATM switch router.

Examples

The following example shows how to configure the NSAP-format ATM end-system address for interface ATM 0.1.

```
Switch(config)# interface atm 0.1
Switch(config-subif)# atm nsap-address 47.0091.8100.0000.1111.1111.1111.1111.1111.1111.00
Switch(config-subif)# exit
Switch(config)# atm route 47.0091.8100.0000.1111.1111.1111.1111.1111.1111.00 atm0
internal
```

Related Commands

Command	Description
atm esi-address	Enters the end station ID (ESI) and selector byte fields of the ATM NSAP address.
atm nsap-address	Configures the NSAP-format ATM end-system address of an ATM interface.

atm nsap (map-list)

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

protocol protocol-address atm-nsap *atm-nsap-address* [**class** *class-name*] [**broadcast**] [**aal5mux**]

no protocol protocol-address atm-nsap *atm-nsap-address* [**class** *class-name*] [**broadcast**] [**aal5mux**]

Syntax Description

protocol	Specified as the keyword **ip**.
protocol-address	Destination address that is being mapped to this SVC.
atm-nsap-address	Destination ATM NSAP address. Must be exactly 40 hexadecimal digits long and in the correct dotted format.
class-name	Name of a table that contains encapsulation-specific parameters. Such a table can be shared between maps that have the same encapsulation.
broadcast	Indicates this map entry is to be used when the corresponding protocol sends broadcast packets to the interface.
aal5mux	Uses **aal5mux** encapsulation. The default is **nsap**.

Defaults

No map statements are defined.

Command Modes

Map-list configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

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

Examples

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

```
Switch(config)# map-list atm 1/0/0
Switch(config-map-list)# map-list atmsvc
ip 172.21.97.17 atm-nsap AB.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12 class qos
```

Related Commands

Command	Description
map-list	Defines an ATM map statement for either a PVC or SVC.

atm oam (global)

To configure the OAM, AIS, RDI, and loopback operations and to set the maximum number of OAM connections, use the **atm oam** global configuration command. To disable these operations, use the **no** form of this command.

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atm oam [**ais**] [**end-loopback**] [**max-limit** *number*] [**rdi**] [**seg-loopback**]

no atm oam [**ais**] [**end-loopback**] [**max-limit** *number*] [**rdi**] [**seg-loopback**]

Catalyst 8510 MSR and LightStream 1010

atm oam [**ais**] [**end-loopback**] [**intercept end-to-end**] [**max-limit** *number*] [**rdi**] [**seg-loopback**]

no atm oam [**ais**] [**end-loopback**] [**intercept end-to-end**] [**max-limit** *number*] [**rdi**] [**seg-loopback**]

Syntax Description

ais	AIS operation.
end-loopback	End-to-end OAM loopback.
intercept end-to-end	End-to-end OAM flow intercept. (Catalyst 8510 MSR and LightStream 1010)
max-limit	Maximum number of OAMs supported.
number	Number of maximum OAM-configured connections allowed per switch. The range is 1 to 3200.
rdi	RDI operation.
seg-loopback	Segment loopback.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command. Originally **atm oam (global)**

Usage Guidelines

To set the maximum number of OAM connections that can be configured per switch, use the **atm oam max-limit** global configuration command.

Examples

The following example globally enables AIS, RDI, and segment loopback operators for all interfaces.

```
Switch(config)# atm oam seg-loopback ais rdi
```

Related Commands

Command	Description
atm oam (interface)	Configures the OAM, AIS, RDI, and loopback modules at the interface level.

atm oam (interface)

To configure the OAM, AIS, RDI, and loopback modules at the interface level, use the **atm oam** interface configuration command. To disable these modules, use the **no** form of this command.

atm oam [**interface atm** *card/subcard/port*[**.***vpt#*]] [*vpi* [*vci*]] [**ais**] [**end-loopback**] [**loopback-timer**] [**max-limit**] [**rdi**] [**seg-loopback**] [**intercept end-to-end**]

no atm oam [**interface atm** *card/subcard/port*[**.***vpt#*]] [*vpi* [*vci*]] [**ais**] [**end-loopback**] [**loopback-timer**] [**max-limit**] [**rdi**] [**seg-loopback**] [**intercept end-to-end**]

Syntax Description

card/subcard/port	Specifies the card, subcard, and port number for the ATM interface.
.*vpt#*	Specifies the virtual path tunnel number for the ATM interface.
vpi	Specifies the virtual path identifier.
vci	Specifies the virtual channel identifier.
ais	AIS operation.
end-loopback	End-to-end OAM loopback.
loopback-timer	OAM loopback transmit timer.
max-limit	Maximum number of OAMs supported.
rdi	RDI operation.
seg-loopback	Segment loopback.
intercept end-to-end	Intercept OAM cells and forward to the ATM switch processor.

Defaults

Default for the **loopback-timer** interval is 5 seconds.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally **atm oam (interface)**

Usage Guidelines

To enable or disable OAM operations on a VP connection, only specify the *vpi* value. To enable or disable VC connections, you must specify both *vpi* and *vci* values.

In interface and subinterface command modes, *vpt* configuration is supported.

Note For the Catalyst 8510 MSR and the LightStream 1010, use the **atm oam loopback-timer** command only with the **seg-loopback** and **end-loopback** keywords.

Examples

The following example enables end-to-end OAM loopback on VPI 50 VCI 100 on ATM 3/0/0.

```
Switch(config)# interface atm 3/0/0
Switch(config-if)# atm oam 50 100 end-loopback
```

The following example enables or disables the OAM, AIS, RDI, and loopback operation to a specified connection.

```
Switch(config-if)# no atm oam 12 100
Switch(config-if)# atm oam 19 rdi
Switch(config-if)# atm oam 100 200 ais rdi
Switch(config-if)# atm oam 34 89 seg-loopback end-to
```

The following example shows changing the loopback timer interval to 10 seconds.

```
Switch(config-if)# atm oam 50 100
Switch(config-if)# atm loopback-timer 10
```

Related Commands

Command	Description
atm oam (global)	Configures the OAM, AIS, RDI, and loopback operations and sets the maximum number of OAM connections.

atm output-queue (Catalyst 8510 MSR and LightStream 1010)

To change the maximum queue size of the output queue, use the **atm output-queue** interface configuration command. To reset the maximum queue size to the default value, use the **no** form of this command.

atm output-queue [**force**] {**cbr** | **vbr-rt** | **vbr-nrt** | **abr-ubr**} **max-size** *number*

no atm output-queue [**force**] {**cbr** | **vbr-rt** | **vbr-nrt** | **abr-ubr**} **max-size**

Syntax Description

force	Forces the change to be made regardless of lost data on the interface queue.
cbr	Specifies the constant bit rate service category parameter.
vbr-rt	Specifies the variable bit rate real-time parameter.
vbr-nrt	Specifies the variable bit rate when the parameter is not real-time.
abr-ubr	Specifies the available to unspecifed bit rate parameters.
max-size	Maximum output queue size per service category.
number	Queue size in cells, from 256 to 65280. For installation in hardware, the number provided is rounded up to the next value available in the hardware. The configured and installed values are both displayed using the **show atm interface** command.

Defaults

Varies by physical interface type, queue, and either **abr-ubr** or **vbr-nrt** queues, and by the OSF value.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally **atm output-queue**
12.0(4a)W5(11a)	Added: (**Catalyst 8510 MSR and LightStream 1010**)

Usage Guidelines

The **force** argument indicates that the change should be made even if it results in losing data on the interface queue (the queue must be momentarily disabled to change the threshold). This command without the **force** argument only changes the threshold if the interface is down. An error message is displayed and the command does not take effect if the interface is up and the **force** argument has not been specified.

Note This command is not supported on systems equipped with the FC-PCQ.

This command does not support subinterface configuration and does not apply to the route processor interface (ATM 0).

On a 25-Mbps port adapter, you can configure the parameters only on physical ports 0 or 6. The following rules apply:

- The parameters configured on port 0 apply to ports 0 through 5.
- The parameters configured on port 6 apply to ports 6 through 11.

Examples

In the following example, the maximum size of the **vbr-nrt** output queue is set to a minimum of 512 cells. This can be set even if the interface is up.

```
Switch(config-if)# atm output-queue force vbr-nrt max-size 512
```

Related Commands

Command	Description
atm pacing	Enables or changes the artificial limitation on interface output rate.
show atm interface	Displays ATM-specific information about an ATM interface.
show atm interface resource	Displays resource management interface configuration status and statistics.

atm output-threshold (Catalyst 8510 MSR and LightStream 1010)

To change the output queue thresholds, use the **atm output-threshold** interface configuration command. To reset the threshold to the default value, use the **no** form of this command.

atm output-threshold {**cbr** | **vbr-rt** | **vbr-nrt** | **abr** | **ubr**} **discard** *disc-thresh-num*
atm output-threshold {**cbr** | **vbr-rt** | **vbr-nrt** | **abr** | **ubr**} **efci** *efci-thresh-num*
atm output-threshold abr relative-rate *abr-thresh-num*

no atm output-threshold discard *disc-thresh-num*
no atm output-threshold efci *efci-thresh-num*
no atm output-threshold abr relative-rate *abr-thresh-num*

Syntax Description

cbr	Specifies the constant bit rate parameter.
vbr-rt	Specifies the variable bit rate real-time parameter.
vbr-nrt	Specifies the variable bit rate when the parameter is not real-time.
abr	Specifies the available bit rate parameter.
ubr	Specifies the unspecified bit rate parameter.
discard	When a cell arrives at a congested output queue (as indicated by discard-threshold), it is eligible for CLP discard (or EPD if EPD is enabled on the connection).
disc-thresh-num	A number (12, 25, 37, 50, 62, 75, 87, or 100) that indicates the percentage of queue-full. Using 100 disables the threshold.
efci	When cells arrive on connections to a congested (as indicated by **efci** threshold) output queue on the interface, the **efci** bit in the cell header is set.
efci-thresh-num	A number (12, 25, 50, or 100) that indicates the percentage of queue-full. Using 100 disables the threshold.
relative-rate	When a backward RM cell is received on an ABR connection on the interface (from outside the switch), its congestion bit is set if the ABR-UBR interface output queue is congested (as indicated by *abr-thresh-num*).
abr-thresh-num	A number (12, 25, 37, 50, 62, 75, 87, or 100) that indicates the percentage of queue-full. Using 100 disables the threshold.

Defaults

For all service categories, **discard** is 87 percent and **efci** is 25 percent.
The **abr relative-rate** is 25 percent.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally **atm output-threshold**
12.0(4a)W5(11a)	Added: (**Catalyst 8510 MSR and LightStream 1010**)

Usage Guidelines

This command does not support subinterface configuration. This command does not apply to the route processor interface (ATM 0).

Note This command is not supported on systems equipped with FC-PCQ.

You can configure the **abr relative-rate** parameter only on physical ports 0 or 6 on a 25-Mbps port adapter. The following rules apply:

- The parameter configured on port 0 applies to ports 0 to 5.
- The parameter configured on port 6 applies to ports 6 to 11.

Examples

In the following example, the discard threshold of the VBR-NRT queue is set to 87 percent of the maximum queue size.

```
Switch(config-if)# atm output-threshold vbr-nrt discard 87
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.

atm over-subscription-factor (Catalyst 8510 MSR and LightStream 1010)

To set the over-subscription factor, use the **atm over-subscription-factor** global configuration command. To restore the default value to the over-subscription factor, use the **no** form of this command.

atm over-subscription-factor *number*

no atm over-subscription-factor

Syntax Description

number	A positive integer from 1 to 32, representing the over-subscription factor.

Defaults

8

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command. Originally **atm over-subscription-factor**
12.0(4a)W5(11a)	Added: (**Catalyst 8510 MSR and LightStream 1010**)

Usage Guidelines

The over-subscription factor number is a positive integer from 1 through 32. Use this command to determine the initial port queue size. The over-subscription factor is used to size the VBR-NRT and ABR/UBR queues.

The resizing of queues can be overridden using the **atm output-queue (Catalyst 8510 MSR and LightStream 1010)** command. Changes to the **atm over-subscription-factor** command only take place during startup.

The sizing of VBR-NRT and ABR UBR queues is determined by the following equations.

```
size (vbr-nrt) = .25 * ((osf * 2048) - DefaultSize (cbr) - DefaultSize (vbr-rt))
size (abr-ubr) = .75 * ((osf * 2048) - DefaultSize (cbr) - DefaultSize (vbr-rt))
```

The default size of the CBR and VBR queues varies by interface type, as defined in Table 2-2.

Table 2-2 Default Maximum Queue Size by Interface Type

Interface Type	Default Max Size CBR Queue	Default Max Size VBR-RT Queue
SONET	256	256
DS3/E3	256	512

Note This command is not supported on systems equipped with FC-PFQ.

Examples

In the following example, the over-subscription factor of the switch is set to 15. To effect this change and resize the UBR and VBR-RT queues, the configuration must be written to NVRAM and the switch must be restarted.

```
Switch(config)# atm over-subscription-factor 15
```

Related Commands

Command	Description
atm output-queue (Catalyst 8510 MSR and LightStream 1010)	Used to change the maximum queue size of the output queue.
show atm resource	Displays global resource manager configuration and status.

atm pacing

To enable or change the artificial limitation on interface output rate, use the **atm pacing** interface configuration command. To disable output pacing, use the **no** form of this command.

atm pacing *r-value* [**force**]

no atm pacing

Syntax Description

r-value	Bit rate expressed in kbps.
force	Forces a change to be made regardless of the results. See "Usage Guidelines."

Defaults

No pacing

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command is only available on systems equipped with the switch processor feature card or on LightStream 1010 not equipped with FC-FCQ.

Note For the Catalyst 8540, this command applies only to port adapters in the carrier module.

This command is not supported for subinterface configuration and does not apply to the route processor interface (ATM 0). You cannot configure this parameter on OC-12 and 25-Mbps ports.

On systems equipped with the switch processor feature card, the pacing value installed cannot be less than the guaranteed bandwidth allocated on the interface, regardless of the value of the **force** argument. The **force** argument indicates that the change should be made even if it results in an output cell-rate that does not provide sufficient bandwidth for guaranteed service on the transmit flow of the interface. An error message is displayed and the command does not take effect if the change impacts guaranteed bandwidth, and the **force** argument is not present.

Note The granularity of the pacing rate provided by the hardware varies with the size of the bit rate requested. The value entered by the user is rounded up to the closest value available for installation in the hardware. Both the configured and installed values are displayed with the **show ima interface** command.

Examples

In the following example, the transmit cell rate of the interface is limited to the closest value possible in hardware, greater than 30,000 kbps. If the amount of bandwidth allocated to CBR and VBR connections in the transmit direction on the interface is greater than 30,000 kbps, the command fails.

```
Switch(config)# interface atm 3/0/0
Switch(config-if)# atm pacing 30000
```

Related Commands

Command	Description
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

atm pnni admin-weight

To specify the administrative weight of the ATM PNNI interface, use the **atm pnni admin-weight** interface configuration command. To return to the default values, use the **no** form of this command.

atm pnni admin-weight *number traffic-class*

no atm pnni admin-weight *traffic-class*

Syntax Description

number	The administrative weight value assigned to the interface (1 to 1000000). Refer to the **administrative-weight** command for default values.
traffic-class	The service-category keywords for traffic class are **cbr**, **vbr-rt**, **vbr-nrt**, **abr**, **ubr**, or **all**.

Defaults

Determined by the mode set by the **administrative-weight** command.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

This command does not apply to the ATM 0 interface and applies only to the NNI interface.

Use this command to manually set the administrative weight of an interface. Changing the administrative weight of an interface to a larger value might cause calls to be routed away from the interface.

Related Commands

Command	Description
administrative-weight	Configures the mode of default administrative weight assignment for PNNI interfaces.
show atm pnni interface	Displays specific information about an interface and lists the interfaces running on a PNNI node.

atm pnni aggregation-token

To specify the aggregation token for a PNNI interface, use the **atm pnni aggregation-token** PNNI interface configuration command.

atm pnni aggregation-token *value*

Syntax Description

value	The aggregation token on this interface, in the range of 0 to 4294967295.

Defaults

0

Command Modes

PNNI interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Aggregation tokens are used to determine the grouping of links that are summarized to higher levels of the PNNI hierarchy. All lower-level links with the same aggregation token between a pair of peer groups will be treated as a single aggregated link at the parent node level.

In the default case, all parallel links between two peer groups are aggregated with aggregation token 0.

Examples

The following example shows how to set the aggregation token on ATM interface 1/0/0.

```
Switch(config)# interface atm 1/0/0
Switch(config-if)# atm pnni aggregation-token 100
```

Related Commands

Command	Description
aggregation-mode	Specifies the mode that is used to calculate the combined metrics from multiple lower-level PNNI links into individual aggregated links to be advertised by this node.
show atm pnni aggregation link	Displays the aggregated PNNI links on the switch.
show atm pnni aggregation node	Displays the PNNI nodal aggregation tables for a complex node.

atm pnni explicit-path

To enter PNNI explicit path configuration mode to create or modify PNNI explicit paths, use the **atm pnni explicit-path** command from global configuration mode. Use the **no** form of this command to delete the explicit path and all associated explicit path segments.

atm pnni explicit-path {**identifier** *path-id-number* [**name** *path-name*] | **name** *path-name*} [**enable** | **disable**]

no atm pnni explicit-path {**identifier** *path-id-number* [**name** *path-name*] | **name** *path-name*}

Syntax Description

identifier *path-id-number*	Path ID number of the explicit path.
name *path-name*	Path name of the path for the explicit path. If you specify the **identifier** first, you can assign or modify its path name.
enable	Enables the explicit path to be used for routing any soft connections that reference it.
disable	Prevents the explicit path from being used for routing any soft connections that reference it.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Use this command to manually configure either a fully-specified or a partially-constrained path for routing a standard soft VC or soft VP connection or a Frame Relay soft VC.

Creating Explicit Path Entries

Once you are in PNNI explicit path configuration mode, there are several commands that you can use to create and edit an ordered list of path entries. Refer to the following commands for more information on creating the individual path entries:

- **exclude-node**
- **next-node**
- **segment-target**

Editing and Deleting Explicit Path Entries

Each explicit path has entries with indexes that give it a relative position within the list. Use these indexes to edit an explicit path. After each entry is added, the entire current list is displayed.

Use the following keywords to edit, add an entry to, or delete an entry from an explicit path:

- Use the **index** keyword to specify the index of the entry to be edited. If no index is specified for a new entry, it always defaults to one higher than the last path entry. If the index specified matches the index of an existing entry, the index is overwritten with new information.
- Use the **append-after** keyword to insert a path entry after the specified index. The path entries that follow are renumbered to make room for the new entry.
- Use the **no** form of the command to delete an existing index or entry for a specific explicit path.
- Use the **list** keyword to display the entire current list.

Use the following syntax to edit, add an entry to, or delete an entry from any explicit path:

atm pnni explicit-path {**identifier** *path-id-number* [**name** *path-name*] | **name** *path-name*}

[**no**] [**index** ***index-number*** | **append-after** ***index-number***] **list**

Examples

The following example shows how to enter PNNI explicit path configuration mode from global configuration mode, for a path named *boston_2.path1*.

```
Switch(config)# atm pnni explicit-path name boston_2.path1
Switch(cfg-pnni-expl-path)#
```

Once in PNNI explicit path configuration mode, the following example shows how to configure the explicit path boston_2.path1 with four entries and then exit explicit path configuration mode:

- The first entry configures the dallas_2 node.
- The second entry configures the dallas_4 node, which is adjacent to dallas_2. For the dallas_4 node, an exit port is specified.
- The third entry configures a partially specified segment to the node chicago_2 (which is several hops away).
- The fourth entry configures a higher-level LGN node adjacent to chicago_2, which is specified by its 15-byte node-ID prefix.

```
Switch(cfg-pnni-expl-path)# next-node dallas_2
Switch(cfg-pnni-expl-path)# next-node dallas_4 port 80003004
Switch(cfg-pnni-expl-path)# segment-target chicago_2
Switch(cfg-pnni-expl-path)# next-node 40:72:47.009181000000106000000000
Switch(cfg-pnni-expl-path)# end
Switch#
```

The following example shows how to reenter PNNI explicit path configuration mode for a path named *new_york.path1* and list the current path.

```
Switch(config)# atm pnni explicit-path name new_york.path1
Switch(cfg-pnni-expl-path)# list
Explicit_path name new_york.path1 (id 5) from node dallas_1:
1 next-node dallas_2
2 next-node dallas_4 port 80003004
3 segment   chicago_2
4 next-node new_york
```

Examples

The following example shows how to modify the first entry to add an exit port, using the **index** keyword to specify the index of the entry to be modified.

```
Switch(cfg-pnni-expl-path)# index 1 next-node dallas_2 port 80000000
Explicit_path name new_york.path1 (id 5) from node dallas_1:
1 next-node dallas_2 port 80000000
2 next-node dallas_4 port 80003004
3 segment   chicago_2
4 next-node 40:72:47.009181000000106000000000.
```

The following example shows how to use the **append-after** keyword to add a new entry into an explicit path list.

If the explicit path has four **next-node** entries labelled as index 1 through 4, use the **append-after** keyword to add a new entry after index 2, which results in index 3. The remaining two entries are automatically renumbered to index 4 and 5 to accommodate the newly added index 3.

```
Switch(cfg-pnni-expl-path)# append 2 next-node st_louis
Explicit_path name new_york.path1 (id 5) from node dallas_1:
1 next-node dallas_2 port 80000000
2 next-node dallas_4 port 80003004
3 next-node st_louis
4 segment   chicago_2
5 next-node 40:72:47.009181000000106000000000.
```

Related Commands

Command	Description
atm soft-vc	Used to create a soft PVC on the switch.
atm soft-vp	Used to create a soft PVP on the switch.
exclude-node	Specifies a node to exclude from all segments of a partially specified ATM PNNI explicit path.
frame-relay soft-vc	Creates Frame Relay soft PVCs on the switch.
next-node	Specifies the next adjacent entry in a fully-specified ATM PNNI explicit path.
segment-target	Specifies a target entry in a partially specified PNNI explicit-path.
show atm pnni explicit-paths	Displays a summary of explicit paths that have been configured.

atm pnni link-selection

To configure a method for selecting a link out of multiple links to the same neighbor, use the **atm pnni link-selection** interface configuration command. To return to the default value, use the **no** form of this command.

atm pnni link-selection {**cbr | vbr-rt | vbr-nrt | abr | ubr | all**}{**admin-weight-minimize | blocking-minimize | transmit-speed-maximize | load-balance** | alternate}

no atm pnni link-selection {**cbr | vbr-rt | vbr-nrt | abr | ubr | all**}

Syntax Description

cbr	Constant bit rate service category.
vbr-rt	Variable bit rate real-time service category.
vbr-nrt	Variable bit rate non-real-time service category.
abr	Available bit rate service category.
ubr	Unspecified bit rate service category.
all	All service categories.
admin-weight-minimize	Transmits a call on the interface with the lowest administrative weight.
blocking-minimize	Minimizes subsequent call blocking.
transmit-speed-maximize	Transmits calls on the highest-speed parallel link.
load-balance	Balances calls across parallel links.
alternate	Selects an alternate link that is used only when all other, nonalternate, links are either down or full.

Defaults

blocking-minimize is the default link selection for **cbr, vbr-rt,** and **vbr-nrt** service categories.

load-balance is the default link selection for **abr** and **ubr** service categories.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

This command does not apply to the ATM 0 interface.

Link selection applies whenever the port specified in the DTL is zero and there are multiple interfaces to the next node.

When multiple parallel “alternate” links are considered during call setup, the load-balance link selection is applied to these parallel links. The alternate configuration on some links does not modify the link selection for non-alternate parallel links.

When multiple parallel links are configured inconsistently, the order of precedence of configured values is **admin-weight-minimize**, **blocking-minimize**, **transmit-speed-maximize**, and **load-balance**. For example, if any link is configured as **admin-weight-minimize**, that becomes the link selection criteria for the entire group.

Examples

The following example shows how to configure link selection on ATM interface 0/0/0 with a VPR-NRT service category and in transmit speed maximize mode:

```
Switch(config)# interface atm 0/0/0
Switch(config-if)# atm pnni link-selection vbr-nrt transmit-speed-maximize
```

The following example shows how to configure link selection on ATM interface 0/0/0 with a CBR service category, and then designate the link as an alternate:

```
Switch(config)# interface atm 0/0/0
Switch(config-if)# atm pnni link-selection cbr alternate
```

Related Commands

Command	Description
show atm pnni neighbor	Displays the PNNI neighboring peers for a switch.

atm pnni node

To specify which PNNI node in the switch router runs on an interface when the interface runs PNNI, use the **atm pnni node** interface configuration command. To return to the default value, use the **no** form of this command.

atm pnni node *node-index*

no atm pnni node

Syntax Description

node-index	An integer, from 1 through 255, identifying a PNNI node running on this switch. Currently only a single lowest-level node with node index 1 is supported.

Defaults

Node index 1

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

This command does not apply to the ATM 0 interface.

Currently node index 1 is the only valid value. Refer to the **node** command for more information.

By default, PNNI node 1 automatically runs on all PNNI interfaces.

This command does not turn PNNI on or off for this interface. See the **atm auto-configuration** command and the **atm nni** commands for more information on the interface type.

Examples

The following example shows how to configure a PNNI node index on ATM interface 1/0/0.

```
Switch# configure terminal
Switch(config)# interface atm 1/0/0
Switch(config-if)# atm pnni node 1
```

Related Commands

Command	Description
atm auto-configuration	Used to enable or disable ILMI autoconfiguration.
atm nni	Configures an ATM NNI on the specified physical or logical (VP tunnel) port.

Command	Description
node	Used to create, delete, enable, or disable PNNI nodes running on this switch and to specify or change the level of a node.
show atm pnni interface	Displays specific information about an interface and lists the interfaces running on a PNNI node.

atm prefix

To configure an ILMI address prefix for an ATM interface, use the **atm prefix** interface configuration command. To delete a configured ILMI address prefix, use the **no** form of this command.

atm prefix *13-byte-prefix*

no atm prefix

Syntax Description

13-byte-prefix	A 13-byte ATM address prefix, specified as 26 hexadecimal digits.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

This command is used to assign one or more address prefixes to a specific interface that is different from any prefixes based on the switch addresses (see the **atm address** command). ILMI assigns the prefix to end systems attached to this interface. These prefixes are used as network prefixes during ILMI address registration.

Whenever one or more ILMI address prefix is assigned on an interface, no network prefixes derived from the switch address are used for address registration on that interface.

Examples

The following example shows how to configure an ILMI address prefix on interface ATM 3/1/0.

```
Switch(config)# interface atm 3/1/0
Switch(config-if)# atm prefix 47123456789012345678112233
```

Related Commands

Command	Description
atm address	Assigns a 20-byte ATM address to the switch.
show atm addresses	Displays the active ATM addresses on a switch.
show atm ilmi-status	Displays the ILMI-related status information.

atm pvc

To create a PVC, use the **atm pvc** interface configuration command. To create a PVCC, use the long form of the **atm pvc** command. To create a PVCL, use the short form of the **atm pvc** command. To remove the specified PVC, use the **no** form of this command.

atm pvc *vpi-A* [*vci-A* | **any-vci**] [**cast-type** *type-A*] [**upc** *upc-A*] [**pd** *pd*] [**rx-cttr** *index*] [**tx-cttr** *index*] [**wrr-weight** *weight*] **interface atm** *card-B*/*subcard-B*/*port-B*[**.***vpt #*] *vpi-B* [*vci-B* | **any-vci**] [**cast-type** *type-B*] [**upc** *upc-B*] [**encap** *aal-encap*] [**inarp** *minutes*] [**wrr-weight** *weight*]

atm pvc *vpi vci* [**cast-type** *type*] [**upc** *upc*] [**pd** *pd*] [**rx-cttr** *index*] [**tx-cttr** *index*] [**wrr-weight** *weight*]

no atm pvc *vpi vci*

Syntax Description

any-vci	Selects any available VCI. This feature only applies to the route processor interface (ATM 0).
vpi	VPI of this PVC, from 0 to 4095 for the Catalyst 8540 MSR, or 0 to 255 for the Catalyst 8510 MSR and LightStream 1010. The VPI is a 12-bit field in the Catalyst 8540 MSR, or an 8-bit field in the Catalyst 8510 MSR and LightStream 1010 in the header of the ATM cell. The VPI value is unique only on an interface, not throughout the ATM network (it has local significance only).
vci	VCI of this PVC. The range is normally 32 to 16383, but can be expanded from 5 to 16383 in manual-well-known-vc mode. The VCI is a 16-bit field in the header of the ATM cell. The VCI value is unique only on a single interface, not throughout the ATM network (it has local significance only).
type	The type of PVC, specified as **p2p**, **p2mp-root**, or **p2mp-leaf**. The default is **p2p**.
pd	Specifies the intelligent packet discard option as **on** or **off**. The default is **off**.
vpt #	Specifies the virtual path tunnel number.
encap	AAL and encapsulation type and applies only to terminating connections. When **aal5mux** is specified, a protocol is required. Possible values are as follows: • **aal5lane**—A LANE-type virtual connection. • **aal5mux decnet**—A MUX-type virtual connection. • **aal5snap**—LLC/SNAP precedes the protocol datagram. This is the only encapsulation supported for Inverse ARP. • **ilmi**—Specifies the ILMI control VC when in manual-well-known-vc mode only. • **pnni**—Specifies the PNNI control VC when in manual-well-known-vc mode only. • **qsaal**—Specifies the signalling control VC when in manual-well-known-vc mode only.

upc	Usage parameter control, specified as **pass**, **tag**, or **drop**; the default is **pass**. The *upc* parameter can be set to **tag** or **drop** only under the following conditions: • The ATM interface is not the route processor port (ATM 0) or a logical port (VP tunnel). • The connection is not the leaf of a point-to-multipoint connection.
rx-cttr	Connection traffic table row index in the received direction. The connection traffic table row should be configured before using the **atm pvc** command. See the **atm connection-traffic-table-row** command for information on configuring the **rx-cttr** parameter. The default is 1.
tx-cttr	Connection traffic table row index in the transmitted direction. The connection traffic table row should be configured before using the **atm pvc** command. See the **atm connection-traffic-table-row** command for information on configuring the **tx-cttr** parameter. The default is 1.
card/subcard/port	Card, subcard, and port number for the ATM interface.
inarp *minutes*	Specifies how often Inverse ARP datagrams are sent on this virtual connection and applies only to terminating connections. The default value is 15 minutes.
weight	Specifies the weight assigned to the output VC for weighted round robin scheduling. This value is an integer in the range of 1 to 15. **Note** This parameter is valid only on systems equipped with the switch processor feature card. (Catalyst 8540 MSR and Catalyst 8510 MSR and LightStream 1010 with FC-PFQ)

Defaults

See "Syntax Description."

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

The commands are used to create or delete the following types of ATM connections on a switch.

- Transit point-to-point PVCC
- Transit point-to-multipoint PVCC
- Point-to-point PVCL
- Point-to-multipoint PVCL
- Point-to-point PVC connection terminated at route processor (terminating VC)
- Point-to-multipoint PVC connection terminated at route processor (terminating VC)

When setting UBR connections the **tx-cttr** and **rx-cttr** fields are not needed, but these fields are required when setting up a CBR, VBR, or ABR connection. Refer to the **atm connection-traffic-table-row** command for information on configuring in the connection traffic table specified by index.

Examples

Catalyst 8540 MSR

The following example shows how to configure a terminating PVC between interface ATM 3/1/1 and the route processor port.

```
Switch(config)# interface atm 0
Switch(config-if)# atm pvc 0 any-vci interface atm 3/1/1 0 100
```

The following example shows how to set up a UBR PVC connection between interface ATM 3/0/0 and 3/0/1 with a VPI of 0 and a VCI of 40.

```
Switch(config)# interface atm 3/0/0
Switch(config-if)# atm pvc 0 40 interface atm 3/0/1 0 40
```

The following example shows a display using the **encap** variable.

```
Switch(config-if)# atm pvc 100 200 interface atm 0 0 344 encap ?
aal5lane AAL5+LANE Encapsulation
aal5mux   AAL5+MUX Encapsulation
aal5snap AAL5+LLC/SNAP Encapsulation
```

The following example shows how to establish a PVC between a logical interface (VP tunnel) on ATM 3/1/1.99 and ATM 3/0/0.

```
Switch(config)# interface atm 3/1/1.99
Switch(config-subif)# atm pvc 99 100 interface atm 3/0/0 0 89
```

The following example shows how to use the **show atm vc** command to display all VCs on an interface. The `Encap` column is displayed only on systems equipped with the switch processor feature card.

```
Switch# show atm vc interface atm 0/0/1.51
Interface    VPI   VCI   Type    X-Interface  X-VPI X-VCI  Encap Status
ATM0/0/1.51  51    3      PVC     ATM2/0/0     0     75    SNAP   DOWN
ATM0/0/1.51  51    4      PVC     ATM2/0/0     0     76    SNAP   DOWN
ATM0/0/1.51  51    5      PVC     ATM2/0/0     0     74    QSAAL  DOWN
ATM0/0/1.51  51    16     PVC     ATM2/0/0     0     73    ILMI   DOWN
```

The following example shows how to use the **show atm vc** command to display detailed information about a specific connection on a system equipped with the switch processor feature card.

```
Switch# show atm vc interface atm 0/0/1.51 51 16
Interface: ATM0/0/1.51, Type: oc3suni
VPI = 51  VCI = 16
Status: DOWN
Time-since-last-status-change: 2w0d
Connection-type: PVC
Cast-type: point-to-point
Packet-discard-option: enabled
Usage-Parameter-Control (UPC): pass
Wrr weight: 32
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states:  Not-applicable
Cross-connect-interface: ATM2/0/0, Type: ATM Swi/Proc
Cross-connect-VPI = 0
Cross-connect-VCI = 73
Cross-connect-UPC: pass
Cross-connect OAM-configuration: disabled
Cross-connect OAM-state:  Not-applicable
Encapsulation: AAL5ILMI
Threshold Group: 6, Cells queued: 0
Rx cells: 0, Tx cells: 0
Tx Clp0:0,  Tx Clp1: 0
Rx Clp0:0,  Rx Clp1: 0
Rx Upc Violations:0, Rx cell drops:0
Rx pkts:0, Rx pkt drops:0
Rx connection-traffic-table-index: 6
Rx service-category: UBR (Unspecified Bit Rate)
Rx pcr-clp01: 424
Rx scr-clp01: none
Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx       mbs: none
Tx connection-traffic-table-index: 6
Tx service-category: UBR (Unspecified Bit Rate)
Tx pcr-clp01: 424
Tx scr-clp01: none
Tx mcr-clp01: none
Tx      cdvt: none
Tx       mbs: none
No AAL5 connection registered
```

The following example shows how to delete the previously configured ATM transit point-to-point PVC.

```
Switch(config-if)# interface atm 1/1/1
Switch(config-if)# no atm pvc 50 100
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example shows how to use the **show atm vc** command to display detailed information about a specific connection on a system equipped with the FC-PCQ.

```
Switch# show atm vc interface atm 0/1/0 1 10

Interface: ATM0/1/0, Type: oc3suni
VPI = 1  VCI = 100
Status: UP
Time-since-last-status-change: 00:00:08
Connection-type: PVC
Cast-type: point-to-point
Packet-discard-option: disabled
Usage-Parameter-Control (UPC): pass
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states:  Not-applicable
Cross-connect-interface: ATM0/1/3, Type: oc3suni
Cross-connect-VPI = 1
Cross-connect-VCI = 100
Cross-connect-UPC: pass
Cross-connect OAM-configuration: disabled
Cross-connect OAM-state:  Not-applicable
Rx cells: 0, Tx cells: 0
Rx connection-traffic-table-index: 1
Rx service-category: UBR (Unspecified Bit Rate)
Rx pcr-clp01: 7113539
Rx scr-clp01: none
Rx tolerance: 0 (from default for interface)
Tx connection-traffic-table-index: 1
Tx service-category: UBR (Unspecified Bit Rate)
Tx pcr-clp01: 7113539
Tx scr-clp01: none
Tx tolerance: none
```

Related Commands

Command	Description
atm connection-traffic-table-row	Used to create a table entry.
atm pvp	Used to create a PVP.
show atm interface	Displays ATM-specific information about an ATM interface.
show atm vc	Displays the ATM layer connection information about the virtual connection.

atm pvp

To create a PVP, use the **atm pvp** interface configuration command. To create a PVPC, use the long form of the **atm pvp** command. To create a PVPL, use the short form of the **atm pvp** command. To remove the specified PVP, use the **no** form of this command.

atm pvp *vpi-A* [**cast-type** *type-A*] [**upc** *upc-A*] [**rx-cttr** *index*] [**tx-cttr** *index*] [**wrr-weight** *weight*] **interface atm** *card-B/subcard-B/port-B vpi-B* [**cast-type** *type-B*] [**upc** *upc-B*] [**wrr-weight** *weight*]

atm pvp *vpi* [**cast-type** *type*] [**hierarchical** | **shaped**] [**upc** *upc*] [**rx-cttr** *index*] [**tx-cttr** *index*] [**wrr-weight** *weight*]

no atm pvp *vpi*

Syntax Description

vpi	• Catalyst 8540 MSR: VPI of this PVP, from 1 to 4095. The VPI is a 12-bit field in the header of the ATM cell. • Catalyst 8510 MSR and LightStream 1010: VPI of this PVP from 1 to 255. The VPI is an 8-bit field in the header of the ATM cell. The VPI value is unique only on a single interface, not throughout the ATM network. It has local significance only.
type	Specified as **p2p**, **p2mp-root**, or **p2mp-leaf**. The default is **p2p**.
upc	Usage parameter control, specified as **pass**, **tag**, or **drop**. The default is **pass**. The *upc* variable can be set to **tag** or **drop** only under the following conditions: • The ATM interface is not the route processor port (ATM 0) or a logical port (VP tunnel). • The connection is not the leaf of a point-to-multipoint connection.
hierarchical	Defines a hierarchical VP tunnel. See "Usage Guidelines" for limitations. The PVP is a VP tunnel that should use hardware shaping of the aggregate transmit flow of cells. Only CBR PVPs can be hierarchical VP tunnels. Hierarchical VP tunnels can support transit VCs of all service categories at the same time.
rx-cttr	Connection traffic table row index in the received direction. The connection traffic table row should be configured before using the **atm pvc** command. See the **atm connection-traffic-table-row** command for information on configuring the **rx-cttr** parameter. The default is 1.
shaped	The PVP is a VP tunnel that should use hardware shaping of the aggregate transmit flow of cells. Only CBR PVPs can be shaped VP tunnels.
tx-cttr	Connection traffic table row index in the transmitted direction. The connection traffic table row should be configured before using **atm pvc** command. See the **atm connection-traffic-table-row** command for information on configuring the **tx-cttr** parameter. The default is 1.
card/subcard/port	Card, subcard, and port number for the ATM interface.
weight	Specifies the weight assigned to the output VP for weighted round-robin scheduling. This value is an integer in the range of 1 to 15. This parameter is valid only on systems equipped with the switch processor feature card.

Defaults See "Syntax Description."

Command Modes Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

Catalyst 8540 MSR

When the PVP is specified as shaped or hierarchical, it must subsequently be used as a VP tunnel (via the **interface** command). Only CBR VPs can be used for shaped or hierarchical tunnels. A shaped or hierarchical PVP cannot be cross-connected.

Note Shaped and hierarchical tunnels are only supported on systems with FC-PFQ installed. The **atm pvp** command does not apply to the route processor port or logical port (VP tunnel).

The commands are used to create or delete the following types of ATM connections on a switch:

- Transit point-to-point PVPC
- Transit point-to-multipoint PVPC
- Point-to-point PVPL
- Point-to-multipoint PVPL

Hierarchical VP tunnels can only be defined on slots 0, 2, 8, and 11.

The maximum number of hierarchical VP tunnels that can be supported on the ATM switch router varies from 120 to 240, depending on the port adapter type installed.

If the ATM switch router is entirely populated with LightStream 1010 port adapters installed in carrier modules, hierarchical VP-tunnels can be defined on the following ports, for a total of 120 defined hierarchical VP-tunnels.

- 0/*subcard*/*port* (30 maximum)
- 2/*subcard*/*port* (30 maximum)
- 8/*subcard*/*port* (30 maximum)
- 11/*subcard*/*port* (30 maximum)

If the ATM switch router is entirely populated with OC-12 SuperPAMs, hierarchical VP tunnels can be defined on the following ports, for a total of 240 defined hierarchical VP-tunnels.

- 0/0/0 and 1 (30 maximum)
- 0/0/2 and 3 (30 maximum)
- 2/0/0 and 1 (30 maximum)
- 2/0/2 and 3 (30 maximum)
- 8/0/0 and 1 (30 maximum)
- 8/0/2 and 3 (30 maximum)

- 11/0/0 and 1 (30 maximum)
- 11/0/2 and 3 (30 maximum)

For a total of 240 defined hierarchical VP-tunnels.

Any physical port with one or more hierarchical VP tunnels defined cannot have any other VCs or VPs (signalled or permanent) defined on that port (except well-known VCs).

Conversely, to define a hierarchical VP tunnel on a port, all existing VCs or VPs on that port must be removed.

Tag switching must not be configured on a port that has hierarchical VP tunnels defined.

Note You must enable the hierarchical VP tunnel feature on the ATM switch router before configuring hierarchical VP tunnels on an interface. See the **atm idle-timeout** command for configuration information.

Before physically removing a port adapter from the chassis with hierarchical VP tunnels defined, all defined hierarchical VP tunnels must be deleted, unless an identical port adapter is plugged back in. If you do not do this, the hardware schedulers allocated for these hierarchical tunnels remain allocated and cannot be used by any other port.

Usage Guidelines

Catalyst 8510 MSR and LightStream 1010

When the PVP is specified as shaped or hierarchical, it must subsequently be used as a VP tunnel (via the **interface** command). Only CBR VPs can be used for shaped or hierarchical tunnels. A shaped or hierarchical PVP cannot be cross-connected.

Note Shaped and hierarchical tunnels are only supported on systems with FC-PFQ installed. The **atm pvp** command does not apply to the route processor port or logical port (VP tunnel).

The commands are used to create or delete the following types of ATM connections on a switch:

- Transit point-to-point PVPC
- Transit point-to-multipoint PVPC
- Point-to-point PVPL
- Point-to-multipoint PVPL

ATM switch routers equipped with ASP-B and feature card version FC-PFQ can have hierarchical VP tunnels defined on the following ports:

0/0/*port* and 3/0/*port* (30 maximum)

0/1/*port* and 3/1/*port* (32 maximum)

ATM switch routers equipped with ASP-C and feature card version FC-PFQ can have hierarchical VP-tunnels defined on the following ports:

- 0/*subcard*/*port* (30 maximum)
- 3/*subcard*/*port* (32 maximum)

Any physical port with one or more hierarchical VP tunnels defined cannot have any other VCs or VPs (signalled or permanent) defined on that port (except well-known VCs).

Conversely, to define a hierarchical VP tunnel on a port, all existing VCs or VPs on that port must be removed.

Tag switching must not be configured on a port that has hierarchical VP tunnels defined.

Note You must enable the hierarchical VP tunnel feature on the ATM switch router before configuring hierarchical VP tunnels on an interface. See the **atm idle-timeout** command for configuration information.

Before you physically remove a port adapter from the chassis with hierarchical VP tunnels defined, we strongly recommended that all defined hierarchical VP tunnels be deleted, unless an identical port adapter is plugged back in. If you do not do this, the hardware schedulers allocated for these hierarchical tunnels remain allocated and cannot be used by any other port.

Examples

The following example shows how to configure an ATM PVP from ATM 3/1/1 to ATM 3/1/2.

```
Switch(config)# interface atm 3/1/1
Switch(config-if)# atm pvp 99 upc drop rx-cttr 37 tx-cttr 37 interface atm 3/1/1 88 upc
tag
```

The following example shows how to use the **show atm vp** command to display details about the ATM interface 3/1/1 for VPI 99 using the switch processor feature card.

```
Switch# show atm vp interface atm 3/1/1 99
Interface: ATM3/1/1, Type: ds3suni_Quad
VPI = 99
Status: TUNNEL
Time-since-last-status-change: 03:22:05
Connection-type: PVP
Cast-type: point-to-point
Usage-Parameter-Control (UPC): pass
Wrr weight: 32
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states:  Not-applicable
Threshold Group: 5, Cells queued: 0
Rx cells: 0, Tx cells: 0
Tx Clp0:0,  Tx Clp1: 0
Rx Clp0:0,  Rx Clp1: 0
Rx Upc Violations:0, Rx cell drops:0
Rx Clp0 q full drops:0, Rx Clp1 qthresh drops:0
Rx connection-traffic-table-index: 1
Rx service-category: UBR (Unspecified Bit Rate)
Rx pcr-clp01: 7113539
Rx scr-clp01: none
Rx mcr-clp01: none
Rx tolerance: 1024 (from default for interface)
Tx connection-traffic-table-index: 1
Tx service-category: UBR (Unspecified Bit Rate)
Tx pcr-clp01: 7113539
Tx scr-clp01: none
Tx mcr-clp01: none
Tx tolerance: none
```

To create a VP tunnel on a physical interface, enter the interface configuration mode for the switch, then specify the PVP and create the tunnel. The following example shows the commands used to create a tunnel on ATM 0/0/1.

```
Switch(config)# interface atm 0/0/1
Switch(config-if)# atm pvp 51
Switch(config-if)# interface atm 0/0/1.51
```

The following example shows how to use the **show atm interface** command to display the interface information about ATM 0/0/1.51 using the switch processor feature card.

```
Switch# show atm interface atm 0/0/1.51
Interface:      ATM0/0/1.51     Port-type:      vp tunnel
IF Status:      DOWN            Admin Status:   down
Auto-config:    enabled         AutoCfgState:   waiting for response from peer
IF-Side:        Network         IF-type:        UNI
Uni-type:       Private         Uni-version:    V3.0
Max-VPI-bits:   0               Max-VCI-bits:   14
Max-VP:         0               Max-VC:         16383
ConfMaxSvpcVpi: 0               CurrMaxSvpcVpi: 0
ConfMaxSvccVpi: 0               CurrMaxSvccVpi: 0
ConfMinSvccVci: 33              CurrMinSvccVci: 33
Signalling:     Enabled
ATM Address for Soft VC: 47.0091.8100.0000.0040.0b0a.2a81.4000.0c80.0010.33
Configured virtual links:
  PVCLs SoftVCLs   SVCLs   TVCLs Total-Cfgd Inst-Conns
      4        0       0       0          4          0
```

To create a hierarchical VP tunnel on a physical interface, enter the interface configuration mode for the switch, then specify the PVP and create the tunnel. The following example shows the commands used to create a hierarchical VP tunnel on ATM 0/0/0.10.

```
Switch(config-if)# atm pvp 10 hierarchical rx-cttr 2 tx-cttr 2
Switch(config-if)# interface atm 0/0/0.10
```

Related Commands

Command	Description
atm connection-traffic-table-row	Used to create a table entry.
atm pvc	Used to create a PVC.
show atm interface	Displays ATM-specific information about an ATM interface.
show atm vp	Displays the ATM layer connection information about the virtual path.

atm qos default

To configure individual default QoS objectives assigned to SVC setup messages entering the switch through UNI interfaces, use the **atm qos default** global configuration command. To return all default objective values for a service category to the default, use the **no** form of this command.

atm qos default {**cbr** | **vbr-rt**} **max-cell-transfer-delay** {*microseconds* | **any**}

atm qos default {**cbr** | **vbr-rt**} **peak-to-peak-cell-delay-variation** {*microseconds* | **any**}

atm qos default {**cbr** | **vbr-rt** | **vbr-nrt**} **max-cell-loss-ratio** [**clp0** | **clp1plus0**] {*loss-ratio exponent* | **any**}

no atm qos default {**cbr** | **vbr-rt** | **vbr-nrt**}

Syntax Description

microseconds	Integer number, which represents time in microseconds, in the range of 0 through 16777214.
loss-ratio exponent	Positive integer in the range of 1 through 15. This represents $10^{-(\text{loss-ratio})}$.
any	Indicates that the QoS value is not considered in the setup of the connection.

Defaults

any

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command. Originally **uni3 default**
11.2(5)	Changed to present name.

Usage Guidelines

This command provides default values for individual QoS objectives used in establishing CBR or VBR SVCs. These default values are used when values are not provided in the received setup message. The QoS objectives are as follows:

- Maximum cell-transfer-delay (MaxCTD)
- Peak-to-Peak cell-delay-variation (PPCDV)
- Cell-loss-ratio for CLP = 0 traffic (CLR0)
- Cell-loss-ratio for CLP=0 and CLP=1 traffic (CLR01)

These objectives can be set differently for each of the three service categories: CBR, VBR-RT, and VBR-NRT (VBR-NRT only uses CLR0 and CLR01). All UNI SVC requests received for a particular service category use the configured values. These objectives are signalled across a continuous sequence of PNNI hops, starting at the source switch. The default values should be the same for an entire network.

When **max-cell-loss-ratio** is specified, and the **clp0** or **clp1plus0** value is not configured, the default is LP=0.

Examples

In the following example, the default CBR MaxCTD objective is set to 1000 microseconds.

```
Switch(config)# atm qos default cbr max-cell-transfer-delay 1000
```

Related Commands

Command	Description
show atm resource	Displays the ATM layer connection information about the virtual path.

atm rmon collect

To add a port to an ATM-RMON MIB port select group, use the **atm rmon collect** interface configuration command. To disable ATM-RMON collection, use the **no** form of this command.

atm rmon collect *number*

no atm rmon collect

Syntax Description

number	Specifies the port select group number, from 1 to 2147483647.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command allows references to a nonexistent port select group. You cannot reference an active port select group. However, you can access the group if RMON collection is disabled using the **no** form of the **atm rmon collect** command.

Note Collection must be disabled with the **no atm rmon enable** command before using the **no** form of this command.

Currently, this command is not allowed on logical ports (VP tunnel).

Examples

The following example shows setting the port select group number to 1000.

```
Switch(config)# atm rmon enable
Switch(config)# interface atm 1/0/0
Switch(config-if)# atm rmon collect 1000
```

Related Commands

Command	Description
atm rmon enable	Enables ATM-RMON MIB data collection.
interface	Configures an interface type and enters interface configuration mode.
show atm rmon	Shows the status of the ATM RMON MIB.

atm rmon enable

To enable ATM-RMON MIB data collection, use the **atm rmon enable** global configuration command. To stop data collection for all fully configured port select groups, use the **no** form of this command.

atm rmon enable

no atm rmon enable

Syntax Description

This command has no keywords or arguments.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Using this command causes dynamic data pools to be allocated and data collection to begin in the background. This command also propagates signalling information to the RMON agent.

When using the **no** form of this command, all control tables are preserved; however, the drop, insert, and delete counters are cleared, and all data tables are removed.

Related Commands

Command	Description
show atm rmon	Shows the status of the ATM RMON MIB.

atm rmon portselgrp

To configure statics, host, and matrix collection parameters for ATM-RMON MIB, use the **atm rmon portselgrp** global configuration command. To remove data to a configured port select group, use the **no** form of this command.

atm rmon portselgrp *number* [**descr** *string* | **host-prio** *number* | **host-scope** *number* | **matrix-prio** *number* | **matrix-scope** *number* | **maxhost** *number* | **maxmatrix** | **nostats** | **owner** *string*]

no atm rmon portselgrp *number*

Syntax Description

number	Specifies the number of the port select group, from 1 to 2147483647.
descr	Specifies the descriptive label for the ATM-RMON collection.
host-prio	Specifies the host collection resource priority from 1 to 3. Use 1 for low, 2 for normal, and 3 for high. The default is 2.
host-scope	Specifies the host collection address collection scope from 1 to 3. Use 1 for prefix, 2 for prefix and esi, and 3 for the entire address. The default is 2.
matrix-prio	Specifies the matrix collection resource priority from 1 to 3. Use 1 for low, 2 for normal, and 3 for high. The default is 2.
matrix-scope	Specifies the matrix collection address collection scope from 1 to 3. Use 1 for prefix, 2 for prefix and esi, and 3 for the entire address. The default is 2.
maxhost	Specifies the maximum desired host entries, from 0 to 4294967295. Use 0 to disable, or omit the number to indicate no configuration limit.
maxmatrix	Specifies the maximum desired matrix entries from 0 to 4294967295. Use 0 to disable, or omit the number to indicate no configuration limit.
nostats	Suppresses the collection of the atmStatsTable for this group.
owner	Specifies the owner for all the control tables used by the ATM-RMON collection (portSelGrpOwner, atmHostControlOwner, or atmMatrixControlOwner). The default is an empty string.

Defaults

See "Syntax Description."

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

To use this command, configure the ports into port select groups using the **atm rmon collect** interface configuration command.

Examples

The following example shows configuring the port select group, and sets the **maxhost** to 1000 and the **matrix-scope** to 3.

```
Switch(config-if)# atm rmon collect 3
Switch(config-if)# exit
Switch(config)# atm rmon portselgrp 3 maxhost 1000 matrix-scope 3
```

Related Commands

Command	Description
atm rmon collect	Adds a port to an ATM-RMON MIB port select group.
show atm rmon	Shows the status of the ATM RMON MIB.

atm route

To specify a static route to a reachable address prefix, use the **atm route** global configuration command. To delete a static route, use the **no** form of this command.

atm route *addr-prefix type card/subcard/port*[**.***vpt#*] [**internal**] [**scope** *org-scope*] [**e164-address** *address-string* [**number type** *numtype*]] [**aesa-gateway** *aesa-address*]

no atm route *addr-prefix type card/subcard/port*[**.***vpt#*] [**internal**] [**scope** *org-scope*] [**e164-address** *address-string* [**number type** *numtype*]] [**aesa-gateway** *aesa-address*]

Syntax Description

addr-prefix	Specifies the address prefix. The address prefix has a maximum length of 19 bytes. By default, each character in the prefix is 4 bits long. To specify a part of a prefix in bits, use parentheses () to enclose binary numbers. The asterisk (*) wildcard character means "neutral." Wildcard character ellipses (...) after a prefix match any destination address that starts with the prefix.
type	Specifies the interface type as **atm**, **atm-p**, **cbr**, **ethernet**, **loopback**, **null**, **serial** or **tunnel**.
card/subcard/port	Identifies the card, subcard, and port number for the interface.
.*vpt#*	Specifies an interface that represents a virtual path tunnel.
internal	Specifies an internal static route to an internal reachable address prefix. By default, an exterior static route to an exterior reachable address prefix is created.
org-scope	Specifies the organizational **scope** (for example, UNI scope) value for the route. The valid range of organizational scope values is from local (1) to global (15). The default organizational scope is global (15) for individual addresses and local (1) for group addresses.
e164-address	Associates a forwarding E.164 address with the static route.
address-string	Specifies a forwarding native E.164 address, used when a call matching the ATM address prefix is forwarded across the specified interface. The E.164 address consists of 7 to 15 decimal characters.
numtype	Specifies a number from the following four options: **international**, **national**, **subscriber**, and **local**.
aesa-gateway	Associates a forwarding AESA with the static route.
aesa-address	Specifies a forwarding AESA; used when a call matching the ATM address prefix is forwarded across the specified interface.

Defaults

See "Syntax Description."

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The internal keyword should be used when a static route is configured to an address prefix representing an attached end system (for example, in place of an ILMI address registration).

The type of static route should be exterior, and the **internal** keyword should not be present when a static route is configured to an address prefix representing end systems attached to a different switch or network.

The **scope** keyword value translates to a PNNI level according to the PNNI scope map. Refer to the **scope map** and **scope mode** commands for more information.

When the **e164-address** option is included, the specified *address-string* is passed on as the called party address. The received called party address is passed on as the called party subaddress, the E.164 address of this interface (configured using the **atm e164 address** command) is passed on as the calling party address, and the received calling party address (if any) is passed on as the calling party subaddress.

If no **e164-address** is specified, the received called party address and calling party address are passed on unchanged.

When the **aesa-gateway** option is included, the specified AESA address is passed on as the called party address. The received called party address is passed on as the called party subaddress. The AESA gateway address of this interface (configured using the **atm aesa gateway** command) is passed on as the calling party address. The received calling party address (if any) is passed on as the calling party subaddress.

Examples

The following example shows how to configure a static route on interface ATM 1/2/1 to the address prefix 47.8 of 12 bits in length.

```
Switch(config)# atm route 47.8... atm 1/2/1
```

The following example shows how to configure a static route on interface ATM 1/2/1 to the address prefix 47.88 of 14 bits in length.

```
Switch(config)# atm route 47.8(10*)... atm 1/2/1
```

The following example shows how to configure a static route on ATM 0/0/0 with a forwarding E.164 address.

```
Switch(config)# atm route 1234 atm 0/0/0 e164-address 1234567
```

The following example shows how to configure a static route with a forwarding AESA gateway address.

```
Switch(config)# atm route 1234 atm 0/0/0 aesa-gateway
92.999999999999999999999999.222222222222.00
```

Related Commands

Command	Description
atm aesa gateway	Configures an AESA gateway address on an ATM switch interface that connects to a service provider maintaining a separate ATM addressing plan.
atm e164 address	Configures the native E.164 address of an ATM interface.
redistribute	Instructs the PNNI to redistribute static routes throughout the PNNI routing domain.
scope map	Specifies the mapping from a range of organizational scope values.
scope mode	Specifies the configuration mode of the mapping from organizational scope values (used at UNI interfaces) to PNNI scope (such as in terms of PNNI routing-level indicators).

Command	Description
show atm pnni aesa embedded-number	Shows the E.164 AESAs with the E.164 AFI to the left-justified encoding format.
show atm route	Displays all local or network-wide reachable address prefixes in this switch router's ATM routing table.

atm route-optimization (EXEC)

To initiate route optimization immediately for a specific interface or specific soft VC, use the **atm route-optimization** EXEC command.

atm route-optimization soft-connection interface {**atm** *card/subcard/port* [*vpi* [*vci*]] | **serial** *card/subcard/port*:*cgn* [*dlci*]}

Syntax Description

card/subcard/port	Specifies the card, subcard, and port number of a specific ATM interface.
vpi	Specifies the virtual path identifier.
vci	Specifies the virtual channel identifier.
card/subcard/port:cgn	Specifies the card, subcard, port and channel-group number for the Frame Relay interface.
dlci	For a Frame Relay interface, if a DLCI is not specified, this command sets optimization for the specified Frame Relay interface. If a DLCI is specified, this command sets optimization for a specific Frame Relay interworking soft VC.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

If you do not specify the VPI and VCI, this command sets optimization for a specific interface. If you specify the VPI and VCI, this command sets optimization for a specific soft VC.

Note The **atm route-optimization (EXEC)** command must be entered on the same interface where the soft PVCs or PVPs are configured. Route optimization only works for the source end of a soft PVC or PVP, and is ignored if entered on the destination interface.

Examples

The following example shows how to initiate ATM route optimization on a soft VC at ATM interface 1/0/0 100 250.

```
Switch# atm route-optimization soft-connection interface atm 1/0/0 100 250
```

The following example shows how to initiate ATM route optimization on a soft VC at serial interface 1/0/3:3 DLCI 248.

```
Switch# atm route-optimization soft-connection interface serial 1/0/3:1 248
```

Related Commands

Command	Description
atm route-optimization (interface)	Enables and configures soft PVC route optimization on an ATM interface.
atm route-optimization percentage-threshold	Specifies the percentage reduction in the administrative weight of the existing path required to trigger route optimization.

atm route-optimization (interface)

To enable and configure soft PVC route optimization on an ATM interface, use the **atm route-optimization** interface configuration command. To disable this feature, use the **no** form of this command.

atm route-optimization soft-connection [**interval** *minutes*] [**time-of-day** {**anytime** | *start-time end-time*}]

no atm route-optimization soft-connection

Syntax Description

interval *minutes*	Specifies the frequency of route optimization in minutes. The range is 10 to 10000. The default is 60 minutes.
time-of-day	Specifies the 24-hour time range when route optimization can occur. The default is **anytime**.
anytime	Route optimization can occur at any time during the day.
start-time	Specifies the start of the time range when route optimization is allowed, in 24-hour format (*hh:mm*).
end-time	Specifies the end of the time range when route optimization is allowed, in 24-hour format (*hh:mm*).

Defaults

For **interval**: 60 minutes
For **time-of-day**: **anytime**

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use this command to enable and configure soft PVC route optimization to determine when a better route is found. You can also reconfigure the old route after you perform this configuration.

Note The **atm route-optimization (interface)** command must be entered on the same interface where the soft PVCs or PVPs are configured. Route optimization only works for the source end of a soft PVC or PVP and is ignored if entered on the destination interface.

The **time-of-day** parameter is used as a filter to determine if route optimization is acceptable when the interval timer activates.

To ensure that route optimization takes place at least once a day, set the interval to a smaller value than the time range. After route-optimization starts, it runs until it is finished regardless of the time range. All connections on this interface subject to route optimization are checked to see if better paths exist. When better paths are found, the connections are rerouted.

Note The **atm route-optimization (interface)** command can also be used to configure route optimization for Frame Relay interfaces.

Examples

The following example enables soft PVC route optimization on interface ATM 0/1/2, with the time period of 120 minutes.

```
Switch(config)# interface atm 0/1/2
Switch(config-if)# atm route-optimization soft-connection interval 120
```

The following example configures a soft PVC with route optimization interval configured as every 30 minutes between the hours of 6:00 p.m. and 5:00 a.m.

```
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# atm route-optimization soft-connection interval 30 time-of-day 18:00
5:00
```

Related Commands

Command	Description
atm route-optimization (EXEC)	Initiates route optimization immediately for a specific interface or specific soft VC.
atm route-optimization percentage-threshold	Specifies the percentage reduction in the administrative weight of the existing path required to trigger route optimization.
show atm interface	Displays ATM-specific information about an ATM interface.
show running-config	Displays the configuration information currently running on the terminal.

atm route-optimization percentage-threshold

To specify the percentage reduction in the administrative weight of the existing path required to trigger route optimization, use the **atm route-optimization percentage-threshold** global configuration command. To set the threshold to the default value, use the **no** form of this command.

atm route-optimization percentage-threshold *percent*

no atm route-optimization percentage-threshold

Syntax Description

percent	Specifies the route optimization threshold in percent, from 5 to 100.

Defaults

30

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

When route optimization is enabled and the threshold is exceeded, the existing path is partially torn down and a new path is established. Currently route optimization is only supported for soft PVCs and soft PVPs.

Smaller values lead to greater network efficiency, at the expense of an increased amount of calls subject to rerouting.

Examples

The following example shows setting the route optimization threshold to 20 percent.

```
Switch(config)# atm route-optimization percentage-threshold 20
```

Related Commands

Command	Description
atm route-optimization (EXEC)	Initiates route optimization immediately for a specific interface or specific soft VC.

atm router pnni

To enter the PNNI configuration mode, use the **atm router pnni** global configuration command. To exit from the PNNI configuration mode, use the **no** form of this command.

atm router pnni

no atm router pnni

Syntax Description

This command has no arguments or keywords.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Use this command to start global PNNI configuration mode.

Examples

The following example shows using the **atm router pnni** global configuration command to change to ATM router PNNI configuration mode.

```
Switch(config)# atm router pnni
Switch(config-atm-router)#
```

Related Commands

Command	Description
show atm pnni local-node	Displays information about a PNNI logical node running on the switch.

atm routing-mode

To restrict the mode of ATM routing on an ATM switch router, use the **atm routing-mode** global configuration command. To remove all restrictions on ATM routing, use the **no** form of this command.

atm routing-mode static

no atm routing-mode static

Syntax Description

static	Restricts ATM routing to allow only static configuration of ATM routes. In this routing mode, the switch does not run any dynamic ATM routing protocols, such as PNNI routing.

Defaults

Disabled (no restrictions on ATM routing)

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command takes effect on the next reboot.

Switch behavior in static routing mode is analogous to that of the LightStream 1010 default IISP software images of Cisco IOS Release 11.1. Without any restrictions on the routing mode, PNNI functionality is available on all interfaces.

This command differs from deletion of all PNNI nodes (using the **node** command) because it affects ILMI autoconfiguration. When the switch is in static routing mode, for each interface, the ILMI variable *atmfAtmLayerNniSigVersion* for the switch is set to **iisp**. This causes ILMI autoconfiguration on interfaces between two switches to determine an interface type of IISP, unless the switch on the other side indicates that the NNI signalling protocol is not supported.

Examples

The following example shows configuration of a switch to allow only static routing.

```
Switch(config)# atm routing-mode static
```

Related Commands

Command	Description
atm auto-configuration	Used to enable or disable ILMI autoconfiguration.
node	Used to create, delete, enable, or disable PNNI nodes running on this switch and to specify or change the level of a node.

atm service-category-limit (Catalyst 8510 MSR and LightStream 1010)

To set the limits on the number of cells simultaneously allowed in the switch memory by type of output queue, use the **atm service-category-limit** global configuration command. To restore the default value of 64544, use the **no** form of this command.

atm service-category-limit {**cbr** | **vbr-rt** | **vbr-nrt** | **abr-ubr**} *number*

no atm service-category-limit {**cbr** | **vbr-rt** | **vbr-nrt** | **abr-ubr**}

Syntax Description

number	Integer in the range of 0 to 64544, expressed as number of cells.

Defaults

64544

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command
12.0(4a)W5(11a)	Added: (**Catalyst 8510 MSR and LightStream 1010**)

Usage Guidelines

The **no** form of this command applies to all service categories.

Note This command is not supported on systems equipped with the FC-PFQ.

Caution Setting a **service-category-limit** to 0 causes the connection requests for the associated service categories to be rejected.

Examples

In the following example, the maximum number of **abr** and **ubr** cells allowed into the switch fabric at one time is limited to 45000.

```
Switch(config)# atm service-category-limit abr-ubr 45000
```

Related Commands

Command	Description
show atm resource	Displays the ATM layer connection information about the virtual path.

atm service-class

To specify the weighting for each service class for physical interfaces or for a hierarchical VP tunnel, use the **atm service-class** interface configuration command. To return the weight of the specified class to its default (See tables below), use the **no** form of this command.

To specify the weighting for each service class for physical interfaces or for a hierarchical VP tunnel, use the **atm service-class** interface configuration command. To return the weight of the specified class to its default, use the **no** form of the **atm service-class** command. This command supports both the ATM Forum service categories and the TBR service classes on physical interfaces, as shown in Table 2-3.

Table 2-3 ATM Forum Service Classes and Tag Bit Rate Service Classes for Physical Interfaces

ATM Forum Service Classes	ATM Forum Service Categories	Tag Bit Rate	Service Classes
2	VBR-RT	1	TBR class 1
3	VBR-NRT	6	TBR class 2
4	ABR	7	TBR class 3
5	UBR	8	TBR class 4

To specify the weighting of each service class for a physical interface, use the following syntax:

atm service-class {**1** | **2** | **3** | **4** | **5** | **6** | **7** | **8**} **wrr-weight** *weight*

To cancel WRR scheduling or to set weights to their defaults, use the **no** form of the command.

no atm service-class [1 | **2** | **3** | **4** | **5** | **6** | **7** | **8**] **wrr-weight** *weight*

For hierarchical VP tunnels, this command supports either the ATM Forum service categories or the TBR service classes, as shown in Table 2-4.

Table 2-4 ATM Forum Service Classes and Tag Bit Rate Service Classes for Hierarchical VP Tunnels

ATM Forum Service Classes	ATM Forum Service Categories	Tag Bit Rate	Service Classes
1	VBR-RT	1	TBR class 1
2	VBR-NRT	2	TBR class 2
3	ABR	3	TBR class 3
4	UBR	4	TBR class 4

To specify the weighting for each service class for a hierarchical VP tunnel, use the following syntax:

atm service-class {**1** | **2** | **3** | **4**} **wrr-weight** *weight*

To cancel WRR scheduling or to set weights to their defaults, use the **no** form of the command.

no atm service-class {**1** | **2** | **3** | **4**} **wrr-weight** *weight*

Syntax Description

1-8	ATM Forum service classes or tag bit rate service classes. Refer to Table 2-5 for service classes 1 to 8 for physical interfaces. Refer to Table 2-4 for service classes 1 to 4 for hierarchical VP tunnels.
wrr-weight *weight*	Integer in the range of 1 to 15.

Defaults

Table 2-5 lists the service classes and the default class weights for physical interfaces and hierarchical VP tunnels.

Table 2-5 Service Classes and Default Class Weights for Physical Interfaces and Hierarchical VP Tunnels

Physical Interfaces		Hierarchical VP Tunnels		
Service Class	**Default Class Weight**	**Service Class**	**Default Class Weight for ATM Forum Service Classes**	**Default Class Weight for Tag Bit Rate Service Classes**
1	1	1	8	1
2	8	2	1	2
3	1	3	1	3
4	1	4	1	4
5	1	–	–	–
6	2	–	–	–
7	3	–	–	–
8	4	–	–	–

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

If **wrr-weight** is not specified, the default weight applies. The **no** form of the command returns the weight of the specified class to its default.

Note This command is available only on systems equipped with the FC-PFQ.

Examples

In the following example, ATM interface 2/0/1 is configured for service class 3 with a WRR weight of 8.

```
Switch(config)# interface atm 2/0/1
Switch(config-if)# atm service-class 3 wrr-weight 8
```

Related Commands

Command	Description
show atm interface resource	Displays resource management interface configuration status and statistics.

atm signalling cug access

To restrict access to and from a closed user group, use the **atm signalling cug access** interface configuration command. To disable this feature, use the **no** form of this command.

atm signalling cug access [**permit-unknown-cugs** {**to-user** | **from-user** p**ermanent** | **both-directions permanent**}]

no atm signalling cug access

Syntax Description

permit-unknown-cugs	Permits calls between users attached to this interface and unknown users that are not members of the CUGs on this interface.
to-user	Applies to calls going from the network to the user.
from-user	Applies to calls going from the user to the network.
both-directions	Applies to calls going from the network to the user, and to calls going from the user to the network.
permanent	Indicates that **permit-unknown-cugs** applies to all calls from users to the network, regardless of whether the call setup asked for the permission or not.

Defaults

No incoming or outgoing access allowed. An interface is not considered to be a CUG access interface unless this command is configured. If the keywords **permit-unknown-cugs** are not specified, calls to or from unknown CUGs are denied. When a CUG call goes out, and the destination is not in the same CUG, the call is rejected at the destination switch.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

CUG procedures are invoked on the interface only if the interface is configured as an access interface. No CUG configuration applies until this command is configured.

Transmission and reception of CUG interlock codes is not allowed over access interfaces. All interfaces leading outside of the network should be configured as access interfaces, ensuring that all CUG interlock codes are generated and used only within this network.

Note Interfaces to other networks should be configured as CUG access interfaces, even if no CUGs are configured on the interface. In this case, if you want to exchange SVCs with the neighbor network, **permit-unknown-cugs both-directions permanent** should be configured.

Table 2-6 describes the relationship between the Cisco CUG access terminology and ITU-T CUG access terminology.

Table 2-6 CUG Access Terminology and ITU-T CUG Access Terminology

ITU-T CUG	Cisco CUG
incoming access allowed to-user	**permit-unknown-cugs**
outgoing access allowed from-user	**permit-unknown-cugs**

Examples

The following example shows configuration as a CUG access interface that allows calls from unknown CUGs.

```
Switch(config)# interface atm 2/0/1
Switch(config-if)# atm signalling cug access permit-unknown-cugs to-user
```

Related Commands

Command	Description
atm signalling cug assign	Assigns a CUG to an interface.
show atm signalling cug	Displays all configured CUGs.

atm signalling cug alias

To create a CUG alias, use the **atm signalling cug alias** global configuration command. To delete the alias, use the **no** form of this command.

atm signalling cug alias *alias-name* **interlock-code** *interlock-code*

no atm signalling cug alias *alias-name*

Syntax Description

alias-name	The name of the alias.
interlock-code	The 24-byte interlock code, specified as a string of 48 hexadecimal digits.

Defaults

No alias name is defined.

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

Use this command to configure an alias for the interlock codes. The alias can be used while configuring CUGs on the interface.

An alias can be defined for each CUG interlock code used on the switch. Using an alias simplifies configuration of a CUG on multiple interfaces. When the alias is used, it removes the need to specify the 48-hexadecimal digit CUG interlock code on each interface attached to a CUG member.

Examples

The following example shows how to create the **switch_cug** CUG alias with the 24-bite interlock code.

```
Switch(config)# atm signalling cug alias switch_cug interlock-code
47.009181000000061705BDA01.0061705BDA01.00.12345678
```

Related Commands

Command	Description
atm signalling cug assign	Assigns a CUG to an interface.

atm signalling cug assign

To assign a CUG to an interface, use the **atm signalling cug assign** interface configuration command. To disable this feature, use the **no** form of this command.

atm signalling cug assign {**alias** *name* | **interlock-code** *string*} [**deny-same-cug** {**to-user** | **from-user**}] [**preferential**]

no atm signalling cug assign {**alias** *name* | **interlock-code** *string*}

Syntax Description

alias	The *name* of the alias for the 24-byte CUG interlock code.
interlock-code	The 24-byte interlock code, specified as a *string* of 48 hexadecimal digits.
deny-same-cug	Deny calls to or from other members of the same CUG. Use with the **to-user** or **from-user** keywords.
to-user	Deny calls to the user from members of the same CUG.
from-user	Deny calls from the user to members of the same CUG.
preferential	The preferential CUG is the default CUG associated with calls from the user to the network. If a preferential CUG already exists, this command is rejected.

Defaults

If **deny-same-cugs** is not specified, calls to or from other members of the same CUG are permitted. If **preferential** is not specified, the CUG is assigned as a non-preferential CUG.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

Each access interface can be configured to have one or more CUGs associated with it. Only one CUG can be selected as the preferential CUG. Calls received from users attached to this interface can only be associated with the preferential CUG. Calls directed to users attached to this interface can be accepted, based on membership in any of the CUGs configured on this interface.

CUG service can be configured without any preferential CUG. If no preferential CUG is configured on the interface, and calls are permitted from users attached to this interface to unknown users, the calls proceed as non-CUG calls, without generating any CUG IE.

Note The CUGs assigned to this interface take effect only when the interface is configured as an access interface (see the **atm signalling cug access** command for additional information).

Table 2-7 describes the relationship between the Cisco CUG terminology and the ITU-T CUG terminology.

Table 2-7 ITU-T CUG Terminology and Cisco Terminology

ITU-T CUG Terminology	Cisco Terminology
preferential CUG	**preferential**
incoming calls barred (ICB)	**deny-same-cug to-user**
outgoing calls barred (OCB)	**deny-same-cug from-user**

Examples

The following example shows assignment of the redefined CUG switch router as the preferential CUG on the interface to ATM 2/0/1.

```
Switch(config)# interface atm 2/0/1
Switch(config-if)# atm signalling cug assign alias switch_cug preferential
```

Related Commands

Command	Description
atm signalling cug access	Restricts access to and from a closed user group.
atm signalling cug alias	Used to create a CUG alias.
show atm signalling cug	Displays all configured CUGs.

atm signalling diagnostics

To create a filter table for signalling diagnostics, use the **atm signalling diagnostics** global configuration command. To disable signalling diagnostics, use the **no** form of this command.

atm signalling diagnostics {*index* | **enable**}

no atm signalling diagnostics {*index* | **enable**}

Syntax Description

index	Specifies the diagnostics index number for the filter table, from 1 to 50, and enters the diagnostics configuration mode.
enable	Enables signalling diagnostics globally.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

ATM signalling diagnostics is a tool for troubleshooting call failures in the ATM network, and should not be enabled while the switch is operating.

Note The **atm signalling diagnostics** global configuration command changes the configuration mode to ATM signalling diagnostics, and the new prompt appears:

```
Switch(cfg-atmsig-diag)#
```

Examples

The following example shows creating filter table 1.

```
Switch(config)# atm signalling diagnostics 1
Switch(cfg-atmsig-diag)#
```

Related Commands

Command	Description
age-timer	Cisco IOS command removed from this manual.
calling-address-mask	Configures the address mask for identifying valid bits of the called NSAP address field.
called-nsap-address	Configures the NSAP-format ATM address for the signalling diagnostics filter entry.
cast-type	Filters ATM signalling call failures by connection type (point-to-point or point-to-multipoint).

Command	Description
clear-cause	Configures the release cause code value in the signalling diagnostics filter table entry.
connection-category	Used to filter ATM signalling call failures by virtual circuit category.
ima active-links-minimum	Configures the minimum active links for an IMA group to function.
max-records	Configures the maximum number of records to be collected for a particular signalling diagnostics filter table entry.
outgoing-port	Filters ATM signalling call failure based on the outgoing interface rejected call.
purge	Cisco IOS command removed from this manual.
scope	Filters ATM signalling call failures that occur within the switch router and on other switch routers.
segment-target	Specifies a target entry in a partially specified PNNI explicit-path.
status	Configures the status of this filter table entry.

atm signalling enable

To enable the signalling and SSCOP on a port, use the **atm signalling enable** interface configuration command. To disable signalling and SSCOP on a port, use the **no** form of this command.

atm signalling enable

no atm signalling enable

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

ILMI is automatically restarted whenever signalling is enabled or disabled. This command, when used to disable signalling on a PNNI interface, disables both PNNI routing and PNNI signalling.

Note This command does not apply to the route processor interface.

Examples

The following example shows how to disable signalling on ATM 0/1/2.

```
Switch(config)# interface atm 0/1/2
Switch(config-if)# no atm signalling enable
Switch(config-if)#
%ATM-5-ATMSOFTSTART: Restarting ATM signalling and ILMI on ATM0/1/2.
```

Related Commands

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

atm signalling ie aal5 mode

To allow the mode field in AAL5 IEs to be added when using UNI 3.0, use the **atm signalling ie aal5 mode** interface configuration command. To disable this feature, use the **no** form of this command.

atm signalling ie aal5 mode {**stream** | **message**}

no atm signalling ie aal5 mode

Syntax Description

stream	Streaming mode.
message	Message mode.

Defaults

Message mode is passed in UNI 3.0 AAL5 information elements.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

The **atm signalling ie aal5 mode** interface configuration command allows you to fill in the mode field in AAL5 IEs when using UNI 3.0.

The AAL5 IE has a mode field in UNI version 3.0. This mode field was removed in UNI version 3.1. When a setup request arrives from a UNI 3.1 side connection, the AAL5 IE does not have the mode information. Some vendor switches and end systems reject the connection because the mode information is missing. To allow interoperability, this **atm signalling ie aal5 mode** interface configuration command allows, by default, a message mode field to be added statically on UNI 3.0 side connections even if one was not received from the other side, for example, from a UNI 3.1 connection.

Examples

The following example configures, in interface configuration mode, ATM interface 1/0/0 signalling IEs in AAL5 to include a mode field configured as message.

```
Switch(config)# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# interface atm 1/0/0
Switch(config-if)# atm signalling ie aal5 mode message
Switch(config-if)# ^Z
Switch#
```

Related Commands

Command	Description
show running-config	Displays the configuration information currently running on the terminal.

atm signalling ie forward

To specify which signalling IEs are forwarded from the calling party to the called party, use the **atm signalling ie forward** interface configuration command. To stop the transfer of information, use the **no** form of this command.

atm signalling ie forward {**all** | **calling-number** | **calling-subaddress** | **called-subaddress** | **higher-layer-info** | **lower-layer-info** | **bli-repeat-ind** | **aal-info** | **unknown-ie**}

no atm signalling ie forward

Syntax Description

all	Forward all signalling information from the calling party to the called party.
calling-number	Forward the calling party's number to the called party.
calling-subaddress	Forward the calling party's subaddress to the called party.
called-subaddress	Forward the called party's subaddress to the calling party.
higher-layer-info	Forward the broadband higher-layer information element from the calling party to the called party.
lower-layer-info	Forward the broadband lower-layer information element from the calling party to the called party.
bli-repeat-ind	Forward the broadband lower-layer repeat indicator information element to the called party.
aal-info	Forward the AAL information element from the calling party to the called party.
unknown-ie	Forward the unknown information element in the absence of a known indicator.

Defaults

Forward all IEs in the signalling message from the calling party to the called party.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

When the action indicator in the IE is not set to indicate what action should be taken when an **unknown-ie** is received, the appropriate action is taken, depending upon whether the **unknown-ie** is enabled or disabled. If the action indicator is set, then the **unknown-ie** configuration is ignored.

Examples

The following example shows how to forward the calling party's number to the called party.

```
Switch(config)# interface atm 0/1/2
Switch(config-if)# atm signalling ie forward calling-number
```

atm signalling vpci

To specify the value of VPCI to be carried in the signalling messages within a VP tunnel, use the **atm signalling vpci** subinterface configuration command. To use the default configuration, use the **no** form of this command.

atm signalling vpci *vpci_number*

no atm signalling vpci

Syntax Description

vpci_number	VPCI number 0 to 255.

Defaults

Use the value of VPI on which the subinterface is established. By default, the VPCI is the same as the VPI on the ATM switch router.

Command Modes

Subinterface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

The **atm signalling vpci** subinterface command allows you to configure the VPCI to be different from VPI when configuring PVP tunnels.

The connection identifier IE is used in signalling messages to identify the corresponding user information flow. The connection identifier IE contains the VPCI and VCI.

For example, if you want to configure a PVP tunnel connection from a LightStream 1010 ATM switch on VPI 2, VCI X, to a router with a virtual path switch in between, the signalling message would contain connection ID VPI 2, VCI X. Since the PVP tunnel at the router end is on VPI 3, VCI X, the connection will be refused. By configuring VPCI to 3, you can configure the signalling message explicitly to contain connection ID VPI 3, VCI X, instead of containing VPI 2, VCI X.

This command could also be used to support virtual UNI connections.

Examples

The following example configures a PVP tunnel on ATM interface 0/0/0, PVP 99, and then configures the connection ID VCPI as 0 in subinterface configuration mode.

```
Switch(config)# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# interface atm 1/0/0
Switch(config-if)# atm pvp 99
Switch(config-if)# exit
Switch(config)# interface atm 1/0/0.99
Switch(config-subif)# atm signalling vpci 0
Switch(config-subif)# end
Switch#
```

Related Commands

Command	Description
show running-config	Displays the configuration information currently running on the terminal.

atm snoop

To set the current port snooping configuration and actual register values for the highest ATM interface, use the **atm snoop interface atm** interface configuration command.

atm snoop interface atm *card/subcard/port* [**direction** *dir*]

Syntax Description

card/subcard/port	Card, subcard, and port number for the ATM interface to be monitored. The port can be any port except the ATM 0 port or the test port.
dir	Specified as **receive** or **transmit** and determines the direction of the cell traffic to monitor.

Defaults

Receive

Command Modes

Interface configuration on the snoop test port.

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

The **atm snoop interface atm** subcommand applies only if the previously specified port is the highest system port residing on card 4 and subcard 1 (which has been shut down). If so, this enables it as the snoop test port. Cells transmitted from the snoop test port are copies of cells from a single direction of a monitored port.

While in snoop mode, any prior permanent virtual connections to the snoop test port remain in the down state.

The port number of the test port depends on the card type. Table 2-8 defines the snoop test port number for various interfaces.

Table 2-8 atm snoop Port Numbers

Interface	Port Number
OC-3	3/1/3
OC-12	3/1/0
DS3/E3	Not supported

Examples

The following example configures the highest port in the snoop mode to monitor port card 1, subcard 0, and port 2 in the transmit direction, starting from the configuration mode.

```
Switch(config)# interface atm 3/1/3
Switch(config-if)# shutdown
Switch(config-if)# atm snoop interface atm 1/0/2 direction transmit
Switch(config-if)# no shutdown
```

Related Commands

Command	Description
show atm snoop	Displays the current port snooping configuration and actual register values for the highest ATM interface.

atm snoop-vc

To set the current port snooping configuration and actual register values per-VC, use the **atm snoop-vc** interface configuration command. To remove a previous configuration, use the **no** form of this command.

atm snoop-vc [*vpi-A vci-A*] **interface atm** *card/subcard/port vpi-B vci-B* [**direction** {**receive** | **transmit**}]

no atm snoop-vc [*vpi-A vci-A*] **interface atm** *card/subcard/port vpi-B vci-B* [**direction** {**receive** | **transmit**}]

Syntax Description

vpi-A	VPI of the snooping connection.
vci-A	VCI of the snooping connection.
card/subcard/port	Card, subcard, and port number for the ATM interface to be monitored. The port can be any port except the ATM 0 port or the test port.
vpi-B	VPI of the snooped connection.
vci-B	VCI of the snooped connection.
direction	When used with the **receive** or **transmit** keywords, determines which direction of cell traffic to monitor.
receive	Monitors cell traffic in the receive direction.
transmit	Monitors cell traffic in the transmit direction.

Defaults

Receive

Command Modes

Interface configuration. Applies to the snoop test port.

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

There is no restriction on the snoop test port on a switch processor feature card-based system for ATM snoop, snoop-vc, and snoop-vp configurations. The snoop port can be any port and is not limited to the highest port.

The **atm snoop-vc interface atm** option applies only if the previously specified port is the highest system port residing on card 4 and subcard 1 (which has been shut down) on the snoop test port. Cells transmitted from the snoop test port are copies of cells from a single direction of a monitored port. For Catalyst 8510 MSR and LightStream 1010, this restriction is only for FC-PCQ-based systems.

When in snoop mode, any prior permanent virtual connections to the snoop test port remain in the down state.

The port number of the test port depends on the card type. Table 2-9 defines the ATM snoop test port number for various interfaces.

Table 2-9 atm snoop-vc Port Numbers

Interface	Port Number
OC-3	3/1/3
OC-12	3/1/0
DS3/E3	Not supported

Examples

The following example configures the port in the snoop mode to monitor port card 1, subcard 0, and port 2 in the transmit direction, starting from the configuration mode.

```
Switch(config)# interface atm 3/1/3
Switch(config-if)# shutdown
Switch(config-if)# atm snoop-vc interface atm 1/0/2 1 13 direction transmit
Switch(config-if)# no shutdown
```

Related Commands

Command	Description
show atm snoop-vc	Displays the current port snooping configuration and actual register values per-VC.

atm snoop-vp

To set the current port snooping configuration and actual register values per-VP, use the **atm snoop-vp** interface configuration command. To remove a previous configuration, use the **no** form of this command.

atm snoop-vp [*vpi-A vci-A*] **interface atm** *card/subcard/port vpi-B vci-B* [**direction** {**receive** | **transmit**}]

no atm snoop-vc [***vpi-A vci-A***] **interface atm** *card/subcard/port vpi-B vci-B* [**direction** {**receive** | **transmit**}]

Syntax Description

vpi-A	VPI of the snooping connection.
vci-A	VCI of the snooping connection.
card/subcard/port	Card, subcard, and port number for the ATM interface to be monitored. The port can be any port except the ATM 0 port or the test port.
vpi-B	VPI of the snooped connection.
vci-B	VCI of the snooped connection.
direction	When used with the **receive** or **transmit** keywords, determines which direction of cell traffic to monitor.
receive	Monitors cell traffic in the receive direction.
transmit	Monitors cell traffic in the transmit direction.

Defaults

receive

Command Modes

Interface configuration. Applies to the snoop test port.

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

There is no restriction on the snoop test port on a switch processor feature card-based system for ATM snoop, snoop-vc, and snoop-vp configurations. The snoop port can be any port and is not limited to the highest port.

The **atm snoop-vp interface atm** command applies only if the previously specified port is the highest system port residing on card 4 and subcard 1 (which has been shut down) on the snoop test port. Cells transmitted from the snoop test port are copies of cells from a single direction of a monitored port. For Catalyst 8510 MSR and LightStream 1010, this restriction is only for FC-PCQ-based systems.

When in snoop mode, any prior permanent virtual connections to the snoop test port remain in the down state.

The port number of the test port depends on the card type. Table 2-10 defines the ATM snoop test port number for various interfaces.

Table 2-10 atm snoop-vp Port Numbers

Interface	Port Number
OC-3	3/1/3
OC-12	3/1/0
DS3/E3	Not supported

Examples

The following example configures the port in the snoop mode to monitor port card 1, subcard 0, and port 2 in the transmit direction, starting from the configuration mode.

```
Switch(config)# interface atm 3/1/3
Switch(config-if)# shutdown
Switch(config-if)# atm snoop-vp interface atm 1/0/2 1 13 direction transmit
Switch(config-if)# no shutdown
```

Related Commands

Command	Description
show atm snoop-vp	Displays the current port snooping configuration and actual register values per-VP.

atm soft-vc

To create a soft PVC on the switch router, use the **atm soft-vc** interface configuration command.

atm soft-vc *source-vpi source-vci* **dest-address** *atm-address dest-vpi dest-vci* [enable | disable]
[**upc** *upc*] [*pd pd*] [**rx-cttr** *index*] [**tx-cttr** *index*]
[**retry-interval** [**first** *retry-interval*] [**maximum** *retry-interval*]]
[**explicit-path** *precedence* {**name** *path-name* | **identifier** *path-id*}
[**upto** *partial-entry-index*] [*only-explicit*]]

For existing soft PVCs, use the **no** form of the command to delete the soft PVC.

no atm soft-vc *source-vpi source-vci*

To respecify the explicit paths, use the **redo-explicit** form.

atm soft-vc *source-vpi source-vci* [enable | disable] [redo-explicit [explicit-path precedence *{name path-name | identifier path-id} [upto partial-entry index] [only-explicit]]]*

Syntax Description

source-vpi	Source VPI number.
source-vci	Source VCI number.
dest-address *atm-address*	ATM address for the destination port.
dest-vpi	Destination VPI number.
dest-vci	Destination VCI number.
enable	Allows the soft connection to be set up; **enable** is the default for the initial soft connection configuration. **Note** Note: If the soft-connection command is reentered for an existing connection, the default is the current enabled or disabled state.
disable	Prevents an initial soft connection from being set up, or tears down an existing connection.
upc *upc*	Usage parameter control, specified as **pass** | **tag** | **drop**. Default is **pass**. The **upc** option can be set to **tag** or **drop** only when the connection is not the leaf of a point-to-multipoint connection.
pd *pd*	Intelligent packet discard option, specified as **on** | **off**. The default is **off**.
rx-cttr *index*	Connection traffic table row index in the received direction. The **cttr** should be configured before using the **atm pvc** command. See the **atm connection-traffic-table-row** command for information on configuring the **rx-cttr**. The default is 1.
tx-cttr *index*	Connection traffic table row index in the transmitted direction. The **cttr** should be configured before using the **atm pvc** command. See the **atm connection-traffic-table-row** command for information on configuring the **tx-cttr**. The default is 1.
retry-interval	Configures the retry interval timers for a soft PVC.

first *retry-interval*	Retry interval for the first retry after the first failed attempt, specified in milliseconds. If the first retry after the first failed attempt also fails, the subsequent attempts is made at intervals computed using the **first** *retry-interval* as follows: (2 ** (*k*-1)) * **first** *retry-interval* Where the value of *k* is 1 for the first retry after the first failed attempt and will be incremented by 1 for every subsequent attempt. Range is from 100 to 3600000 milliseconds; the default is 5000 milliseconds.
maximum *retry-interval*	The maximum retry interval between any two attempts, specified in seconds. Once the retry interval is computed in the **first** *retry-interval* and becomes equal to or greater than the **maximum** *retry-interval* configured, the subsequent retries will be done at regular intervals of **maximum** *retry-interval* seconds until the call is established. Range is from 1 to 65535 seconds; the default is 60.
redo-explicit	Applies only to existing soft connections and allows explicit paths to be respecified without tearing down connections. Existing connections are unaffected unless a reroute takes place, and then they will use the newer **explicit-path** configuration.
explicit-path	The PNNI explicit path that is manually configured for routing a soft PVC, using the **atm pnni explicit-path** command.
precedence	The precedence number by which ATM PNNI explicit paths are assigned, from1 to 3. Up to three explicit paths can be assigned to a soft PVC.
name *path-name*	The name of the ATM PNNI explicit path for routing soft PVCs.
identifier *path-id*	Specifies the path ID for the explicit path being configured to route soft PVCs.
upto *partial-entry-index*	Allows a subset of a longer explicit path to be used, so that all included nodes after the specified entry index will be disregarded. If the destination is reachable at any next node or segment target, the remaining included nodes in the explicit path are disregarded automatically.
only-explicit	If one or more explicit paths have been specified and if the explicit path fails, the soft connection will remain down until it is retried at its next retry interval. If this option is not specified, the system uses the standard on-demand routing instead of waiting for the next retry interval.

Defaults

See "Syntax Description."

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

Obtain the destination port address before configuring a soft PVC by using the **show atm interface** or **show atm addresses** command on the destination switch**.**

The following list identifies why the creation of a soft PVC might be unsuccessful:

- There is a VPI or VCI collision at the source or destination switch.
- The source or destination interface is not up (or autoconfiguration is not complete).
- The specified destination address is not correct.

Up to three explicit paths can be assigned to a soft VC, using precedence numbers 1 through 3. The precedence 1 explicit path is considered the primary path and is tried first. If it fails, then the next precedence path is tried. Explicit paths can be specified either by **name** or by **identifier**.

The explicit path options can be changed without tearing down an existing soft PVC. Use the **redo-explicit** form of the command to respecify all of the explicit path options.

After configuring a soft PVC, use the **show atm vc interface** command on the source node (specifying the source VPI and source VCI) to verify that the soft PVC has succeeded and to see the explicit path taken.

Note The show configuration displayed for soft connections with explicit paths is always shown as two separate lines, with the **redo-explicit** keyword on the second line, even if it was originally configured using a single command line.

Examples

The following example shows how a user at the destination switch displays the address of the destination port.

```
Switch# show atm address
Switch Address(es):47.0091810000000003BE59ED00.0003BE59ED00.00 active

Soft VC Address(es):
  47.0091.8100.0000.0003.be59.ed00.4000.0c81.0000.00 ATM2/0/0
  47.0091.8100.0000.0003.be59.ed00.4000.0c81.8000.00 ATM3/0/0
  47.0091.8100.0000.0003.be59.ed00.4000.0c81.8010.00 ATM3/0/1
  47.0091.8100.0000.0003.be59.ed00.4000.0c81.8020.00 ATM3/0/2
  47.0091.8100.0000.0003.be59.ed00.4000.0c81.8030.00 ATM3/0/3
  47.0091.8100.0000.0003.be59.ed00.4000.0c82.1000.00 ATM3/1/0
  47.0091.8100.0000.0003.be59.ed00.4000.0c82.1000.05 ATM3/1/0.5
  47.0091.8100.0000.0003.be59.ed00.4000.0c82.1010.00 ATM3/1/1
  47.0091.8100.0000.0003.be59.ed00.4000.0c82.1020.00 ATM3/1/2
  47.0091.8100.0000.0003.be59.ed00.4000.0c82.1030.00 ATM3/1/3

ILMI Switch Prefix(es):
  47.0091.8100.0000.0003.be59.ed00

ILMI Configured Interface Prefix(es):

LECS Address(es):
```

The following example shows how to configure a soft PVC on interface ATM 0/1/0. At the source switch, create a soft PVC with the following configuration.

```
src vpi = 100,
src vci = 200,
dest port address = 47.0091.8100.0000.0003.be59.ed00.4000.0c82.1000.0,
dest vpi = 100
dest vci = 200

Switch(config-if)# atm soft-vc 100 200 dest-address
47.0091.8100.0000.0003.be59.ed00.4000.0c82.1000.05 100 200
```

The following example shows how to manually configure an explicit path for a soft PVC. For this example, if the explicit path fails, standard routing will be used.

```
Switch(config)# interface atm 0/1/3
Switch(config-if)# atm soft-vc 0 40 dest-address
47.0091.8100.0000.0003.be59.ed00.4000.0c82.1000.05 100 200
```

The following example shows how to use the **redo-explicit** keyword to modify an existing explicit-path configuration to add a second alternate explicit path, and to prevent standard routing from being used should both paths fail. Note that the system prompts you to confirm the changes.

```
Switch(config)# interface atm 0/1/3
Switch(config-if)# atm soft-vc 0 40 redo-explicit explicit-path 1 name chicago.path1
explicit-path 2 name chicago.path2 only-explicit
Modify with new explicit path options [yes], or abort changes [no]? [yes/no]:y
```

The following example shows how to remove all explicit paths from an existing soft PVC, using the **redo-explicit** keyword with no other options specified. The path is not changed until a soft PVC reroute occurs.

```
Switch(config)# interface atm 0/1/3
Switch(config-if)# atm soft-vc 0 40 redo-explicit
Modify with new explicit path options [yes], or abort changes [no]? [yes/no]:y
```

Related Commands

Command	Description
atm pnni explicit-path	Used to enter PNNI explicit path configuration mode to create or modify PNNI explicit path.
show atm addresses	Displays the active ATM addresses on a switch.
show atm pnni explicit-paths	Displays a summary of explicit paths that have been configured.
show atm vc	Displays the ATM layer connection information about the virtual connection.

atm soft-vp

To create a soft PVP on the switch, use the **atm soft-vp** interface configuration command.

atm soft-vp *vpi-s* **dest-address** *address vpi-d* [**upc** *upc*] [**rx-cttr** *index*] [**tx-cttr** *index*] [**retry-interval** [**first** *retry-interval*] [**maximum** *retry-interval*]]

For existing soft PVPs, use the **no** form of the command to delete the soft PVP.

no atm soft-vp *vpi-s*

Use the **redo-explicit** form of the command to respecify explicit paths.

atm soft-vp *vpi-s [enable | disable]*
redo-explicit [explicit-path precedence {name path-name | identifier path-id}
*[upto **partial-entry-index***] [**only-explicit**]]]

Syntax Description

vpi-s	Source VPI number.
dest-address *address*	ATM address for the destination port.
vpi-d	Destination VPI number.
upc *upc*	Usage parameter control, specified as **pass** | **tag** | **drop**; the default is **pass**. The **upc** option can be set to **tag** or **drop** only under the following conditions: • The ATM interface is not the route processor port (ATM 0) or a logical port (VP tunnel). • The connection is not the leaf of a point-to-multipoint connection.
rx-cttr *index*	Connection traffic table row index in the received direction. The **cttr** should be configured before using the **atm soft-vp** command. See the **atm connection-traffic-table-row** command for information on configuring the **rx-cttr**. The default is 1.
tx-cttr *index*	Connection traffic table row index in the transmitted direction. The **cttr** should be configured before using the **atm soft-vp** command. See the **atm connection-traffic-table-row** command for information on configuring the **tx-cttr**. The default is 1.
retry-interval	Configures retry interval timers for a soft VP.
first *retry-interval*	Retry interval after the first failed attempt, specified in milliseconds. If the first retry after the first failed attempt also fails, the subsequent attempts are made at intervals computed using the **first** *retry-interval* as follows: (2 ** (*k*-1)) * **first** *retry-interval* Where the value of *k* is 1 for the first retry after the first failed attempt, and will be incremented by 1 for every subsequent attempt. Range is from 100 to 3600000 milliseconds; the default is 5000 milliseconds.

maximum *retry-interval*	The maximum retry interval between any two attempts, specified in seconds. Once the retry interval is computed in the **first** *retry-interval* and becomes equal to or greater than the **maximum** *retry-interval* configured, the subsequent retries will be done at regular intervals of **maximum** *retry-interval* seconds until the call is established. Range is from 1 to 65535 seconds; the default is 60.
enable	Allows the soft connection to be set up. Enable is the default for the initial soft connection configuration. If the soft connection command is reentered for an existing connection, the default is the current enabled or disabled state.
disable	Prevents an initial soft connection from being set up, or tears down an existing connection.
redo-explicit	Applies only to existing soft connections and allows explicit paths to be respecified without tearing down connections. Existing connections are unaffected unless a reroute takes place, and then they will use the newer explicit path configuration.
explicit-path	The PNNI explicit path that is manually configured for routing a soft PVP, using the **atm pnni explicit-path** command.
precedence	The precedence number by which ATM PNNI explicit paths are assigned, from 1 to 3. Up to three explicit paths can be assigned to a soft PVP.
name *path-name*	The name of the ATM PNNI explicit path for routing soft PVPs.
identifier *path-id*	Specifies the path ID for the explicit path being configured to route soft PVPs.
upto *partial-entry-index*	Allows a subset of a longer explicit path to be used, so that all included nodes after the specified entry index will be disregarded. If the destination is reachable at any **next-node** or **segment-target**, the remaining included nodes in the explicit path are disregarded automatically. For more information, see the **atm pnni explicit-path next-node** and **atm pnni explicit-path segment-target** PNNI explicit path configuration commands.
only-explicit	If one or more explicit paths have been specified and if the explicit path fails, the soft connection remains down until it is retried at its next **retry-interval**. If this option is not specified, the system uses the standard on-demand routing instead of waiting for the next **retry interval**.

Defaults

See “Syntax Description.”

Command Modes

Interface configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

Obtain the destination port address before configuring a soft PVP by using the **show atm interface** or **show atm addresses** command on the destination switch.

The following list identifies reasons why the creation of a soft PVP is unsuccessful:

- There is a VPI collision at the source or destination switch.
- The source or destination interface is not up (or autoconfiguration is not complete).
- The specified destination address is not correct.

Up to three explicit paths can be assigned to a soft VP, using precedence numbers 1 through 3. The precedence 1 explicit path is considered the primary path and is tried first. If it fails, then the next precedence path is tried. Explicit paths can be specified either by **name** or by **identifier**.

The explicit path options can be changed without tearing down an existing soft PVP. Use the **redo-explicit** form of the command to respecify all of the explicit path options.

After configuring a soft PVP, use the **show atm vp interface** command on the source node (specifying the source VPI) to verify that the soft PVP has succeeded and to see the explicit path taken.

Note The show configuration displayed for soft connections with explicit paths is always shown as two separate lines, with the **redo-explicit** keyword on the second line, even if it was originally configured using a single command line.

Examples

The following example shows how a user at the destination switch displays the address of the destination port.

```
Switch# show atm interface atm 3/0/1

Interface:  ATM3/0/1
Interface Status: DOWN
Auto-configuration: enabled
Auto-configuration status: waiting for response from peer
Port-type: External
Interface-type: UNI, Interface-side: User
Uni-type: Public, Uni-version: V3.0
Max-VPI-bits: 12, Max-VCI-bits: 14
Max-VP: 4095,     Max-VC: 32768
Number of PVP: 0  Number of SVP: 0  Number of SoftVP: 0
Number of PVC: 3  Number of SVC: 0  Number of SoftVC: 0
Number of logical port (VP-tunnel): 0
Total number of connections: 3
Input cells: 0, Output cells: 0
5 minute input rate: 0 bits/sec, 0 cells/sec
5 minute output rate: 0 bits/sec, 0 cells/sec
ATM Address for Soft VC: 47.0091.8100.0000.0003.be59.ed00.4000.0c82.0010.00
```

At the source switch, create a soft PVP with the VP of 150, the destination port address of 47.0091.8100.0000.0003.be59.ed00.4000.0c82.0010.00, and the destination VPI of 160.

```
Switch(config-if)# atm soft-vp 150 dest-address
47.0091.8100.0000.0003.be59.ed00.4000.0c82.0010.00 160
```

The following example shows how to manually configure an explicit path for a soft PVP. In this example, if the explicit path fails, standard routing is used.

```
Switch(config)# interface atm 0/1/3
Switch(config-if)# atm soft-vp 3 dest-address
47.0091.8100.0000.1061.705b.d900.4000.0c81.9000.00 3 explicit-path 1 name chicago.path1
```

The following example shows how to use the **redo-explicit** keyword to modify an existing explicit-path configuration to add a second alternate explicit path and to prevent standard routing from being used should both explicit paths fail. Note that the system prompts you to confirm the changes.

```
Switch(config)# interface atm 0/1/3
Switch(config-if)# atm soft-vp 3 redo-explicit explicit-path 1 name chicago.path1
explicit-path 2 name chicago.path2 only-explicit
Modify with new explicit path options [yes], or abort changes [no]? [yes/no]:y
```

The following example shows how to remove all explicit paths from an existing soft PVP by using the **redo-explicit** keyword, with no other options specified. The path is not changed until a soft PVP reroute occurs.

```
Switch(config)# interface atm 0/1/3
Switch(config-if)# atm soft-vp 3 redo-explicit
Modify with new explicit path options [yes], or abort changes [no]? [yes/no]:y
```

Related Commands

Command	Description
atm pnni explicit-path	Used to enter PNNI explicit path configuration mode to create or modify PNNI explicit paths.
show atm addresses	Displays the active ATM addresses on a switch.
show atm pnni explicit-paths	Displays a summary of explicit paths that have been configured.
show atm vp interface	Displays the ATM layer connection information about the virtual path.

atm sustained-cell-rate-margin-factor

To change the SCRMF, use the **atm sustained-cell-rate-margin-factor** global configuration command. SCRMF dictates the weight given to PCR in computing the bandwidth used by VBR connections. To assign the default value to SCRMF, use the **no** form of this command.

atm sustained-cell-rate-margin-factor *percent*

no atm sustained-cell-rate-margin-factor

Syntax Description

percent	Percent value that dictates the weighting of PCR with respect to SCR in computing the bandwidth used in the CAC of VBR connections.

Defaults

1 percent

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The following equation is used in the CAC of VBR connections to define the bandwidth requested.

```
bandwidth = (SCRMF * (PCR-SCR))/100 + SCR
```

Examples

In the following example, the SCRMF of the switch is set to 35 percent.

```
Switch(config)# atm sustained-cell-rate-margin-factor 35
```

Related Commands

Command	Description
show atm resource	Displays the ATM layer connection information about the virtual path.

atm svcc vci min

To specify the minimum VCI value for the ILMI signalling stack to support for allocation to SVCCs, use the **atm svcc vci min** interface configuration command.

atm svcc vci min *value*

Syntax Description

value	Minimum VCI value, in the range of 32 to 16383.

Defaults

35

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

This command specifies the minimum VCI value used in range negotiation by the ILMI signalling stack for SVCCs. This feature is supported in autoconfiguration and nonautoconfiguration mode.

Examples

The following example illustrates how to set the minimum SVCC VCI value on ATM interface 0/0/1 to 100.

```
Switch(config)# interface atm 0/0/1
Switch(config-if)# atm svcc vci min 100
```

Related Commands

Command	Description
atm svcc vpi max	Specifies the maximum VPI value for the ILMI signalling stack to support for allocation to SVCCs.
show atm interface	Displays ATM-specific information about an ATM interface.

atm svcc vpi max

To specify the maximum VPI value for the ILMI signalling stack to support for allocation to SVCCs, use the **atm svcc vpi max** interface configuration command.

atm svcc vpi max *value*

Syntax Description

value	Maximum VPI value. Allowed values have the following ranges, by interface type: • For 25-MB port adapters: From 0 to 3 • For logical and CPU interfaces: 0 only • For other interfaces: From 0 through 255

Defaults

For CPU interfaces: 0

For other interfaces: 255

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

This command specifies the maximum VPI value used in range negotiation by the ILMI signalling stack for SVCCs. This feature is supported in autoconfiguration and nonautoconfiguration mode.

Note On a bidirectional VCC, the VPI/VCI values used for both directions of the connection are the same at each interface. The same VCI is used for both directions of a connection at an interface.

Examples

The following example illustrates how to set the maximum SVCC VPI value on ATM interface 0/0/1 to 3.

```
Switch(config)# interface atm 0/0/1
Switch(config-if)# atm svcc vpi max 3
```

Related Commands

Command	Description
atm svcc vci min	Specifies the minimum VCI value for the ILMI signalling stack to support for allocation to SVCCs.
show atm interface	Displays ATM-specific information about an ATM interface.

atm svpc vpi max

To specify the maximum VPI value for the ILMI signalling stack to support for allocation to SVPCs, use the **atm svpc vpi max** interface configuration command.

atm svpc vpi max *value*

Syntax Description

value	Maximum VPI value. Allowed values have the following ranges, by interface type: • For 25-MB port adapters: From 0 to 3 • For logical and CPU interfaces: 0 only • For other interfaces: From 0 through 255

Defaults

For CPU interfaces: 0

For other interfaces: 255

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

This command specifies the maximum VPI value used in range negotiation by the ILMI signalling stack for SVPCs. This feature is supported in autoconfiguration and non-autoconfiguration mode.

Note On a bidirectional VCC, the VPI/VCI values used for both directions of the connection are the same at each interface. The same VCI is used for both directions of a connection at an interface.

Examples

The following example shows how to set the maximum SVPC VPI value to 3 on ATM interface 0/0/1.

```
Switch(config)# interface atm 0/0/1
Switch(config-if)# atm svpc vpi max 3
```

Related Commands

Command	Description
atm svcc vci min	Specifies the minimum VCI value for the ILMI signalling stack to support for allocation to SVCCs.
atm svcc vpi max	Specifies the maximum VPI value for the ILMI signalling stack to support for allocation to SVCCs.
show atm interface	Displays ATM-specific information about an ATM interface.

atm threshold-group discard-threshold

To specify the threshold at which the per-connection queue is considered full for CLP discards and EPD, use the **atm threshold-group discard-threshold** global configuration command. To reset the discard threshold percentage for a particular threshold group to the default value, use the **no** form of this command.

Catalyst 8540 MSR

atm threshold-group [**module-id** *id-num*] *tg-num* **discard-threshold** *percent*

no atm threshold-group *tg-num* **discard-threshold**

Catalyst 8510 MSR and LightStream 1010

atm threshold-group *tg-num* **discard-threshold** *percent*

no atm threshold-group *tg-num* **discard-threshold**

Syntax Description

id-num	Module identification number. (Catalyst 8540 MSR)
tg-num	Threshold group number, in the range of 1 to 6.
percent	The percentage of queue-full in the threshold. To disable the threshold, use 100. The range is 0 to 100.

Defaults

87 percent

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

As the threshold group becomes congested (the cumulative number of cells on the queues of VCs in the threshold group approaches the configured max-cells value), the maximum number of cells per queue shrinks from the threshold group max-queue-limit to the min-queue-limit. As the queue size changes, the discard threshold changes, and the installed threshold is made as close as possible to the percent of queue-full specified.

Note This command is not available on systems equipped with the FC-PCQ. (Catalyst 8510 MSR and LightStream 1010)

Examples

The following example shows how to configure threshold group 3 to a discard-threshold of 50 percent.

```
Switch(config)# atm threshold-group 3 discard-threshold 50
```

Related Commands

Command	Description
atm threshold-group max-cells	Specifies the maximum number of cells queued for all connections that are members of a specified threshold group.
atm threshold-group max-queue-limit	Sets the largest per-VC queue limit for a specified threshold group.
atm threshold-group min-queue-limit	Sets the smallest per-VC queue limit for a specified threshold group.
show atm resource	Displays the ATM layer connection information about the virtual path.

atm threshold-group marking-threshold

To specify the threshold at which the per-connection queue is considered full for EFCI marking and ABR relative-rate marking, use the **atm threshold-group marking-threshold** global configuration command. To reset the marking threshold percentage for a particular threshold group to the default value, use the **no** form of this command.

Catalyst 8540 MSR

atm threshold-group [**module-id** *id-num*] *tg-num* **marking-threshold** *pct*

no atm threshold-group *tg-num* **marking-threshold**

Catalyst 8510 MSR and LightStream 1010

atm threshold-group *tg-num* **marking-threshold** *pct*

no atm threshold-group *tg-num* **marking-threshold**

Syntax Description

id-num	Module identification number. (Catalyst 8540 MSR)
tg-num	Threshold group number, in the range of 1 through 6.
pct	The percentage of queue-full in the threshold. To disable the threshold, use 100. The range is 0 to 100.

Defaults

25 percent

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

As the threshold group becomes congested (the cumulative number of cells on the queues of VCs in the threshold group approaches the configured max-cells value), the maximum number of cells per queue shrinks from the threshold group max-queue-limit to the min-queue-limit. As the queue size changes, the marking threshold changes, and the installed threshold is made as close as possible to the percent of queue-full specified.

Note This command is not available on systems equipped with the FC-PCQ. (Catalyst 8510 MSR and LightStream 1010)

Examples

The following example shows how to configure threshold group 3 to to a marking-threshold of 50 percent.

```
Switch(config)# atm threshold-group 3 marking-threshold 50
```

Related Commands

Command	Description
atm threshold-group max-cells	Specifies the maximum number of cells queued for all connections that are members of a specified threshold group.
atm threshold-group max-queue-limit	Sets the largest per-VC queue limit for a specified threshold group.
atm threshold-group min-queue-limit	Sets the smallest per-VC queue limit for a specified threshold group.
show atm resource	Displays the ATM layer connection information about the virtual path.

atm threshold-group max-cells

To specify the maximum number of cells queued for all connections that are members of a specified threshold group, use the **atm threshold-group max-cells** global configuration command. To reset the maximum cell count for a particular threshold group to the default value, use the **no** form of this command.

Catalyst 8540 MSR

atm threshold-group [**module-id** *id-num*] *tg-num* **max-cells** *cell-num*

no atm threshold-group *tg-num* **max-cells**

Catalyst 8510 MSR and LightStream 1010

atm threshold-group *tg-num* **max-cells** *cell-num*

no atm threshold-group *tg-num* **max-cells**

Syntax Description

id-num	Module identification number. (Catalyst 8540 MSR)
tg-num	Threshold group number, in the range of 1 to 6.
cell-num	Cell number, in the range of 0 to 65535.

Defaults

65535

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

As the threshold group becomes congested (the cumulative number of cells on the queues of VCs in the threshold group approaches the configured max-cells value), the maximum number of cells per queue shrinks from the threshold group max-queue-limit to the min-queue-limit.

The hardware does not provide all possible max-cell values in the range. Rather, the value used is the closest number of cells greater than that specified. The possible values are {(64*i)-1, 1<=i<=1024}. The installed value can be displayed using the **show atm resource** command.

Note This command is not available on systems equipped with the FC-PCQ. (Catalyst 8510 MSR and LightStream 1010)

Examples

The following example shows how to set threshold-group 3 to a maximum cell count of 32000.

```
Switch(config)# b tm threshold-group 3 max-cells 32000
```

Related Commands

Command	Description
atm threshold-group discard-threshold	Specifies the threshold at which the per-connection queue is considered full for CLP discards and EPD.
atm threshold-group marking-threshold	Specifies the threshold at which the per-connection queue is considered full for EFCI marking and ABR relative-rate marking.
atm threshold-group max-queue-limit	Sets the largest per-VC queue limit for a specified threshold group.
atm threshold-group min-queue-limit	Sets the smallest per-VC queue limit for a specified threshold group.
show atm rmon	Shows the status of the ATM RMON MIB.

atm threshold-group max-queue-limit

To set the largest per-VC queue limit for a specified threshold group, use the **atm threshold-group max-queue-limit** global configuration command. To reset the maximum queue limit for a particular threshold group to the default value, use the **no** form of this command.

Catalyst 8540 MSR

atm threshold-group [**module-id** *id-num*] *tg-num* **max-queue-limit** *cells*

no atm threshold-group *tg-num* **max-queue-limit**

Catalyst 8510 MSR and LightStream 1010

atm threshold-group *tg-num* **max-queue-limit** *cells*

no atm threshold-group *tg-num* **max-queue-limit**

Syntax Description

id-num	Module identification number. (Catalyst 8540 MSR)
tg-num	Threshold group number, in the range of 1 to 6.
cells	Number of cells. This value is limited to the lesser of 16383 or the value specified with the **atm threshold-group max-cells** command.

Defaults

Depends on the threshold group.

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

As the threshold group becomes congested (the cumulative number of cells on the queues of the VCs in the threshold group approaches the configured max-cells value), the maximum number of cells per queue shrinks from the threshold group max-queue-limit to the min-queue-limit.

The hardware does not provide all possible max-queue-limit values in the range. Rather, the value used is the closest number of cells greater than that specified. The possible values are {(16 * i) -1, 2 <= i <= 1024}. The installed value can be displayed using the **show atm resource** command.

Note This command is not available on systems equipped with the FC-PCQ. (Catalyst 8510 MSR and LightStream 1010)

Examples

The following example shows how to set threshold-group 3 to a maximum queue limit of 16383.

```
Switch(config)# atm threshold-group 3 max-queue-limit 16383
```

Related Commands

Command	Description
atm threshold-group discard-threshold	Specifies the threshold at which the per-connection queue is considered full for CLP discards and EPD.
atm threshold-group marking-threshold	Specifies the threshold at which the per-connection queue is considered full for EFCI marking and ABR relative-rate marking.
atm threshold-group max-cells	Specifies the maximum number of cells queued for all connections that are members of a specified threshold group.
atm threshold-group min-queue-limit	Sets the smallest per-VC queue limit for a specified threshold group.
show atm resource	Displays the ATM layer connection information about the virtual path.

atm threshold-group min-queue-limit

To set the smallest per-VC queue limit for a specified threshold group, use the **atm threshold-group min-queue-limit** global configuration command. To reset the minimum queue limit for a particular threshold group to the default value, use the **no** form of this command.

Catalyst 8540 MSR

atm threshold-group [**module-id** *id-num*] *tg-num* **min-queue-limit** *cells*

no atm threshold-group *tg-num* **min-queue-limit**

Catalyst 8510 MSR and LightStream 1010

atm threshold-group *tg-num* **min-queue-limit** *cells*

no atm threshold-group *tg-num* **min-queue-limit**

Syntax Description

id-num	Module identification number. (Catalyst 8540 MSR)
tg-num	Threshold group number, in the range of 1 to 6.
cells	Number of cells. This value is limited to the lesser of 1023 or the value specified by the **atm threshold-group max-queue-limit** command.

Defaults

Depends on the threshold group.

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

As the threshold group becomes congested (the cumulative number of cells on the queues of VCs in the threshold group approaches the configured max-cells value), the maximum number of cells per-queue shrinks from the threshold group max-queue-limit to the min-queue-limit.

Note This command is not available on systems equipped with the FC-PCQ. (Catalyst 8510 MSR and LightStream 1010)

Examples

The following example shows how to set threshold-group 3 to a minimum queue limit of 31.

```
Switch(config)# atm threshold-group 3 min-queue-limit 31
```

Related Commands

Command	Description
atm threshold-group discard-threshold	Specifies the threshold at which the per-connection queue is considered full for CLP discards and EPD.
atm threshold-group marking-threshold	Specifies the threshold at which the per-connection queue is considered full for EFCI marking and ABR relative-rate marking.
atm threshold-group max-queue-limit	Sets the largest per-VC queue limit for a specified threshold group.
atm threshold-group max-cells	Specifies the maximum number of cells queued for all connections that are members of a specified threshold group.
show atm resource	Displays the ATM layer connection information about the virtual path.

atm threshold-group name

To specify the name associated with a threshold group number, use the **atm threshold-group name** global configuration command. To reset the name of a particular threshold group to the default value, use the **no** form of this command.

Catalyst 8540 MSR

atm threshold-group [**module-id** *id-num*] *tg-num* **name** *tg-name*

no atm threshold-group *tg-num* **name**

Catalyst 8510 MSR and LightStream 1010

atm threshold-group *tg-num* **name** *tg-name*

no atm threshold-group *tg-num* **name**

Syntax Description

id-num	Module identification number. (Catalyst 8540 MSR)
tg-num	Threshold group number, in the range of 1 to 5.
tg-name	Threshold group name, in the range of 1 to 15 characters.

Defaults

1 – cbr-default
2 – vbrrt-default
3 – vbrnrt-default
4 – abr-default
5 – ubr-default

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

You cannot rename the well-known VC threshold group.

Note This command is not available on systems equipped with the FC-PCQ.

Examples

The following example shows how to change the name of threshold group 3 to **bigq**.

```
Switch(config)# atm threshold-group 3 name bigq
```

Related Commands

Command	Description
show atm resource	Displays the ATM layer connection information about the virtual path.

atm threshold-group service

To assign a service category to a threshold group, use the **atm threshold-group service** global configuration command. To reset the association of a particular service category to a threshold group, use the **no** form of this command.

atm threshold-group service {**cbr** | **vbr-rt** | **vbr-nrt** | **abr** | **ubr**} *tg-num*

no atm threshold-group service {**cbr** | **vbr-rt** | **vbr-nrt** | **abr** | **ubr**}

Syntax Description

cbr	The constant bit rate parameter.
vbr-rt	The variable bit rate real-time parameter.
vbr-nrt	The variable bit rate when the parameter is not real-time.
abr	The available bit rate parameter.
ubr	The unspecified bit rate parameter.
tg-num	Threshold group number, in the range of 1 to 5.

Defaults

atm threshold-group service cbr 1
atm threshold-group service vbr-rt 2
atm threshold-group service vbr-nrt 3
atm threshold-group service abr 4
atm threshold-group service ubr 5

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

This command is not available on systems equipped with the FC-PCQ. (Catalyst 8510 MSR and LightStream 1010)

Examples

The following example shows how to set the threshold group to use subsequently in connection setup for CBR connections to group 3.

```
Switch(config)# atm threshold-group service cbr 3
```

Related Commands

Command	Description
show atm resource	Displays the ATM layer connection information about the virtual path.

atm-vc

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

protocol protocol-address **atm-vc** *vci* [**class** *class-name*] [**broadcast**] [**aal5mux**]

no *protocol protocol-address* **atm-vc** *vci* [**class** *class-name*] [**broadcast**] [**aal5mux**]

Syntax Description

protocol	The keyword **ip**.
protocol-address	The destination address being mapped to this PVC.
vci	Is 31 < *vci* < 2**14 - 1 (default max-VCI bits is 14).
class-name	The name of a table that contains encapsulation-specific parameters. Such a table can be shared between maps that have the same encapsulation.
broadcast	This map entry is to be used when the corresponding protocol sends broadcast packets to the interface.
aal5mux	Specifies AAL5 multiplexing encapsulation. The default is **snap**.

Defaults

No map statements are defined.

Command Modes

Map-list configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

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

Examples

The following example shows how to create a map-list named *atm*, followed by a map statement for the protocol address being mapped.

```
Switch(config)# map-list atm
Switch(config-map-list)# ip 172.21.168.112 atm-vc 99
```

Related Commands

Command	Description
map-list	Defines an ATM map statement for either a PVC or SVC.

CHAPTER 3

B Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

background-routes-enable

To enable background route computation and to specify how often the switch polls for a significant change that activates a new computation of the background routes, use the **background-routes-enable** ATM router PNNI configuration command. To disable background route computation, use the **no** form of this command.

background-routes-enable [**insignificant-threshold** *number*] [**poll-interval** *seconds*]

no background-routes-enable

Syntax Description

number	Specifies the number of insignificant changes necessary to trigger a new computation of the background routes, from 1 to 100. The default is 32.
seconds	Specifies the poll interval in seconds, from 1 to 60. The default is 10 seconds.

Defaults

Disabled

Command Modes

ATM router PNNI configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

The ATM switch router supports the following two route selection modes:

- On-demand (no background routes)—Separate route computation is performed for each SETUP or ADD PARTY message received over a UNI or IISP interface. In this mode, the most recent topology information received by this node is always used for each setup request.
- Background routes—Most calls are routed using precomputed routing trees. In this mode, multiple background trees are precomputed for several service categories and QoS metrics. If no route is found in the background trees that satisfies the QoS requirements of a particular setup request, route selection reverts to on-demand route computation.

The background routes mode should be enabled in large networks, where it could exhibit less stringent processing requirements and better scalability.

The **poll-interval** is used to throttle background route computation. Route computation is performed at most every **poll-interval** *seconds*, when a significant change in the topology of the network is reported, or when a specified **insignificant-threshold** *number* of changes has occurred since the last route computation.

Caution Decreasing the **poll-interval** increases the load on the switch processor.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following example shows how to enable background routes with a **poll-interval** of 15 seconds using **the background-routes-enable** ATM router PNNI configuration command.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# background-routes-enable poll-interval 15
```

Related Commands

Command	Description
show atm pnni background routes	Used to show the precalculated background route table to other PNNI nodes.
show atm pnni background status	Used to show the status of background route computation activity.

bert (Catalyst 8510 MSR and LightStream 1010)

To check the bit errors on a line for a particular interval, use the **bert** interface configuration command. To deactivate the test, use the **no** form of this command. The test also terminates automatically when the interval expires.

bert pattern {**2^15 | 2^20 | 2^23 | 0s | 1s | 2^11 | 2^20-QRSS | alt-0-1**} **interval** *minutes*

no bert

Syntax Description

2^15	2^15 test pattern.
2^20	2^20 test pattern.
2^23	2^23 test pattern.
0s	All 0's test pattern.
1s	All 1's test pattern.
2^11	2^11-1 test pattern.
2^20-QRSS	2^20-1 QRSS O.151 test pattern.
alt-0-1	Alternating 0's and 1's test pattern.
interval *minutes*	Time in minutes (from 1 to 14400) of the testing interval.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

The bert test checks the bit errors on a line for a specified (in minutes) interval of time. The test starts at the interface configuration level, and stops automatically when the time interval expires. The **no** form of the **bert** command also deactivates the test.

Examples

The following example activates the **bert** command for a testing interval of 1 minute with an all 0's test pattern on ATM 3/1/0.

```
Switch(config)# interface atm 3/1/0
Switch(config-if)# bert pattern 0s interval 1
```

The following example displays the test results of the **bert** command on ATM 3/1/0 by using the **show controllers** command.

```
Switch# show controller atm 3/1/0
<information deleted>
Bert Information:
        state      : OFF, pattern     : all zeros
        interval   : 0,   result      : OUT_OF SYNC
        sync count : 1536,   bit errors  : 17600
        kbit count : 0
        bit errors since last sync    : 0
        kbit count since last sync    : 0
<information deleted>
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.

boot config

To specify the device and filename of the configuration file from which the switch configures itself during initialization, use the **boot config** global configuration command. To remove this specification, use the **no** form of the command.

boot config *device***:***filename*

no boot config

Syntax Description

*device***:**	Device containing the configuration file. The colon (**:**) is required. Valid devices are as follows: • **bootflash:** is the internal Flash memory. • **sec-bootflash:** is the secondary internal Flash memory on the redundant route processor. (Catalyst 8540 MSR) • **slot0:** is the first PC slot on the route processor card and is the initial default device. • **sec-slot0:** is the first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** is the second PC slot on the route processor card. • **sec-slot1:** is the second PC slot on the redundant route processor card. (Catalyst 8540 MSR)
filename	Name of the configuration file. The configuration file must be an ASCII file. The maximum filename length is 63 characters.

Defaults

No device and filename are specified.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **boot config** command is used to set or modify the *config_file* environment variable in the current running memory. This variable specifies the configuration file used for initialization.

Note When you use this global configuration command, you affect only the running configuration. You must save the environment variable setting to your startup configuration to place the information under ROM monitor control and to have the environment variable function as expected. Use the **copy running-config** command to save the environment variable from your running configuration to your startup configuration.

boot system

To specify the system image that the switch loads at startup, use one of the following **boot system** global configuration commands. To remove the startup system image specification, use the **no** form of this command.

boot system {[*device***:**]*filename* [*hostname*] | **flash** [*device***:**][*filename*] | **mop** *filename* [*if-type*] [*card*/*subcard*/*port*] | **rcp** *filename* [*ip-address*] | **rom** | **tftp** [*hostname*]}

no boot system [[*device***:**]*filename* [*hostname*] | **flash** [[*device***:**]*filename*] | **mop** *filename* [*if-type*] [*card*/*subcard*/*port*] | **rcp** *filename* [*ip-address*] | **rom** | **tftp** [*hostname*]]

Syntax Description

device:	Device containing the system image to load at startup. A colon (**:**) is required as part of the device specification. Valid devices are as follows: • **bootflash:** is the internal Flash memory. • **sec-bootflash:** is the secondary internal Flash memory on the redundant route processor. (Catalyst 8540 MSR) • **slot0:** is the first PC slot on the route processor card and is the initial default device. • **sec-slot0:** is the first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** is the second PC slot on the route processor card. • **sec-slot1:** is the second PC slot on the redundant route processor card. (Catalyst 8540 MSR)
filename	Name of the system image to load at startup. The filename is case sensitive. If you do not specify a *filename* for **flash**, the switch loads the first valid file in the specified Flash device, the specified partition of Flash memory, or the default Flash device (if you omit the *device***:** argument).
hostname	Name or IP address of the host that stores the system image.
flash	Boots the switch from internal Flash memory. If you omit all arguments that follow this keyword, the system searches internal Flash for the first bootable image. This keyword boots the switch from a Flash device, as specified by the *device* argument. When you omit all arguments that follow this keyword, this system searches the PC slot 0 for the first bootable image.
mop	Boots the switch from a DecNet MOP server.
if-type	Interface type, specified as **atm**, **atm-p**, **cbr**, **ethernet**, **null**, or the MAC layer address of the host to boot from.
card/subcard/port	Interface identifier for the specified interface type.
rcp	Boots the switch from a system image stored on a network server using rcp. If you omit this keyword, the transport mechanism defaults to **tftp**.
ip-address	IP address of the TFTP server containing the system image file. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

rom	Boots the switch from the system image stored in ROM.
tftp	Boots the switch from a system image stored on a TFTP server. This is the default when you do not specify any keyword (**flash**, **tftp**, or **rcp**).

Defaults

If you do not specify a system image file with the **boot system** command, the switch uses the configuration register settings to determine the default system image filename for booting from a network server. The switch forms the default boot filename by starting with the word *cisco* and then appending the octal equivalent of the boot field number in the configuration register, followed by a hyphen (-) and the processor type name (cisco*nn-cpu*). See the appropriate hardware installation guide for details on the configuration register and default filename. See also the command **config-register**. See also the "Syntax Description" section.

If you omit a keyword (**flash**, **rcp**, or **tftp**) from the **boot system** command, the system defaults to booting from a system image stored on a TFTP server.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

For this command to work, the **config-register** command must be set properly.

Enter several **boot system** commands to provide a fail-safe method for booting your switch. The switch stores and executes the **boot system** commands in the order in which you enter them in the configuration file. If you enter multiple boot commands of the same type—for example, if you enter two commands that instruct the switch to boot from different network servers—then the switch tries them in the order in which they appear in the configuration file.

Each time you write a new software image to Flash memory, you must delete the existing filename in the configuration file with the **no boot system** *filename* command. Then add a new line in the configuration file with the **boot system** *filename* command.

Note The **no boot system** global configuration command disables all **boot system** configuration commands regardless of argument. Specifying the **flash** device name or the *filename* argument with the **no boot system** command disables only the command specified by these arguments.

You can boot the switch from a compressed image on a network server. When a network server boots software, both the image being booted and the running image must fit into memory. Use compressed images to ensure that enough memory is available to boot the switch. You can compress a software image on any UNIX platform using the **compress** command. Refer to your UNIX platform's documentation for the exact usage of the **compress** command. (You can also decompress data with the UNIX **uncompress** command.)

The rcp protocol requires that a client send the remote username in an rcp request to a server. When the switch executes the **boot system rcp** command, by default the switch software sends the switch host name as both the remote and local usernames. The rcp software searches for the system image to boot from the remote server relative to the directory of the remote username (if the server has a directory structure as UNIX systems do, for example).

The **boot system** command modifies the BOOT environment variable in the running configuration. The BOOT environment variable specifies a list of bootable images on various devices.

CHAPTER 4

C Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

cablelength

To configure the cable length for a channelized DS-3 (CDS3) Frame Relay port adapter, use the **cablelength** controller configuration command. To restore the default cable length, use the **no** form of this command.

cablelength *value*

no cablelength *value*

Syntax Description

value	Cable length of 0 to 450 feet.

Defaults

224 feet

Command Modes

Controller configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Although you can specify a cable length from 0 to 450 feet, the hardware only recognizes two ranges: 0 to 224, and 225 to 450.

For example, if you enter 150 feet, the 0 to 224 range is used. If you later change the cable length to 200 feet, there is no change because 200 is within the 0 to 224 range. However, if you change the cable length to 250, the 225 to 450 range is used. The actual number you enter is stored in the configuration file.

Examples

The following example configures the cable length on controller t3 to 450 feet.

```
Switch(config)# controller t3 4/0/0
Switch(config-controller)# cablelength 450
Switch# show running-config
controller T3 4/0/0
 clock source reference
 cablelength 450
```

called-address-mask

To configure the address mask for identifying valid bits of the called NSAP address field, use the **called-address-mask** ATM signalling diagnostics configuration command. To return the address mask to the default, use the **no** form of this command.

called-address-mask ***atm-address-mask***

no called-address-mask

Syntax Description

atm-address-mask	Denotes the valid bits in the called NSAP address.

Defaults

NULL

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

To match this selection criteria, a failed connect setup must have a called party address value equal to the configured called party address for all bits that are 1 in the value of the mask specified with the command. When the default value is retained, the rejected call matches the filter criteria for any called address in the rejected call.

Examples

The following example shows configuring a called address mask string.

```
Switch# configure terminal
Switch(config)# controller atm 0/0/0
Switch(config-if)# atm signalling diagnostics 1
Switch(cfg-atmsig-diag)# called-address-mask ff.ff.ff
```

called-nsap-address

To configure the NSAP-format ATM address for the signalling diagnostics filter entry, use the **called-nsap-address** ATM signalling diagnostics configuration command. To remove any configured address, use the **no** form of this command.

called-nsap-address ***nsap-address***

no called-nsap-address

Syntax Description

nsap-address	A 40-digit hexadecimal NSAP address.

Defaults

NULL

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

NSAP-format ATM end-system addresses have a fixed length of 40 hexadecimal digits. You should configure the address using the following dotted format:

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

Note The dots can be omitted.

Examples

The following example shows setting a called NSAP address.

```
Switch# configure terminal
Switch(config)# controller atm 0/0/0
Switch(config-if)# atm signalling diagnostics 1
Switch(cfg-atmsig-diag)# called-nsap-address 47.111122223333444455556666.777788881111.00
```

calling-address-mask

To configure the address mask for identifying valid bits of the calling-nsap-address field in the signalling diagnostics filter table entry, use the **calling-address-mask** ATM signalling diagnostics configuration command. To set to the default value, use the **no** form of this command.

calling-address-mask *atm-address-mask*

no calling-nsap-address

Syntax Description

atm-address-mask	Use the address mask to denote the valid bits of the calling address field in the signalling diagnostics filter table entry.

Defaults

NULL

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

To match this selection criteria, a failed connect setup must have a calling party address value equal to the configured calling party address for all bits that are 1 in the value of the mask specified through the command. When the default value is retained, the rejected call matches the filter criteria for any calling address in the rejected call.

Examples

The following example shows a calling address mask.

```
Switch# configure terminal
Switch(config)# controller atm 0/0/0
Switch(config-if)# atm signalling diagnostics 1
Switch(cfg-atmsig-diag)# calling-address-mask ff.ff.ff
```

calling-nsap-address

To configure the NSAP-format ATM address for the signalling diagnostics filter entry, use the **calling-nsap-address** ATM signalling diagnostics configuration command. To remove any configured address, use the **no** form of this command.

calling-nsap-address ***nsap-address***

no calling-nsap-address

Syntax Description

nsap-address	The 40-digit, hexadecimal NSAP address.

Defaults

NULL

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

NSAP-format ATM end-system addresses have a fixed length of 40 hexadecimal digits. You should configure the address using the following dotted format:

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

Note The dots can be omitted.

Examples

The following example shows setting a calling NSAP address.

```
Switch# configure terminal
Switch(config)# controller atm 0/0/0
Switch(config-if)# atm signalling diagnostics 1
Switch(cfg-atmsig-diag)# calling-nsap-address 47.111122223333444455556666.777788881111.00
```

cast-type

To filter ATM signalling call failures by connection type (point-to-point or point-to-multipoint), use the **cast-type** ATM signalling diagnostics configuration command. To disable this feature, use the **no** form of this command.

cast-type {**all** | **p2p** | **p2mp**}

no cast-type

Syntax Description

all	Set the cast type to point-to-point and point-to-multipoint.
p2p	Point-to-point.
p2mp	Point-to-multipoint.

Defaults

all

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Examples

The following example shows call failures filtered by point-to-point connection.

```
Switch# configure terminal
Switch(config)# controller atm 0/0/0
Switch(config-if)# atm signalling diagnostics 1
Switch(cfg-atmsig-diag)# cast-type p2p
```

ces aal1 clock

To configure the AAL1 timing recovery clock for T1/E1 interfaces, use the **ces aal1 clock** interface configuration command. To revert to the default setting, use the **no** form of this command.

ces aal1 clock {**adaptive** | **srts** | **synchronous**}

no ces aal1 clock {**adaptive** | **srts** | **synchronous**}

Syntax Description

adaptive	Adjusts the output clock on a received AAL1 on a first-in, first-out basis. Use in unstructured mode.
srts	Adjusts the output clock on a received AAL1 on a first-in, first-out basis.
synchronous	Configures the timing recovery to synchronous for structured mode.

Defaults

synchronous

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

The clock mode must be **synchronous** for structured mode. In unstructured mode, use **adaptive** when a network-derived clock is not available.

Use **srts** when a network-derived clock is available but devices attached to the CES port use a different clock reference. The **srts** keyword samples the incoming clock, subtracts from the network clock, and sends the remainder in an AAL1 header. The clock is reconstructed during output by adding the residual to the network reference.

Use **synchronous** for all other modes.

Examples

The following command shows setting the AAL1 timing recovery clock to adaptive mode.

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces aal1 clock adaptive
```

ces aal1 service

To configure the type of ces service, use the **ces aal1 service** interface configuration command. To revert to the default setting, use the **no** form of this command.

ces aal1 service {**structured** | **unstructured**}

no ces aal1 service {**structured** | **unstructured**}

Syntax Description

structured	Sets the type of service to structured (cross-connect).
unstructured	Sets the type of service to unstructured (clear-channel).

Defaults

unstructured

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

The **structured** keyword means that each time slot is an independent entity grouped into circuits, where each circuit has an independent PVC.

The **unstructured** keyword reduces the incoming serial data on the receiving end of the ATM network. The keyword also sets the service to single circuit, single PVC, where all time slots are carried.

Examples

The following example shows changing the mode for the **ces aal1 service** command to **structured**.

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces aal1 service structured
```

ces circuit

To configure the CES connection attributes, use the **ces circuit** interface configuration command. To revert to the default setting, use the **no** form of this command.

ces circuit *circuit-id* [**cas**] [**cdv** *max-req*] [**circuit-name** *name*] [**partial-fill** *num*] [**shutdown** | **imeslots** *num*] [**on-hook-detect** *pattern*]

no ces circuit *circuit-id* [**cas**] [**cdv**] [**circuit-name** *name*] [**partial-fill** *num*] [**shutdown**] [**timeslots** *num*] [**on-hook-detect** *pattern*]

Syntax Description

circuit-id	Selects the circuit identification. For unstructured service, use 0. For T1 structure service, the range is 1 through 24. For E1 structure service, the range is 1 through 31.
cas	Enables channel-associated signalling for structured service only. The default is **no cas**.
cdv *max-req*	Enables the peak-to-peak cell delay variation requirement. The range for CDV is 1 thorough 65535 milliseconds. The default is 2000 milliseconds.
circuit-name *name*	Sets the ASCII name for the CES-IWF circuit. The string for the circuit name is 0 through 255. The default is CBRx/x/x:0.
partial-fill *num*	Enables the partial AAL1 cell fill service for structured service only. The range is 0 through 47. The default is 47.
shutdown	Marks the CES-IWF circuit administratively down. The default is **no shutdown**.
timeslots *num*	Configures the time slots for the CES-IWF circuit for structured service only. The range is 1 through 24 for T1. The range is 1 through 31 for E1.
on-hook-detect *pattern*	Configures on-hook detection on the CES circuit.

Defaults

See “Syntax Description.”

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Channel-associated signalling provides information about the time slot (on or off the hook) and is updated once per multiframe.

Examples

The following example shows setting the structured service CDV range to 5000 milliseconds.

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces circuit 3 cdv 5000
```

ces dsx1 clock source

To configure a transmit clock source to the T1/E1 CES port adapter, use the **ces dsx1 clock source** interface configuration command. To revert to the default value, use the **no** form of this command.

ces dsx1 clock source {**loop-timed** | **network-derived**}

no ces dsx1 clock source {**loop-timed** | **network-derived**}

Syntax Description

loop-timed	Configures the transmit clock to loop (rx-clock to tx-clock).
network-derived	Configures the transmit clock to be derived from the network.

Defaults

network-derived

Command Modes

Interface configuration mode

Command History

Release	Modification
11.2(5)	New command

Examples

The following example shows setting the clock source to **loop-timed**.

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces dsx1 clock source loop-timed
```

Related Commands

Command	Description
ces aal1 clock	Configures the AAL1 timing recovery clock for T1/E1 interfaces.

ces dsx1 framing

To select the frame type for the E1 or T1 data line, use the **ces dsx1 framing** interface configuration command. To restore the default setting, use the **no** form of this command.

(For E1) **ces dsx1 framing** {**e1_crc_mfCASlt | e1_crc_mflt | e1_lt | e1_mfCAS_lt**}

(For T1) **ces dsx1 framing** {**sf | esf**}

To restore the default setting, use the **no** form of these commands.

(For E1) **no ces dsx1 framing** {**e1_crc_mfCASlt | e1_crc_mflt | e1_lt | e1_mfCAS_lt**}

(For T1) **no ces dsx1 framing** {**sf | esf**}

Syntax Description

e1_crc_mfCAS_lt	Configures the frame type to e1_crc_mf: CAS enabled.
e1_crc_mf_lt	Configures the frame type to e1_crc_mf: CAS not enabled.
e1_lt	Configures the frame type to e1_lt.
e1_mfCAS_lt	Configures the frame type to e1_mf: CAS enabled.
sf	Configures the frame type to super frame.
esf	Configures the frame type to extended super frame.

Defaults

For E1: **el_lt**

For T1: **esf**

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use this command in configurations where the switch router communicates with either the T1 or the E1 data line to configure the frame type for your circuit.

Examples

The following example shows setting the E1 data line frame type to **e1_mfCAS_lt**.

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces dsx1 framing e1_mfCAS_lt
```

Related Commands

Command	Description
linecode	Selects the linecode type for the T1 or E1 line.

ces dsx1 lbo

To configure T1 port parameters, use the **ces dsx1 lbo** interface configuration command. To revert to the default setting, use the **no** form of this command.

ces dsx1 lbo *length*

no ces dsx1 lbo *length*

Syntax Description

length	Specifies the cable length as one of the following: • **0-110** • **110-200** • **220-330** • **330-440** • **440-550** • **550-660** • **660_above** • **square_pulse**

Defaults

0-110

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Set the cable length to the desired number of feet on your system.

Examples

The following example shows setting the cable length to 440 feet using the **ces dsx1 lbo** interface configuration command.

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces dsx1 lbo 440_550
```

ces dsx1 linecode

To select the linecode type for the T1 or E1 line, use the **ces dsx1 linecode** interface configuration command. To restore the default setting, use the **no** form of this command.

(For E1) **ces dsx1 linecode** {**ami** | **hdb3**}

(For T1) **ces dsx1 linecode** {**ami** | **b8zs**}

To restore the default setting, use the no form of these commands.

(For E1) **no ces dsx1 linecode** {**ami** | **hdb3**}

(For T1) **no ces dsx1 linecode** {**ami** | **b8zs**}

Syntax Description

ami	Specifies the AMI as the linecode type. Valid for the T1 or E1 interfaces.
b8zs	Specifies B8Zs as the linecode type. Valid for the T1 interface only.
hdb3	Specifies the HDB3 as the linecode type. Valid for the E1 interface only.

Defaults

For T1: **b8zs**

For E1: **hdb3**

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

The T1 service provider determines which linecode type (**ami** or **b8zs**) is required for your circuit.
The E1 service provider determines which linecode type (**ami** or **hdb3**) is required for your circuit.

Examples

The following example specifies **b8zs** as the linecode type for the T1 interface.

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces dsx1 linecode b8zs
```

ces dsx1 loopback

To configure loopback for the T1 or E1 circuit emulation port adapter module, use the **ces dsx1 loopback** interface configuration command. To revert to the default setting, use the **no** form of this command.

ces dsx1 loopback {**line** | **noloop** | **payload**}

no ces dsx1 loopback {**line** | **noloop** | **payload**}

Syntax Description

line	Sets the received signal to be looped at the line (does not penetrate line).
noloop	Sets the interface to no loop.
payload	Sets the received signal to be looped through the device and returned.

Defaults

noloop

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command is useful when testing the circuit emulation port adapter module.

Examples

The following example shows setting the loopback to **payload**.

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces dsx1 loopback payload
```

ces dsx1 signalmode robbedbit

To configure the **signalmode** to **robbedbit**, use the **ces dsx1 signalmode robbedbit** interface configuration command. To restore the default setting, use the **no** form of this command.

ces dsx1 signalmode robbedbit

no ces dsx1 signalmode robbedbit

Syntax Description

This command has no keywords or arguments.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

A T1 frame consists of 24 time slots (DS0) that send at a rate of 64 kbps. T1 defines the ability to send signalling in-band on individual time slots by removing the low bit of each byte for signalling in **robbedbit** mode. This procedure allows 8 kbps for signalling and leaves 56 kbps for data.

In structured mode, you can send the T1 signalling information across the BISDN network. This means that after you set the port in **robbedbit** signalling mode, and enable CAS on individual circuits that need this type of service, you are robbing bits from the DS0. The system then puts the bits in the specified format to be sent across the BISDN network and reinserts them at the passive side on the CES-IWF connection.

Examples

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces dsx1 signalmode robbedbit
```

Related Commands

Command	Description
ces aal1 service	Used to configure the type of CES service.
ces circuit	Used to configure the CES connection attributes.

ces pvc

To configure the destination port for the circuit, use the **ces pvc** interface configuration command. To disable this feature, use the **no** form of this command.

ces pvc *service-type* {**interface atm** *card/subcard/port* **vpi** *vpi-number* **vci** *vci-number* | **dest-address** *atm-address* [**vpi** *vpi-number* | **vci** *vci-number*] [**retry-interval** [**first** *retry-interval*] [**maximum** *retry-interval*]]}

no ces pvc *service-type* {**interface atm** *card/subcard/port* **vpi** *vp-numberi* **vci** *vci-number* | **dest-address** *atm-address* [**vpi** *vpi-number* | **vci** *vci-number*] [**retry-interval** [**first** *retry-interval*] [**maximum** *retry-interval*]]}

Syntax Description

service-type	Sets the type of service. For unstructured service, use 0. For T1 structured service, the range is 1 through 24. For E1 structured service, the range is 1 through 31.
card/subcard/port	Card number, subcard number, and port number of the ATM interface.
dest-address	Creates a soft PVC and is specified as the string 0 through 255.
vpi vpi	Virtual path identifier of the destination PVC.
vci vci	Virtual channel identifier of the destination PVC.
retry-interval	Configures retry interval timers for a soft VC.
first *retry-interval*	Retry interval for the first retry after the first failed attempt, specified in milliseconds. If the first retry after the first failed attempt also fails, the subsequent attempts will be made at intervals computed using the **first** *retry-interval* as follows: (2 ** (*k*-1)) * **first** *retry-interval* Where the value of *k* is 1 for the first retry after the first failed attempt and will be incremented by 1 for every subsequent attempt. Range is from 100 to 3600000 milliseconds; the default is 5000 milliseconds.
maximum *retry-interval*	The maximum retry interval between any two attempts specified in seconds. Once the retry interval is computed in the **first** *retry-interval* and becomes equal to or greater than the **maximum** *retry-interval* configured, the subsequent retries are done at regular intervals of **maximum** *retry-interval* seconds until the call is established. Range is from 1 to 65535 seconds; the default is 60.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use the **interface** option to create a hard PVC. Use the **dest-address** option to create a soft PVC.

You must configure both sides of the CES circuits because the source (the active side in CES-IWF) time slots are not recognized at the destination (the passive side).

Each CES circuit has an ATM address. When configuring the source PVC, you need the destination ATM address. See the **show ces address** command.

Examples

The following example shows setting a hard PVC on interface ATM 1/0/0.

```
Switch# configure terminal
Switch(config)# controller cbr 3/0/0
Switch(config-if)# ces pvc 31 interface atm 1/0/0
```

The following example shows setting an unstructured CES soft PVC.

```
Switch(config-if)# ces pvc 0 dest-atm-addr atm 1/0/0 vpi 1 vci 1
```

The following example shows setting a structured hard PVC.

```
Switch(config-if)# ces pvc 24 interface atm 1/0/1 vpi 1 vci 1
```

Related Commands

Command	Description
show ces address	Used to show all the configured CES-IWF ATM addresses.

channel-group

To form a serial interface, or channel-group, by aggregating time slots on a channelized DS3 (CDS3) or channelized E1 (CE1) line, use the **channel-group** controller configuration command. To delete a serial interface or channel-group, use the **no** form of this command.

For the CDS3 Frame Relay line, use the following syntax:

channel-group *cg-number* **t1** *line-number {***timeslots** *list* [**speed** {**64** | **56**}]*}*
no channel-group *cg-number*

For the CE1 Frame Relay line, use the following syntax:

channel-group *cg-number {{***timeslots** *list* | {unframed}*}*

Syntax Description

cg-number	Channel-group number. • For the CDS3, the range is 1 to 127. • For the CE1, the range is 1 to 31.
t1 *line-number*	Identifies the T1 line number. The range is 1 to 28.
timeslots *list*	Specifies the time slots assigned to the channel. • For the CDS3, the range is 1 to 24. • For the CE1, the range is 1 to 31. A dash represents a range of time slots; a comma separates time slots. For example,1-10, 15-18 assigns time slots 1 through 10 and 15 through 18.
[**speed** {**64**	**56**}]	Specifies the speed in Kbps. If you use this keyword, the value you enter must be either 64 or 56. The default speed is 64 kbps. This option is not available for the CE1 line.
unframed	Configures a CE1 interface as clear channel (unframed).

Defaults

For CDS3: **64 kbps**

Not applicable to CE1

Command Modes

Controller configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

If the serial interface has encapsulation set to Frame Relay, then the **no** form of this command works only if you shut down the interface or the controller so that it tears down all soft VCs automatically. Otherwise, an error is returned.

Examples

The following example shows how to configure a channel group (#2), assigning time slots 6 to 31, and creating a logical serial port on interface 1/0/0:2.

```
Switch(config)# controller e1 1/0/0
Switch(config-control)# channel-group 2 timeslots 6-31
```

class

To associate a connect-class with a specific interface, use the **class** interface configuration command. To break the association, use the **no** form of this command.

class *connect-class-name*

no class *connect-class-name*

Syntax Description

connect-class-name	Name of the predefined connect-class.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The precedence of inheriting parameters is as follows:

- A class is directly configured on the VC in the **frame-relay pvc/soft-vc** or **atm pvc/soft-vc** command.
- A class is configured on the VC in the **frame-relay pvc/soft-vc** or **atm pvc/soft-vc** command and contains the parameter.
- A class is configured on the VC subinterface and contains the parameter.
- A class is configured on the VC main interface and contains the parameter.
- Use the default.

Examples

The following example creates a connection class named fr-siw-params on serial interface 1/1/0:16.

```
Switch(config)# interface serial 1/1/0:16
Switch(config-if)# class fr-siw-params
```

Related Commands

Command	Description
connect-class	Defines parameters used to configure interworking PVCs or soft VCs.

clear atm pnni

To clear PNNI-related data, use the **clear atm pnni** privileged EXEC command.

clear atm pnni {**debug packets** | **statistics** {**call** | **flooding** | **traffic**}}

Syntax Description

debug packets	Clears the PNNI debug memory blocks.
call	Clears the PNNI call statistics.
flooding	Clears the PNNI flooding statistics.
traffic	Clears the PNNI traffic statistics.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example shows how to clear the PNNI flooding statistics.

```
Switch# clear atm pnni statistics flooding
```

Related Commands

Command	Description
atm pnni node	Specifies which PNNI node in the switch runs on an interface when the interface runs PNNI.
show atm pnni local-node	Displays information about a PNNI logical node running on the switch.

clear atm signalling statistics

To clear existing ATM signalling statistics, use the **clear atm signalling statistics** EXEC command.

clear atm signalling statistics [**interface atm** *card/subcard/port*]

Syntax Description

card/subcard/port	Specifies the card, subcard, and port number of the ATM interface.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command clears the statistics for all the interfaces or a specific interface.

Examples

The following example shows how to clear the ATM signalling statistics for interface 1/0/0.

```
Switch# clear atm signalling statistics interface atm 1/0/0
```

Related Commands

Command	Description
show atm signalling statistics	Displays the ATM signalling statistics.

clear atm-vc

To release a specified SVC, use the **clear atm vc** privileged EXEC command.

clear atm-vc *card/subcard/port vpi vci*

Syntax Description

card/subcard/port	Card number, subcard number, and port number of the ATM interface.
vpi	Virtual path identifier of the signalling SVC to clear.
vci	Virtual channel identifier of the signalling SVC to clear.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following is an example of the **clear atm-vc** command, which releases interface 3/1/0 on VPI 0 and VCI 99.

```
Switch# clear atm-vc atm 3/1/0 0 99
```

Related Commands

Command	Description
show atm vc	Displays the ATM layer connection information about the virtual connection.

clear-cause

To configure the release cause code value in the signalling diagnostics filter table entry, use the **clear-cause** ATM signalling diagnostics configuration command. To disable this feature, use the **no** format of this command.

clear-cause *clear-cause-code*

no clear-cause

Syntax Description

clear-cause-code	Decimal number denoting the release cause codes, as specified in the ATM Forum UNI 3.1 specification.

Defaults

0

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

Only the call failure records that match this configured clear-cause value are collected and stored. The default value zero (0) means the cause code is not considered during filtering.

Examples

The following example shows setting a value of 100.

```
Switch(cfg-atmsig-diag)# clear-cause 100
```

clear counters

It is recommended that you only use this command for debugging purposes because it clears all counters displayed in the **show interfaces** and **show controllers** commands. To clear the interface counters, use the **clear counters** privileged EXEC command.

clear counters [*type card/subcard/port*]

Syntax Description

type	Specifies the interface type as **atm**, **atm-p**, **cbr**, **ethernet**, **line**, **null**, **serial**, or **tunnel**.
card/subcard/port	Specifies the card, subcard, and port of the interface to clear.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command clears all the current interface counters from the interface unless the optional arguments *type* and *card/subcard/port* are specified to clear only a specific interface type such as ATM, Ethernet, and so on.

Note This command does not clear counters retrieved using SNMP.

Examples

The following example illustrates how to clear all interface counters.

```
Switch# clear counters
```

Related Commands

Command	Description
show ip access-lists	Displays the contents of all current IP access lists.

clear facility-alarm (Catalyst 8540 MSR)

Use the **clear facility-alarm** command to clear alarm conditions and reset the alarm contacts.

clear facility-alarm [**critical** | **major** | **minor**]

Syntax Description

critical	Clears critical facility alarms.
major	Clears major facility alarms.
minor	Clears minor facility alarms.

Defaults

Clears all facility alarms.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

The **clear facility-alarm** command acts like an ACO. Only a reoccurrence of the original alarm source after the original alarm condition is removed can restart the alarm.

Examples

The following example shows how to clear minor facility alarms only.

```
Switch# clear facility-alarm minor
Clearing minor alarms
Switch#
```

The following example shows how to clear all facility alarms.

```
Switch# clear facility-alarm
Clearing all alarms
Switch#
```

Related Commands

Command	Description
facility-alarm (Catalyst 8540 MSR)	Configures the temperatures so that the ATM switch router declares a major or minor alarm condition.
show facility-alarm status (Catalyst 8540 MSR)	Displays the current major and minor alarm status, if any, and displays the configuration of the alarm thresholds.

clear host

To delete entries from the host-name-and-address cache, use the **clear host** privileged EXEC command.

clear host {*name* | ***}

Syntax Description

name	Particular host entry to remove.
*	Removes all entries.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The host name entries are cleared in running memory.

Examples

The following example clears all entries from the host-name-and-address cache.

```
Switch# clear host *
```

Related Commands

Command	Description
show hosts	Displays the default domain name, the style of the name lookup service, a list of name server hosts, and the cached list of host names and addresses.

clear interface

To reset the hardware logic on an interface, use the **clear interface** privileged EXEC command.

clear interface *type card/subcard/port*

Syntax Description

type	Specifies the interface type as **atm**, **atm-p**, **cbr**, **ethernet**, or **null**.
card/subcard/port	Specifies the card, subcard, and port of the interface to clear.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Under normal circumstances, you do not need to clear the hardware logic on interfaces.

Examples

The following example resets the interface logic on ATM interface 1/0/1.

```
Switch# clear interface ATM 1/0/1
```

clear ip accounting

Note This command or some of its parameters might not function as expected.

To delete the cache table entries, use the **clear ip cache** privileged EXEC command.

clear ip cache [*address-prefix address-mask*]

Syntax Description

address-prefix	Specifies the IP address.
address-mask	Required if *address prefix* is specified.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Related Commands

Command	Description
show ip interface	Displays the usability status of interfaces configured for IP.

clear ip redirect

To redirect an IP cache, use the **clear ip redirect** privileged EXEC command.

clear ip redirect

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Related Commands

Command	Description
show ip redirects	Displays the address of a default gateway and the address of hosts for which a redirect has been received.

clear lane client

To clear the LANE client counter configured on the specified LEC interface, use the **clear lane client** privileged EXEC command.

clear lane client join-cnt [**interface atm** *card*/*subcard*/*port*]

Syntax Description

card/*subcard*/*port*	Specifies the LEC interface to clear.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

If you do not specify an interface, this command clears all the counters of any LANE client in the switch.

When you specify an interface, this command clears all the LANE client counters on that interface.

Examples

The following example shows clearing the counters on ATM 1/0/0 interface using the **clear lane client** privileged EXEC command.

```
Switch# clear lane client join-cnt interface atm 1/0/0
```

Related Commands

Command	Description
show lane client	Displays global and per-VCC LANE information for all the LANE clients configured on an interface, or any of its subinterfaces, on a specified subinterface, or on an emulated LAN.

clear lane le-arp

To clear the dynamic LE_ARP table or a single LE_ARP entry of the LANE client configured on the specified subinterface or emulated LAN, use the **clear lane le-arp** privileged EXEC command.

clear lane le-arp [{**interface atm** *card/subcard/port*[**.***subinterface-num*] | **name** *elan-name*} [**mac-address** *mac-addr* | **route-desc segment** *seg-num* **bridge** *bridge-num*]]

Syntax Description

card/subcard/port	ATM interface for the LANE client whose LE_ARP table or entry is to be cleared.
subinterface-num	Subinterface for the LANE client whose LE_ARP table or entry is to be cleared.
elan-name	Name of the emulated LAN for the LANE client whose LE_ARP table or entry is to be cleared. Maximum length is 32 characters.
mac-addr	MAC address of the entry to be cleared from the LE ARP table.
seg-num	Segment number of the next-hop route descriptor. The segment number ranges from 1 to 4095.
bridge-num	Bridge number of the next-hop route descriptor. The bridge number ranges from 1 to 15.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command only removes dynamic LE_ARP table entries. It does not remove static LE_ARP table entries.

If you do not specify an interface or an emulated LAN, this command clears all the LANE ARP tables of any LANE client in the switch.

If you specify a major interface (not a subinterface), this command clears all the LANE ARP tables of every LANE client on all the subinterfaces of that interface.

This command also removes the fast-cache entries built from the LANE ARP entries.

Examples

The following example clears all the LANE ARP tables for all clients on the switch router.

```
Switch# clear lane le-arp
```

The following example clears all the LANE ARP tables for all LANE clients on all the subinterfaces of interface atm 0.

```
Switch# clear lane le-arp interface atm 0
```

The following example clears the entry corresponding to MAC address 0800.AA00.0101 from the LE_ARP table for the LANE client on the emulated LAN named *red*.

```
Switch# clear lane le-arp name red 0800.aa00.0101
```

The following example clears all dynamic entries from the LE_ARP table for the LANE client on the emulated LAN named *red*.

```
Switch# clear lane le-arp name red
```

The following example clears the dynamic entry from the LE_ARP table for the LANE client with next-hop router descriptor segment number 1, bridge number 1, on the emulated LAN named *red*.

```
Switch# clear lane le-arp name red route-desc segment 1 bridge 1
```

Note MAC addresses are written in the same dotted notation for the **clear lane le-arp** command as they are for the global IP **arp** command.

clear lane server

To force a LANE server on a specified subinterface or emulated LAN to drop the Control Direct and Control Distribute VCCs to a given LANE client and force the client to rejoin, subject to the new bindings, use the **clear lane server** privileged EXEC command.

clear lane server {**interface** *card/subcard/port*[**.***subinterface-num*] | **name** *elan-name*}
[**client-atm-address** *client-atm-addr* | **lecid** *lecid* | **mac-address** *mac-addr* |
route-desc segment *seg-num* **bridge** *bridge-num*]

Syntax Description

card/subcard/port	Card, subcard, and port number of the ATM interface.
subinterface-num	Subinterface on which the LANE server is configured.
elan-name	Name of the emulated LAN on which the LANE server is configured. Maximum length is 32 characters.
client-atm-addr	ATM address of the LANE client.
lecid	LANE client ID, a value between 1 and 4096.
mac-addr	MAC address of the LANE client.
seg-num	Segment number of the next-hop route descriptor. The segment number ranges from 1 to 4095.
bridge-num	Bridge number of the next-hop route descriptor. The bridge number ranges from 1 to 15.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

After changing the bindings on the configuration server, enter this command on the LANE server. The LANE server drops the Control Direct and Control Distribute VCCs to the LANE client. The client then asks the LANE configuration server for the location of the LANE server of the emulated LAN it is requesting to join.

If no LANE client is specified, all LANE clients attached to the LANE server are dropped.

Examples

The following example forces all the LANE clients on the emulated LAN named *red* to be dropped. When they try to join again, they are forced to join a different emulated LAN.

```
Switch# clear lane server red
```

Related Commands

Command	Description
show lane server	Used to display global information for the LANE server configured on an interface or any of its subinterfaces.

clear rif-cache

To clear the RIF cache, use the **clear rif-cache** privileged EXEC command.

clear rif-cache

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

Some entries in the RIF cache are dynamically added, while others are static.

Related Commands

Command	Description
rif	Used to enter static source-route information into the RIF cache.
rif timeout	Used to specify the number of minutes an inactive entry is kept in the RIF cache.
show rif	Used to display the current contents of the RIF cache.

clear sgcp statistics

To clear all SGCP statistics, use the **clear sgcp statistics** privileged EXEC command.

clear sgcp statistics

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

This command clears global and per-endpoint statistics.

Examples

The following example clears the SGCP statistics.

```
Switch# clear sgcp statistics
```

Related Commands

Command	Description
show sgcp	Displays global configuration, operational state, and a summary of connection activity for SGCP.
show sgcp endpoint	Displays CES circuit endpoints that might or might not have connections created.

client-atm-address name

To add a LANE client address entry to the configuration servers configuration database, use the **client-atm-address name** lane configuration server database command. To remove a client address entry from the table, use the **no** form of this command.

client-atm-address *atm-address-template* **name** *elan-name*

no client-atm-address *atm-address-template*

Syntax Description

atm-address-template	Template that explicitly specifies an ATM address or a specific part of an ATM address and uses wildcard characters for other parts of the ATM address, enabling you to specify multiple addresses matching the explicitly specified part. Wildcard characters can replace any nibble or group of nibbles in the prefix, the ESI, or the selector fields of the ATM address.
elan-name	Name of the emulated LAN. Maximum length is 32 characters.

Defaults

No address and no emulated LAN name are provided.

Command Modes

LANE configuration server database

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command binds any client whose address matches the specified template into the specified emulated LAN. When a client comes up, it consults the LANE configuration server, which responds with the ATM address of the LANE server for the emulated LAN. The client then initiates join procedures with the LANE server.

Before this command is used, the emulated LAN specified by the *elan-name* argument must be created in the configuration server's database by using the **national reserve** (**Catalyst 8510 MSR and LightStream 1010**) command.

If an existing entry in the configuration server's database binds the LANE client ATM address to a different emulated LAN, the new command is rejected.

This command affects only the bindings in the named configuration server database. It has no effect on the LANE components themselves.

The **client-atm-address name** command is a subcommand of the global **lane database** command. See the **lane database** command for information about creating the database, and the **name server-atm-address** command for information about binding the emulated LAN name to the servers ATM address.

ATM Addresses. A LANE ATM address has the same syntax as an NSAP but it is not a network-level address. It consists of the following:

- A 13-byte prefix that includes the following fields defined by the ATM Forum:
- AFI field (1 byte), DCC or ICD field (2 bytes), DFI field (1 byte), Administrative Authority field (3 bytes), Reserved field (2 bytes), Routing Domain field (2 bytes), and the Area field (2 bytes)
- A 6-byte ESI
- A 1-byte selector field

Address Templates. LANE ATM address templates can use two types of wildcards: an asterisk (*) to match any single character (nibble), and an ellipsis (...) to match any number of leading, middle, or trailing characters. The values of the characters replaced by wildcards come from the automatically assigned ATM address.

In LANE, a *prefix template* explicitly matches the prefix, but uses wildcards for the ESI and selector fields. An ESI template explicitly matches the ESI field, but uses wildcards for the prefix and selector.

With the Cisco implementation of LANE, the prefix corresponds to the switch, the ESI corresponds to the ATM interface, and the selector field corresponds to the specific subinterface of the interface.

Examples

The following example shows how to enter database configuration mode using the database *lane_db*.

```
Switch(config)# lane database lane_db
Switch(lane-config-database)#
```

The following example uses an ESI template to specify the part of the ATM address corresponding to the interface. This example allows any client on any subinterface of the interface that corresponds to the displayed ESI value, no matter where the switch is connected, to join the engineering emulated LAN.

```
Switch(lane-config-database)# client-atm-address ...0800.200C.1001.** name engineering
```

The following example uses a prefix template to specify the part of the ATM address corresponding to the switch. This example allows any client on a subinterface of any interface connected to the switch that corresponds to the displayed prefix to join the marketing emulated LAN.

```
Switch(lane-config-database)# client-atm-address 47.000014155551212f.00.00... name
marketing
```

Related Commands

Command	Description
delay	This command or some of its parameters might not function as expected.
lane database	Cisco IOS command removed from this manual. Refer to Appendix D.
name server-atm-address	Specifies or replaces the ATM address of the LANE server for the emulated LAN in the configuration server's configuration database.

clock source (controller)

To select a transmit clock source for a channelized DS3 (CDS3) or a channelized E1 (CE1) Frame Relay port adapter, or for a 16-port OC-3c MMF port adapter, use the **clock source** controller configuration command. To return the clock source to the default, use the **no** form of this command.

clock source {**free-running** | **loop-timed** | **network-derived** | **reference**}

no clock source {**free-running** | **loop-timed** | **network-derived** | **reference**}

Syntax Description

free-running	The transmit clock is derived from the local oscillator on the port adapter.
loop-timed	The transmit clock is derived from the receive (rx) clock.
network-derived	The transmit clock is derived from the port system clock specified as highest priority when you use the **network-clock-select** global configuration command.
reference	The oscillator on the route processor is used as the transmit clock source.

Defaults

For CDS3 and CE1 Frame Relay port adapters: Default clock source is loop-timed.

For the OC-3c MMF port adapter: Default clock source is **network-derived**.

Command Modes

Controller configuration

Command History

Release	Modification
11.1(4)	New command. Originally **clock source**
12.0(1a)W5(5b)	Added: **(controller)**

Usage Guidelines

Currently, all types of OC-12 port adapters do not support **loop-timed** mode.

When a transmit clock port is set to **free-running**, if there is a local oscillator present on the port adapter, the port uses the port adapter's oscillator as the clock source. If there is no local oscillator present on the port adapter, the port uses the route processor oscillator.

Examples

The following example shows how to enable the reference clocking mode on an E1 interface.

```
Switch# configure terminal
Switch(config)# controller e1 1/0/0
Switch(config-controller)# clock source reference
```

Related Commands

Command	Description
network-clock-select	Allows the recovered clock to specify a particular port to provide network clocking.
show controllers	Displays information about a physical port device.

clock source (interface) (Catalyst 8510 MSR and LightStream 1010)

To select a transmit clock source for a physical device such as a port, use the **clock source** interface configuration command. To return the clock source to the default, use the **no** form of this command.

clock source {**free-running** | **loop-timed** | **network-derived**}

no clock source {**free-running** | **loop-timed** | **network-derived**}

Syntax Description

free-running	The transmit clock is derived from the local oscillator on the port adapter.
loop-timed	The transmit clock is derived from the receive (rx) clock.
network-derived	The transmit clock is derived from the port system clock specified at highest priority when you use the **network-clock-select** global configuration command.

Defaults

network-derived

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command. Originally **clock source (interface)**
12.0(3c)W5(9)	Added: **(Catalyst 8510 MSR and LightStream 1010)**

Usage Guidelines

This command applies to all interfaces except older versions of the DS3/E3 and the 25-Mbps interfaces.

This subcommand allows selection of the transmit clock source for the physical device of a port. Currently, all types of OC-12 port adapters do not support **loop-timed** mode.

When a transmit clock port is set to **free-running**, if there is a local oscillator present on the port adapter, the port uses the port adapter's oscillator as the clock source. If there is no local oscillator present on the port adapter, the port uses the route processor oscillator.

Examples

The following example shows how to enable the loop-timed clocking mode.

```
Switch(config-if)# clock source loop-timed
```

Related Commands

Command	Description
framing (interface)	Selects the frame type for the data line.
network-clock-select	Allows the recovered clock to specify a particular port to provide network clocking.

clock source (Catalyst 8540 MSR)

To select a transmit clock source for a physical device such as a port, use the **clock source** interface configuration command. To return the clock source to the default, use the **no** form of this command.

clock source {**free-running | loop-timed | network-derived | reference**}

no clock source {**free-running | loop-timed | network-derived | reference**}

Syntax Description

free-running	The transmit clock is derived from the local oscillator on the port adapter.
loop-timed	The transmit clock is derived from the receive (rx) clock.
network-derived	The transmit clock is derived from the port system clock specified at highest priority when you use the **network-clock-select** global configuration command.
reference	The oscillator on the route processor is used as the transmit clock source.

Defaults

network-derived

Command Modes

Interface configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

This command applies to all interfaces except older versions of the DS3/E3 and the 25-Mbps interfaces.

This subcommand allows selection of the transmit clock source for the physical device of a port. Currently, all types of OC-12 port adapters do not support **loop-timed** mode.

When a transmit clock port is set to **free-running**, if there is a local oscillator present on the port adapter, the port uses the port adapter's oscillator as the clock source. If there is no local oscillator present on the port adapter, the port uses the route processor oscillator.

Examples

The following example shows how to enable the loop-timed clocking mode.

```
Switch(config-if)# clock source loop-timed
```

Related Commands

Command	Description
framing (interface)	Selects the frame type for the data line.
network-clock-select	Allows the recovered clock to specify a particular port to provide network clocking.

collection-modes

To initialize the collection mode and specify at what time accounting data is recorded in the accounting file, use the **collection-modes** ATM accounting file subcommand. To disable the collection mode, use the **no** form of this command.

collection-modes [**periodic**] [**on-release**]

no collection-modes

Syntax Description

periodic	Data is recorded at recurring time intervals.
on-release	Data is recorded on the release of a connection.

Command Modes

ATM accounting file

Command History

Release	Modification
11.1(4)	New command

Examples

The following example initializes the collection mode and specifies that the accounting data is recorded on the release of a connection.

```
Switch# configure terminal
Switch(config)# atm accounting file acctng_file1
Switch(config-acct-file)# collection-modes on-release
```

Related Commands

Command	Description
atm accounting file	Enables an ATM accounting file and enters the accounting file configuration mode.
failed-attempts	Configures the writing of records for initial connection attempts.
multiring	Enables collection and use of RIF information on a subinterface.

connection-category

To filter ATM signalling call failures by virtual circuit category, use the **connection-category** ATM signalling diagnostics configuration command. To return the connection category to the default, use the **no** form of this command.

connection-category {**all** | **soft-vc** | **soft-vp** | **switched-vc** | **switched-vp**}

no connection-category

Syntax Description

all	Sets the connection category to **soft-vc**, **soft-vp**, **switched-vc**, and **switched-vp**.
soft-vc	Specifies soft virtual circuit.
soft-vp	Specifies soft virtual path.
switched-vc	Specifies switched virtual circuit.
switched-vp	Specifies switched virtual path.

Defaults

all

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

Use the **atm signalling diagnostics** command to enter diagnostics configuration mode.

Examples

In the following example, call failures are filtered by soft virtual circuits.

```
Switch# configure terminal
Switch(config)# controller atm 0/0/0
Switch(config-if)# atm signalling diagnostics 1
Switch(cfg-atmsig-diag)# connection-category soft-vc
```

connection-types

To set types of connections for atm accounting selection, use the **connection-types** ATM accounting selection command. To return the connection-type to the default, use the **no** form of this command.

connection-types [**pvc** | **pvp** | **spvc-originator** | **spvc-target** | **spvp-originator** | **spvp-target** | **svc-in** | **svc-out** | **svp-in** | **svp_out**]

no connection-types [**pvc** | **pvp** | **spvc-originator** | **spvc-target** | **spvp-originator** | **spvp-target** | **svc-in** | **svc-out** | **svp-in** | **svp_out**]

Syntax Description

pvc	Sets the permanent virtual circuit.
pvp	Sets the permanent virtual path.
spvc-originator	Sets the originating SPVC.
spvc-target	Sets the target SPVC.
spvp-originator	Sets the originating SPVP.
spvp-target	Sets the target SPVP.
svc-in	Sets the incoming switched virtual circuit.
svc-out	Sets the outgoing switched virtual circuit.
svp-in	Sets the incoming switched virtual path.
svp_out	Sets the outgoing switched virtual path.

Defaults

The default value for the connection type is **svc-in**, **svc-out**, and **svp-out**.

Command Modes

ATM accounting selection

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

Changes to **connection-types** take effect immediately.

Examples

The following example shows specifying the connection types for ATM accounting selection index 1 as spvc-originator and spvp-originator.

```
Switch(config)# atm accounting selection 1
Switch(config-acct-sel)# connection-types spvc-originator spvp-originator
```

Related Commands

Command	Description
atm accounting selection	Enables ATM accounting selection and enters the ATM accounting selection configuration mode.
atm accounting collection	Controls collection of ATM accounting data into a specific file.
atm accounting file	Enables an ATM accounting file and enters the accounting file configuration mode.
list	Cisco IOS command has been removed from this manual.

controller

To select a port on a Frame Relay port adapter, use the **controller** global configuration command.

controller {**t3** | **e1**} *card/subcard/port*

Syntax Description

t3	Channelized DS3 (CDS3) Frame Relay port adapter.
e1	Channelized E1 (CE1) Frame Relay port adapter.
card/subcard/port	Specifies the card, subcard, and port of the T3 or E1 interface. The card number is displayed using the **show interfaces** command. The subcard number can be either 0 or 1. The port number is 0 for a single-port CDS3 Frame Relay port adapter.

Command Modes

Global configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

Specify the controller to configure by entering the **controller** subcommand, followed by **e1** or **t3**, and *card/subcard/port*.

Examples

The following example begins configuration of the CE1 Frame Relay interface on card 11, subcard 0, and port 0 using the **controller** global configuration command.

```
Switch# configure terminal
Switch(config)# controller e1 11/0/0
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

copy

To copy any file from a Flash device to another destination, use the **copy** privileged EXEC command.

copy {*device***:***filename* | *source*} {*device***:***filename* | *destination*}

Syntax Description

device:filename	Specifies a device and filename as the source or destination of the copy operation. The *device* is optional; but when it is used, the colon (**:**) is required. Valid devices are as follows: • **bootflash:** is the internal Flash memory. • **sec-bootflash:** is the secondary internal Flash memory on the redundant route processor. (Catalyst 8540 MSR) • **nvram:** is the NVRAM on the route processor card. • **sec-nvram:** is the NVRAM on the redundant route processor card. (Catalyst 8540 MSR) • **slot0:** is the first PC slot on the route processor card and is the initial default device. • **sec-slot0:** is the first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** is the second PC slot on the route processor card. • **sec-slot1:** is the second PC slot on the redundant route processor card. (Catalyst 8540 MSR) The *filename* is the name of the source or destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.
source/destination	Specifies a copy source or destination using rcp or TFTP, the running configuration, the startup configuration, or Flash memory. Refer to the **copy flash**, **copy rcp**, **copy running-config**, **copy startup-config**, and **copy tftp** commands.

Defaults

If you omit the source or destination device, the switch uses the default device specified by the **cd** command. If you omit the destination filename, the switch uses the source filename.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp.

When the destination is specified by the *config_file* or BOOTLDR environment variable, the switch prompts you for confirmation before proceeding with the copy. When the destination is the only valid image in the BOOT environment variable, the switch also prompts you for confirmation before proceeding with the copy.

The *config_file* environment variable specifies the configuration used during switch initialization. The BOOTLDR environment variable specifies the Flash device and filename containing the rxboot image for booting. The BOOT environment variable specifies a list of bootable images on various devices. To view the contents of environment variables, use the **show bootvar** command. To modify the *config_file* environment variable, use the **boot config** command. To modify the BOOTLDR environment variable, use the **boot bootldr** command. To modify the BOOT environment variable, use the **boot system** command. To save your modifications, use the **copy running-config startup-config** command.

If you do not specify a source or destination device, the switch uses the default device specified by the **cd** command.

Examples

The following example copies the *switch-config1* file from the internal Flash memory of a switch router to the *switch-backupconfg* file on the Flash memory card inserted in the first slot of the route processor card.

```
Switch# copy bootflash:switch-config1 slot0:switch-backupconfig
```

In the following example, the switch copies the *switch-config* file from the Flash memory card inserted in slot 0 of the route processor card to the startup configuration.

```
Switch# copy slot0:switch-config startup-config
```

Related Commands

Command	Description
boot system	Specifies the system image that the switch router loads at startup.
copy flash	Copies a file from Flash memory to another destination.
copy rcp	Copies a file from a network server to the switch router, or to another destination using **rcp**.
copy running-config	Copies the switch router's running configuration file to another destination.
copy startup-config	Copies the switch router's startup configuration file to another destination.
copy tftp	Copies a file from a TFTP server to the switch router or to another destination.
dialer-list list	This command or some of its parameters might not function as expected. See Appendix D of this command reference.

copy flash

To copy a file from Flash memory to another destination, use the **copy flash** privileged EXEC command.

copy flash {**rcp** | **tftp** | *device***:***filename*}

Syntax Description

rcp	Specifies a copy operation to a network server using rcp.
tftp	Specifies a TFTP server as the destination of the copy operation.
*device***:***filename*	Specifies a *device***:***filename* as the destination of the copy operation. The *device* argument is optional, but when it is used, the colon (**:**) is required.Valid devices are as follows: • **bootflash:** is the internal Flash memory. • **sec-bootflash:** is the secondary internal Flash memory on the redundant route processor. (Catalyst 8540 MSR) • **nvram:** is the NVRAM on the route processor card. • **sec-nvram:** is the NVRAM on the redundant route processor card. (Catalyst 8540 MSR) • **slot0:** is the first PC slot on the route processor card and is the initial default device. • **sec-slot0:** is the first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** is the second PC slot on the route processor card. • **sec-slot1:** is the second PC slot on the redundant route processor card. (Catalyst 8540 MSR) The *filename* argument is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.

Defaults

If you omit the destination device, the switch router uses the default device specified by the **cd** command. If you omit the destination filename, the switch router uses the source filename.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **copy flash** command copies from one of the three Flash memory devices. The system prompts you to enter a specific device and filename. You can enter one of the following as the source device:

- **bootflash:** This device is the internal Flash memory in the switch. router.
- **slot0:** This device is the first PC slot on the route processor card.
- **slot1:** This device is the second PC slot on the route processor card.

You must follow the source device with a colon (**:**) and a filename.

Use the **copy flash rcp** command to copy a system image from Flash memory to a network server using **rcp**. You can use the copy of the system image as a backup copy. You can also use it to verify that the copy in Flash memory is the same as the original file.

The rcp software requires that a client send the remote username on each **rcp** request to the server. When you issue the **copy flash rcp** command, by default the switch router software sends the remote username associated with the current TTY if that name is valid. For example, if the user is connected to the switch router through Telnet and was authenticated through the **username** command, the switch router software sends that username as the remote username.

If the TTY username is invalid, the switch router software uses the switch router host name as both the remote and local usernames.

Note TTYs are commonly used in Cisco communications servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

To specify a different remote username to be sent to the server, use the **ip rcmd remote-username** command. You can also specify the path of an existing directory along with the remote username.

Caution The remote username must be associated with an account on the destination server. If you do not use the **ip rcmd remote-username** command to specify the name of a remote user associated with an account on the server, the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, the switch router host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command does not execute successfully when a default remote username is used.

If you copy the system image to a personal computer used as a file server, the computer must support the rsh protocol.

Use the **copy flash tftp** command to copy a system image from Flash memory to a TFTP server. As with the **copy flash rcp** command, you can use the copy of the system image as a backup or verification that the copy in Flash is the same as the original file.

The **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp. If you do not specify a source or destination device, the switch router uses the default device specified by the **cd** command.

When the destination is also specified by the *config_file* environment variable, the switch router prompts you for confirmation before proceeding with the copy. The *config_file* environment variable specifies the configuration used during switch initialization. To view the contents of the *config_file*

environment variable, use the **show bootvar** command. To modify the *config_file* environment variable, use the **boot config** command. To save your modifications to the *config_file* environment variable, use the **copy running-config startup-config** command.

Examples

The following example shows how to use the **copy flash rcp** command.

```
Switch# configure terminal
Switch# ip rcmd remote-username netadmin1
Ctrl-Z
Switch# copy flash rcp

System flash directory, partition 2:
File  Length   Name/status
  1   984      junk
[1048 bytes used, 8387560 available, 8388608 total]
Address or name of remote host [223.255.254.254]?
Source file name? junk
Destination file name [junk]? junk
Verifying checksum for 'junk' (file # 1)...  OK
Copy 'junk' from Flash to server
  as 'junk'? [yes/no]y
-
Upload to server done
Flash copy took 0:00:00 [hh:mm:ss]
```

You see a spinning line during the copy process.

The following example illustrates how to use the **copy flash rcp** command when copying from a particular partition of Flash memory.

```
Switch# copy flash rcp
System flash partition information:
Partition   Size     Used    Free    Bank-Size   State       Copy-Mode
    1       4096K    2048K   2048K   2048K       Read Only   RXBOOT-FLH
    2       4096K    2048K   2048K   2048K       Read/Write  Direct

[ Type ?number for partition directory; ? for full directory; q to abort]
Which partition? [default = 1]
```

The system prompts you if there are two or more partitions. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (**?**) for a directory display of all partitions, or a question mark and a number (**?***number*) for a directory display of a particular partition. The default is the first partition.

```
System flash directory, partition 2:
File  Length   Name/status
  1   3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [ABC.CISCO.COM]?
Source file name?
```

The file is copied from the partition given earlier by the user.

```
Destination file name [default = source name]?
Verifying checksum for 'master/igs-bfpx.100-4.3' (file # 1)...  OK
Copy 'master/igs-bfpx.100-4.3' from Flash to server
as 'master/igs-bfpx.100-4.3'? [yes/no] yes
```

The following is sample output from the **copy flash tftp** command.

```
Switch# copy flash tftp:
Enter source file name: bootflash:test-image
Enter destination file name [test-image]: tftpboot/backup-image
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
Address or name of remote host []? 172.20.46.50
!
```

The following example illustrates how to use the **copy flash tftp** command when copying from a particular partition of Flash memory.

```
Switch# copy flash tftp
System flash partition information:
Partition   Size     Used    Free    Bank-Size   State       Copy-Mode
    1       4096K    2048K   2048K   2048K       Read Only   RXBOOT-FLH
    2       4096K    2048K   2048K   2048K       Read/Write  Direct

[Type ?number for partition directory; ? for full directory; q to abort]
Which partition? [default = 1]
```

The system prompts you if there are two or more partitions. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (**?**) for a directory display of all partitions, or a question mark and a number (**?***number*) for a directory display of a particular partition. The default is the first partition.

```
System flash directory, partition 2:
File  Length   Name/status
  1   3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [ABC.CISCO.COM]?
Source file name?
```

The file is copied from the partition given earlier by the user.

```
Destination file name [default = source name]?
Verifying checksum for 'master/igs-bfpx.100-4.3' (file # 1)...  OK
Copy 'master/igs-bfpx.100-4.3' from Flash to server
as 'master/igs-bfpx.100-4.3'? [yes/no] yes
```

The following example shows how to use the **copy flash** command.

```
Switch# copy flash slot0:new-config
```

Related Commands

Command	Description
boot config	Used to modify the device and filename of the configuration file from which the switch configures itself during initialization.
boot system flash	Boots the switch router from internal Flash memory.
config-register	Cisco IOS command removed from this manual.
copy running-config startup-config	Copies the switch router's running configuration file to another destination. Specifies the configuration used for initialization as the destination of the copy operation.
ip rcmd remote-username	Cisco IOS command removed from this manual. See Appendix D.
show bootvar	Cisco IOS command removed from this manual. See Appendix D.

copy rcp

To copy a file from a network server to the switch router or to another destination using rcp, use the **copy rcp** privileged EXEC command.

copy rcp {*device*:*filename* | **running-config** | **startup-config** | **system** | **tftp**}

Syntax Description

device:filename	Specifies a *device*:*filename* as the destination of the copy operation. The *device* is optional, but when used, the colon (**:**) is required. Valid devices are as follows: • **bootflash:** is the internal Flash memory. • **sec-bootflash:** is the secondary internal Flash memory on the redundant route processor. (Catalyst 8540 MSR) • **nvram:** is the NVRAM on the route processor card. • **sec-nvram:** is the NVRAM on the redundant route processor card. (Catalyst 8540 MSR) • **slot0:** is the first PC slot on the route processor card and is the initial default device. • **sec-slot0:** is the first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** is the second PC slot on the route processor card. • **sec-slot1:** is the second PC slot on the redundant route processor card. (Catalyst 8540 MSR) The *filename* is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.
rcp	Specifies a server as the destination of the copy operation.
running-config	Specifies the currently running configuration as the destination of the copy operation.
startup-config	Specifies the configuration used for initialization as the destination of the copy operation.
tftp	Specifies a TFTP server as the destination of the copy operation.

Defaults

If you omit the destination device, the switch arouter uses the default device specified by the **cd** command. If you omit the destination filename, the switch router uses the source filename.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **rcp** protocol requires that a client send the remote username of an rcp request to the server. When you issue one of the **copy rcp** commands, by default the switch router software sends the username associated with the current TTY if that name is valid. For example, if the user is connected to the switch router through Telnet and the user was authenticated through the **username** command, the switch router software sends that username as the remote username.

Note For Cisco, TTYs are commonly used in communication servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

If the TTY username is invalid, the switch router software uses the switch router host name as both the remote and local usernames. To specify a different remote username to be sent to the rcp server, use the **ip rcmd remote-username** command. You can also specify the path of an existing directory along with the remote username.

Caution The remote username must be associated with an account on the destination server. If you do not use the **ip rcmd remote-username** command to specify the name of a remote user associated with an account on the server, the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, the switch router host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command does not execute successfully when a default remote username is used.

If you copy a bootstrap image, system image, or configuration file from a personal computer used as a file server, the remote host computer must support the rsh protocol.

Use the **copy rcp bootflash** command to copy a bootstrap image from a network server to Flash memory using rcp. The switch prompts for the name or address of the server and the name of the file to be copied. It provides an option to erase existing Flash memory before writing onto it and allows you to confirm the erasure. The entire copying process takes several minutes and differs from network to network.

Before loading the switch from Flash memory, verify that the checksum of the bootstrap image in Flash memory matches the checksum listed in the README file that was distributed with the system software image.

The checksum of the bootstrap image in Flash memory is displayed at the bottom of the screen when you issue the **copy rcp bootflash** command. The README file was copied to the server automatically when you installed the system software.

Caution If the checksum value does not match the value in the README file, do not reboot the switch. Reissue the **copy rcp bootflash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original bootstrap image back into Flash memory *before* you reboot the switch from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash, the switch router starts the system image (assuming booting from a network server is not configured).

Use the **copy rcp running-config** command to copy a configuration file from a network server to the switch router's running configuration environment using rcp. You can copy either a host configuration file or a network configuration file. Accept the default value of *host* to copy and load a host configuration file containing commands that apply to one network server in particular. Enter value of *network* to copy and load a network configuration file containing commands that apply to all network servers on a network.

Note The **copy rcp running-config** command replaces the **configure network** command when using **rcp**.

Use the **copy rcp startup-configuration** command to copy a host or network configuration file from a network server to the switch router's startup configuration environment using rcp. Accept the default value of *host* to copy and store a host configuration file containing commands that apply to one network server in particular. Enter value of *network* to copy and store a network configuration file containing commands that apply to all network servers on a network.

The command copies a configuration file from the network server to the location specified by the *config_file* environment variable. The *config_file* environment variable specifies the configuration used during switch router initialization.

Note The **copy rcp startup-config** command replaces the **configure overwrite-network** command when using rcp.

The **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to **rcp**.

The **copy rcp** command generally copies a file from a network server to another destination using rcp. If you do not specify a source or destination device, the switch uses the default device specified by the **cd** command.

When the destination is also specified by the *config_file* environment variable, the switch prompts you for confirmation before proceeding with the copy. To view the contents of the *config_file* environment variable, use the **show bootvar** command. To modify the *config_file* environment variable, use the **boot config** command. To save your modifications, use the **copy running-config startup-config** command.

Examples

The following example shows sample output resulting from copying a system image into a partition of Flash memory. The system prompts only if there are two or more read/write partitions or one read-only and one read/write partition and dual-Flash bank support in boot ROMs. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (**?**) for a directory display of all partitions, or a question mark and a number (**?***number*) for a directory display of a particular partition. The default is the first read/write partition.

```
Switch# copy rcp flash

System flash partition information:
Partition   Size     Used    Free    Bank-Size   State       Copy-Mode
    1       4096K    2048K   2048K   2048K       Read Only   RXBOOT-FLH
    2       4096K    2048K   2048K   2048K       Read/Write  Direct

[Type ? no for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

If the partition is read-only and has dual-Flash bank support in boot ROM, the session continues as shown in the following display.

```
                                ****  NOTICE  ****
Flash load helper v1.0
This process will accept the copy options and then terminate
the current system image to use the ROM based image for the copy.
Routing functionality will not be available during that time.
If you are logged in via telnet, this connection will terminate.
Users with console access can see the results of the copy operation.
                                ---- ******** ----
Proceed? [confirm]
System flash directory, partition 1:
File  Length   Name/status
  1   3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/igs-bfpx-100.4.3
Destination file name [default = source name]?
```

The file is copied into the partition given by the user earlier.

```
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from TFTP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

If the partition is read-write, the session continues as follows.

```
System flash directory, partition 2:
File  Length   Name/status
  1   3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/igs-bfpx.100-4.3
Destination file name [default = source name]?
```

The file is copied into the partition given by the user earlier.

```
Accessing file 'master/igs-bfpx.100-4.3' on ABC.CISCO.COM...
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from TFTP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

The following example uses the **copy rcp** *device* command to copy the *switch-image* file from a network server using rcp to the Flash memory card inserted in slot 0 of the route processor card.

```
Switch# copy rcp slot0:switch-image
```

Related Commands

Command	Description
boot config	Used to modify the device and filename of the configuration file from which the switch configures itself during initialization.
boot system flash	Boots the switch router from internal Flash memory.
config-register	Cisco IOS command removed from this manual. See Appendix D.
copy flash rcp	Specifies a copy operation to a network server using rcp.

Command	Description
copy running-config rcp	Copies the switch router's running configuration file to another destination, and specifies a server as the destination of the copy operation.
copy running-config startup-config	Copies the switch router's running configuration file to another destination.
copy startup-config rcp	Specifies the configuration used for initialization as the destination of the copy operation.
ip rcmd remote-username	Cisco IOS command removed from this manual. See Appendix D.
show bootvar	Cisco IOS command removed from this manual. See Appendix D.

copy running-config

To copy the switch router's running configuration file to another destination, use the **copy running-config** privileged EXEC command.

copy running-config {**rcp** | **startup-config** | **tftp** | *device*:*filename*}

Syntax Description

rcp	Specifies a server as the destination of the copy operation.
startup-config	Specifies the configuration used for initialization as the destination of the copy operation.
tftp	Specifies a TFTP server as the destination of the copy operation.
device:*filename*	Specifies a *device*:*filename* as the destination of the copy operation. The *device* is optional, but when used, the colon (:) is required. Valid devices are as follows: • **bootflash:** is the internal Flash memory. • **sec-bootflash:** is the secondary internal Flash memory on the redundant route processor. (Catalyst 8540 MSR) • **nvram:** is the NVRAM on the route processor card. • **sec-nvram:** is the NVRAM on the redundant route processor card. (Catalyst 8540 MSR) • **slot0:** is the first PC slot on the route processor card and is the initial default device. • **sec-slot0:** is the first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** is the second PC slot on the route processor card. • **sec-slot1:** is the second PC slot on the redundant route processor card. (Catalyst 8540 MSR) The *filename* is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.

Defaults

If you omit the destination device, the switch router uses the default device specified by the **cd** command. If you omit the destination filename, the switch router uses the source filename.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Save the configuration file to your startup configuration. This setup saves the configuration to the location specified by the *config_file* environment variable.

The **copy running-config startup-config** command replaces the **write memory** command. The **copy running-config rcp** or **copy running-config tftp** command replaces the **write network** command.

Related Commands

Command	Description
boot config	Used to modify the device and filename of the configuration file from which the switch configures itself during initialization.
boot system flash	Boots the switch router from internal Flash memory.
cd	Cisco IOS command removed from this manual. See Appendix D.
config-register	Cisco IOS command removed from this manual. See Appendix D.
copy running-config startup-config	Copies the switch router's running configuration file to another destination, and specifies the configuration used for initialization as the destination of the copy operation.
copy startup-config rcp	Copies the switch router's startup configuration file to another destination, and specifies an **rcp** server as the destination of the copy operation.

copy startup-config

To copy the switch router's startup configuration file to another destination, use the **copy startup-config** privileged EXEC command.

copy startup-config {**rcp** | **running-config** | **tftp** | *device***:***filename*}

Syntax Description

running-config	Specifies the currently running configuration as the destination of the copy operation.
startup-config	Specifies the configuration used for initialization as the destination of the copy operation.
rcp	Specifies an **rcp** server as the destination of the copy operation.
tftp	Specifies a TFTP server as the destination of the copy operation.
*device***:***filename*	Specifies a *device***:***filename* as the destination of the copy operation. The *device* argument is optional, but when it is used, the colon (**:**) is required. Valid devices are as follows: • **bootflash:** is the internal Flash memory. • **sec-bootflash:** is the secondary internal Flash memory on the redundant route processor. (Catalyst 8540 MSR) • **nvram:** is the NVRAM on the route processor card. • **sec-nvram:** is the NVRAM on the redundant route processor card. (Catalyst 8540 MSR) • **slot0:** is the first PC slot on the route processor card and is the initial default device. • **sec-slot0:** is the first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** is the second PC slot on the route processor card. • **sec-slot1:** is the second PC slot on the redundant route processor card. (Catalyst 8540 MSR) The *filename* argument is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.

Defaults

If you omit the destination device, the switch router uses the default device specified by the **cd** command. If you omit the destination filename, the switch router uses the source filename.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp.

This command copies the configuration file pointed to by the *config_file* environment variable to another destination. To view the contents of the *config_file* environment variable, use the **show bootvar** command. To modify the *config_file* environment variable, use the **boot config** command.

The **rcp** protocol requires that a client send the remote username of an **rcp** request to the server. When you issue the **copy startup-config-rcp** command, by default the switch router software sends the username associated with the current TTY if that name is valid. For example, if the user is connected to the switch router software through Telnet and the user was authenticated through the **username** command, the switch router sends that username as the remote username.

Note For Cisco, TTYs are commonly used in communication servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

To specify a different remote username to be sent to the server, use the **ip rcmd remote-username** command. You can also specify the path of an existing directory along with the remote username.

Caution The remote username must be associated with an account on the destination server. If you do not use the **ip rcmd remote-username** command to specify the name of a remote user associated with an account on the server, the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, the switch router host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command does not execute successfully when a default remote username is used.

If you copy the configuration file to a personal computer used as a server, the computer must support the rsh protocol.

Examples

The following example uses the **copy startup-config** command to copy the startup configuration file (specified by the *config_file* environment variable) to a Flash memory card inserted in slot 0 of the route processor card.

```
Switch# copy startup-config slot0:switch-config
```

The following is sample output from the **copy startup tftp** command.

```
Switch# copy startup tftp
Remote host []? 172.20.46.50
Name of configuration file to write [Switch-confg]? tftpboot/test-config
Write file tftpboot/test-config on host 172.20.46.50? [confirm]
Writing tftpboot/test-config !! [OK]
```

Related Commands

Command	Description
boot config	Used to modify the device and filename of the configuration file from which the switch configures itself during initialization.
cd	Cisco IOS command removed from this manual. See Appendix D.
copy rcp	Copies a file from a network server to the switch or to another destination using rcp.
copy running-config	Copies the switch's running configuration file to another destination.
ip rcmd remote-username	Cisco IOS command removed from this manual. See Appendix D.
show bootvar	Cisco IOS command removed from this manual. See Appendix D.

copy tftp

To copy a file from a TFTP server to the switch router or to another destination, use the **copy tftp** privileged EXEC commands.

copy tftp {**running-config** | **startup-config** | *device***:***filename*}

Syntax Description

running-config	Specifies the currently running configuration as the destination of the copy operation.
startup-config	Specifies the configuration used for initialization as the destination of the copy operation.
*device***:***filename*	Specifies a *device***:***filename* as the destination of the copy operation. The *device* is optional, but when used, the colon (**:**) is required. Valid devices are as follows: • **bootflash:** is the internal Flash memory. • **sec-bootflash:** is the secondary internal Flash memory on the redundant route processor. (Catalyst 8540 MSR) • **nvram:** is the NVRAM on the route processor card. • **sec-nvram:** is the NVRAM on the redundant route processor card. (Catalyst 8540 MSR) • **slot0:** is the first PC slot on the route processor card and is the initial default device. • **sec-slot0:** is the first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** is the second PC slot on the route processor card. • **sec-slot1:** is the second PC slot on the redundant route processor card. (Catalyst 8540 MSR) The *filename* is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.

Defaults

If you omit the destination device, the switch router uses the default device specified by the **cd** command. If you omit the destination filename, the switch router uses the source filename. If you enter a **cd** command to the device, then that device becomes the default. For example, if you enter **cd slot0:** and then enter **copy tftp bootflash**, then “flash” means slot0.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Refer to the following guidelines:

- The system prompts for the address of the TFTP server and TFTP filename if you do not provide them at the command line.
- The system provides an option to erase existing internal Flash memory before copying to internal Flash memory.
- The entire copying process takes several minutes and differs from network to network.

Table 4-1 The following table describes the characters that you might see during processing of the **copy tftp** command.

Table 4-1 copy tftp Character Descriptions

Character	Description
!	An exclamation point indicates that the copy process is taking place. Each exclamation point indicates that ten packets (512 bytes each) have been successfully transferred.
.	A period indicates the copy process timed out. Many periods in a row typically mean that the copy process might fail.
O	An uppercase O indicates a packet was received out of order and the copy process might fail.
e	A lowercase e indicates a device is being erased.
E	An uppercase E indicates an error and the copy process might fail.
V	A series of uppercase Vs indicates the progress during the verification of the image checksum.

When you enter the **copy tftp flash** command, the Flash memory checksum image displays on the bottom of the screen. *Before* booting from Flash memory, verify that this checksum identifier matches the checksum listed in the README file that was distributed with the system software image. You can find the README file on the TFTP server.

Caution If the checksum value is not correct according to the value in the README file, do not reboot the switch. Enter the **copy tftp flash** command and compare the checksums again. If the checksum is wrong, copy the original system software image back into Flash memory *before* you reboot the switch from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash, the switch router starts the system image contained in ROM (assuming booting from a network server is not configured). If ROM does not contain a fully functional system image, the switch router cannot function and must be reconfigured through a direct console port connection.

Note When using TFTP, the **copy tftp running-config** command replaces the **configure network** command and the **copy tftp startup-config** command replaces the **configure overwrite-network** command.

The **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp.

The following example shows how to use the **copy tftp bootflash** command.

```
Switch# copy tftp bootflash

Boot flash directory:
File  Length   Name/status
  1   2622607  ls1010-xboot
[2622672 bytes used, 1571632 available, 4194304 total]

Address or name of remote host [255.255.255.255]? 223.255.254.254
Source file name? ls1010-xboot.101
Destination file name [ls1010-xboot.101]?
Accessing file 'ls1010-xboot.101' on 223.255.254.254...
Loading ls1010-xboot.101 from 223.255.254.254 (via Ethernet0): ! [OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'ls1010-xboot.101' from TFTP server into
     bootflash as 'ls1010-xboot.101' WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeee ...erased
Loading ls1010-xboot.101 from 223.255.254.254 (via Ethernet0): !!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 2622607/4194304 bytes]

Verifying checksum...  OK (0xE408)
Flash copy took 0:00:10 [hh:mm:ss]
```

Related Commands

Command	Description
boot config	Used to modify the device and filename of the configuration file from which the switch configures itself during initialization.
boot system	Specifies the system image that the switch router loads at startup.
cd	Cisco IOS command removed from this manual. See Appendix D.
copy flash	Copies a file from Flash memory to another destination.
show flash	Displays the layout and contents of Flash memory.
verify	Verifies the checksum of a file on a Flash device.

CHAPTER 5

D Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

debug atm accounting

To enable debugging for ATM accounting, use the **debug atm accounting** EXEC command. To disable debugging, use the **no** form of this command.

debug atm accounting errors | events

no debug atm accounting errors | events

Syntax Description

errors	Logs significant errors to the console.
events	Logs significant events to the console.

Defaults

Disabled

Command Modes

EXEC

Note Not all of the **debug** commands are included in this publication. For a complete guide to the debug commands, refer to the *Debug Command Reference* publication.

Command History

Release	Modification
11.1(4)	New command

debug atm conn

To enable debugging for ATM connection management, use the **debug atm conn** privileged EXEC command. To disable debugging, use the **no** form of this command.

debug atm conn {**bitmap** {**errors** | **events**} | **errors** | **events** | **mib**}

no debug atm conn {**bitmap** {**errors** | **events**} | **errors** | **events** | **mib**}

Syntax Description

bitmap	Enables ATM connection bitmap management debugging.
errors	Enables ATM connection management errors debugging.
events	Enables ATM connection management events debugging.
mib	Enables ATM connection management MIB debugging.

Defaults

Disabled

Command Modes

Privileged EXEC

Note Not all of the **debug** commands are included in this publication. For a complete guide to the debug commands, refer to the *Debug Command Reference* publication.

Command History

Release	Modification
11.2(8.0.1)	New command

debug atm oam-all

To enable all the debug flags for the OAM, use the **debug atm oam-all** privileged EXEC command. To disable the debug flags, use the **no** form of the command.

debug atm oam-all

no debug atm oam-all

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Privileged EXEC

Caution This command can generate a significant amount of output when it is implemented.

Note Not all of the **debug** commands are included in this publication. For a complete guide to the debug commands, refer to the *Debug Command Reference* publication.

Command History

Release	Modification
11.1(4)	New command

debug atm oam-pkt

To display the transmit and receive OAM traffic, use the **debug atm oam-pkt** privileged EXEC command. This command also decodes individual OAM cells. To disable OAM traffic debugging, use the **no** form of the command.

debug atm oam-pkt

no debug atm oam-pkt

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Privileged EXEC

Note Not all of the **debug** commands are included in this publication. For a complete guide to the debug commands, refer to the *Debug Command Reference* publication.

Command History

Release	Modification
11.1(4)	New command

debug atm pnni

To enable PNNI debugging output, use the following **debug atm pnni** privileged EXEC commands. To disable PNNI debugging output, use the **no** form of these commands.

debug atm pnni adj-events
debug atm pnni adj-packet
debug atm pnni aggregation
debug atm pnni all
debug atm pnni api
debug atm pnni election
debug atm pnni flood-packet
debug atm pnni hello-packet
debug atm pnni rm [**local-node** *node-index*]
debug atm pnni route-all
debug atm pnni route-errors
debug atm pnni snmp
debug atm pnni svcc-rcc
debug atm pnni topology

no debug atm pnni adj-events
no debug atm pnni adj-packet
no debug atm pnni aggregation
no debug atm pnni all
no debug atm pnni api
no debug atm pnni election
no debug atm pnni flood-packet
no debug atm pnni hello-packet
no debug atm pnni rm [**local-node** *node-index*]
no debug atm pnni route-all
no debug atm pnni route-errors
no debug atm pnni snmp
no debug atm pnni svcc-rcc
no debug atm pnni topology

Syntax Description

adj-events	Turns on adjacency-related event debugging. The feature can be turned on for a specific PNNI interface.
adj-packet	Turns on database summary and request packet debugging. The feature can be turned on for a specific PNNI interface.
aggregation	Turns on link aggregation debugging.
all	Turns on all PNNI debugging. The feature can be turned on for a specific PNNI interface.
api	Turns on application interface debugging.
election	Turns on PGL PNNI election debugging.
flood-packet	Turns on PTSP and ACK packet debugging.
hello-packet	Turns on Hello packet debugging. The feature can be turned on for a specific PNNI interface.
rm	Turns on resource management debugging. Debugging output can be limited to a single node using the **local-node** *node-index* option.

route-all	Turns on all route debugging.
route-errors	Turns on PNNI route errors debugging.
snmp	Turns on debugging of SNMP events (get and set) related to the PNNI MIBs.
svcc-rcc	Turns on debugging for SVCC RCC setup, SVCC Hello processing, and horizontal link extension processing.
topology	Turns on internal topology maintenance debugging.

Defaults

Disabled

Command Modes

Privileged EXEC

Note Not all of the **debug** commands are included in this publication. For a complete guide to the debug commands, refer to the *Debug Command Reference* publication.

Command History

Release	Modification
11.1(4)	New command

debug atm rm

To enable the debug printout messages for ATM resource manager, use the **debug atm rm** privileged EXEC command. To disable the printout message, use the **no** form of this command.

debug atm rm errors
debug atm rm events
debug atm rm pnni-api

no debug atm rm errors
no debug atm rm events
no debug atm rm pnni-api

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Privileged EXEC

Caution This command can generate a significant amount of output and can interfere with other activity on the switch when it is implemented.

Note Not all of the **debug** commands are included in this publication. For a complete guide to the debug commands, refer to the *Debug Command Reference* publication.

Command History

Release	Modification
11.1(4)	New command

debug atm sig

To debug the ATM signalling module, use the **debug atm sig** privileged EXEC commands. To disable the debugging, use the **no** form of these commands.

debug atm sig-all
debug atm sig-error [**atm** *card/subcard/port*]
debug atm sig-events [**atm** *card/subcard/port*]
debug atm sig-ie [**atm** *card/subcard/port*]
debug atm sig-nni [**atm** *card/subcard/port*]
debug atm sig-packets [**atm** *card/subcard/port*]

no debug atm sig-all
no debug atm sig-error [**atm** *card/subcard/port*]
no debug atm sig-events [**atm** *card/subcard/port*]
no debug atm sig-ie [**atm** *card/subcard/port*]
no debug atm sig-nni [**atm** *card/subcard/port*]
no debug atm sig-packets [**atm** *card/subcard/port*]

Syntax Description

sig-all	Turns on the debug output for all of the above conditions.
sig-error	Turns on the debug output for the ATM signalling error conditions.
sig-events	Turns on the debug output for the ATM signalling state machine events.
sig-ie	Turns on the debug output for the ATM signalling messages information element encoding.
sig-nni	Turns on the debug output for the ATM signalling NNI state machine events.
sig-packets	Turns on the debug output for the ATM signalling packets.
card/subcard/ port	Specifies the card, subcard, and port number for the ATM interface.

Defaults

Disabled

Command Modes

Privileged EXEC

Note Not all of the **debug** commands are included in this publication. For a complete guide to the debug commands, refer to the *Debug Command Reference* publication.

Command History

Release	Modification
11.1(4)	New command

debug diag online (Catalyst 8540 MSR)

To enable online diagnostic debugging output, use the **debug diag online** command. To disable debugging, use the **no** form of the command.

debug diag online [**access** | **oir** | **snake**]

no debug diag online [**access** | **oir** | **snake**]

Syntax Description

access	The access tests ensure connectivity at a configurable interval between the primary route processor and the following: • Active switch processors • Standby switch processor, if it is present • Feature cards • Port adapters • Interface modules Whenever the access test detects a hardware failure, the system issues an error message to the console. If the access test detects a hardware problem with an active switch processor, the standby switch processor, if present, automatically takes over and becomes an active switch processor. The system generates an SNMP trap when the switchover occurs.
oir	Online insertion and removal (OIR) tests check the functioning of the switch fabric and interfaces on a per-port basis. The switch router performs these tests when the system boots up and when you insert a port adapter or interface module into a slot. The OIR test sends a packet to the interface loopback and expects to receive it back within a certain time period. If the packet does not reach the port within the expected time period, or the route processor receives a corrupted packet, the system issues an error message to the console, generates an SNMP trap, and brings the port to an administrative down state.
snake	The snake test establishes a connection across all the active ports in the switch router, originating and terminating at the primary route processor. The route processor establishes a connection by sending a packet to each port in turn, which then terminates at the route processor. If the packet does not reach the route processor within the expected time period, or the received packet is corrupted, further testing is performed to isolate and disable the port causing the problem.The size of the packet and frequency of the test are configurable to minimize the impact on system performance. The snake test supports all ATM interface modules and enhanced Gigabit Ethernet interface modules. It does not support ATM port adapters, Fast Ethernet interface modules, or Gigabit Ethernet interface modules.

Defaults

Disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(13)W5(19)	New command

Usage Guidelines

Debug messages are logged onto the console if console logging is enabled. Debug messages are logged in the syslog buffer if console logging is disabled.

Examples

Using the **debug diag online** command in the example shown below will cause diagnostic test results to be displayed at the console.

```
Switch# debug diag online oir
Online Dig OIR Test debugging is on
Switch#
```

Related Commands

Command	Description
diag online (Catalyst 8540 MSR)	Enables, disables, and configures system diagnostics.
show diag online (Catalyst 8540 MSR)	Displays test results for any diagnostic test that is enabled.

debug ncdp

To display NCDP errors, events, and packet information, use the **debug ncdp** command. To disable ncdp debugging, use the **no** form of this command.

debug ncdp {**errors** | **events** | **packets**}

no debug ncdp {**errors** | **events** | **packets**}

Syntax Description

errors	Displays NCDP errors, such as “extract-clock failed.”
events	Displays NCDP events, such as a “switch vector update.”
packets	Displays NCDP messages. This option generates significant output.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

debug sgcp errors

To enable the production of debug information on exceptional conditions encountered in the use of SGCP to control the interconnection of CES circuits, use the **debug sgcp errors** privileged EXEC command. To disable debugging, use the **no** form of this command.

debug sgcp errors

no debug sgcp errors

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

The debug output consists of exceptional events, which should not occur during normal operations. However, these exceptions are not indicative of a software failure.

Examples

The following example enables the debugging of SGCP error events.

```
Switch# debug sgcp errors
Simple Gateway Control Protocol errors debugging is on
```

Related Commands

Command	Description
debug sgcp events	Enables the production of debug information on significant events encountered in the use of SGCP to control the interconnection of CES circuits.
debug sgcp packets	Enables the production of SGCP packets received to control the interconnection of CES circuits.

debug sgcp events

To enable the production of debug information on significant events encountered in the use of SGCP to control the interconnection of CES circuits, use the **debug sgcp events** privileged EXEC command. To disable debugging, use the **no** form of this command.

debug sgcp events

no debug sgcp events

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

The principle debug output includes circuit state changes that occur because of SGCP packet and CES circuit events.

Examples

The following example enables the debugging of SGCP events.

```
Switch# debug sgcp events
Simple Gateway Control Protocol events debugging is on
```

Related Commands

Command	Description
debug ncdp	Displays NCDP errors and/or events.
debug sgcp packets	Enables the production of SGCP packets received to control the interconnection of CES circuits.

debug sgcp packets

To enable the production of SGCP packets received to control the interconnection of CES circuits, use the **debug sgcp packets** privileged EXEC command. To disable debugging, use the **no** form of this command.

debug sgcp packets

no debug sgcp packets

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

This command produces the most verbose output of the SGCP debug commands.

Examples

The following example enables the debugging of SGCP packets.

```
Switch# debug sgcp packets
Simple Gateway Control Protocol packets debugging is on
```

Related Commands

Command	Description
debug ncdp	Displays NCDP errors and/or events.
debug sgcp events	Enables the production of SGCP packets received to control the interconnection of CES circuits.

debug sscop

To debug the ATM signalling SSCOP, use the following **debug sscop** privileged EXEC commands. To return the debug SSCOP to the default, use the **no** form of this command.

debug sscop errors [**atm** *card/subcard/port*]
debug sscop events [**atm** *card/subcard/port*]
debug sscop packets [**atm** *card/subcard/port*]

no debug sscop errors [**atm** *card/subcard/port*]
no debug sscop events [**atm** *card/subcard/port*]
no debug sscop packets [**atm** *card/subcard/port*]

Syntax Description

errors	Turns on the debug output for the SSCOP error conditions.
events	Turns on the debug output for the SSCOP state machine events.
packets	Turns on the debug output for the SSCOP packets.
atm *card/subcard/port*	Specifies the card, subcard, and port number of the ATM interface.

Defaults

Disabled

Command Modes

Global configuration

Interface configuration when **atm** *card/subcard/port* is specified.

Note Not all of the **debug** commands are included in this publication. For a complete guide to the debug commands, refer to the *Debug Command Reference* publication.

Command History

Release	Modification
11.1(4)	New command

debug tag-switching

To debug the tag-switching configuration, use the **debug tag-switching** privileged EXEC commands. To disable tag-switching debugging, use the **no** form of these commands.

debug tag-switching adjacency
debug tag-switching atm-tdp api
debug tag-switching atm-tdp routes
debug tag-switching atm-tdp states
debug tag-switching packets [*if-type*] [*card/subcard/port*]
debug tag-switching tdp advertisements
debug tag-switching tdp bindings
debug tag-switching tdp directed-neighbors
debug tag-switching tdp peer state-machine
debug tag-switching tdp pies {**received** [**all**] | **sent** [**all**]}
debug tag-switching tdp session {**io** [**all**] | **state-machine**}
debug tag-switching tdp transport {**connections** | **events** | **timers**}
debug tag-switching tsp-tunnels events
debug tag-switching tsp-tunnels signalling
debug tag-switching tsp-tunnels tagging

no debug tag-switching adjacency
no debug tag-switching atm-tdp api
no debug tag-switching atm-tdp routes
no debug tag-switching atm-tdp states
no debug tag-switching packets [*if-type*] [*card/subcard/port*]
no debug tag-switching tdp advertisements
no debug tag-switching tdp bindings
no debug tag-switching tdp directed-neighbors
no debug tag-switching tdp peer state-machine
no debug tag-switching tdp pies {**received** [**all**] | **sent** [**all**]}
no debug tag-switching tdp session {**io** [**all**] | **state-machine**}
no debug tag-switching tdp transport {**connections** | **events** | **timers**}
no debug tag-switching tsp-tunnels events
no debug tag-switching tsp-tunnels signalling
no debug tag-switching tsp-tunnels tagging

Syntax Description

adjacency	Displays changes to tag switching entries in the adjacency database. Use this option to monitor instances when entries are updated or added to the adjacency database.
atm-tdp api	Displays information about the VCI allocation of TVCs, free, and cross-connect requests. Use the **debug tag-switching atm-tdp api** command with the **debug tag-switching atm-tdp states** command to display more complete information about a TVC.
atm-tdp routes	Displays information about the state of the routes for which VCI requests are being made. See also "Usage Guidelines."
atm-tdp states	Displays information about TVC state transitions as they occur. See also "Usage Guidelines."

packets	Displays tagged packets switched by this system. The optional *if-type* (**atm**, **atm-p**, **cbr**, **ethernet**, or **null**) and *card/subcard/port* arguments restrict the display to those packets received or transmitted on the specified interface type or number. This command should be used with care because it generates output for every packet processed. Furthermore, enabling this command causes fast and distributed tag switching to be disabled for the selected interfaces. Use this command only when traffic on the network is low, so other activity on the system is not adversely affected.
tdp advertisements	Displays information about the advertisement of tags and interface addresses to TDP peers.
tdp bindings	Displays information about changes to the TIB used to keep track of tag bindings learned from TDP peers through TDP downstream tag distribution.
tdp directed-neighbors	Displays information about TDP directed-neighbor events.
tdp peer	Displays information about state transitions at the tag distribution level. See also "Usage Guidelines."
tdp pies	Displays information about TDP PIEs received from (**received**) or sent to (**sent**) TDP peers. TDP requires periodic transmission of keepalive PIEs. If you do not specify the **all** option, periodic keepalive PIEs are not displayed.
tdp session	Displays TDP session information. See also "Usage Guidelines."
tdp transport	Used with the **connections** keyword, this command displays information about the TCP connections used to support TDP sessions. Used with the **events** keyword, this command displays information about the events related to the TDP peer discovery mechanism, which is used to determine the devices with which to establish TDP sessions. Used with the **timers** keyword, this command displays TDP discovery and transport timer activity. See also "Usage Guidelines."
tsp-tunnels events	Displays TSP tunnels events.
tsp-tunnels signalling	Displays TSP tunnels signalling.
tsp-tunnels tagging	Displays TSP tunnels tagging.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

When there are a large number of routes and a number of system activities (shutting down interfaces, learning new routes, and so on), the **debug tag-switching atm-tdp routes** and **debug tag-switching atm-tdp states** commands display a lot of information that might interfere with system timing. Most commonly, this affects the normal operation of TDP. You should increase the holdtime value of the TDP by using the **tag-switching tdp holdtime** command.

TDP sessions are supported by data structures and state machines at three levels:

- Transport—TCP connections used to support TDP sessions are established and maintained at the transport level.
- Protocol—The protocol level implements the TDP session setup protocol, and deals with constructing and parsing TDP PDUs and PIEs.
- Tag distribution—The tag distribution level uses TDP sessions to exchange tags with TDP peers.

The **debug tag-switching tdp transport** commands provide visible activity at the transport level, the **debug tag-switching tdp session** commands at the protocol level, and the **debug tag-switching tdp peer state-machine** command at the tag distribution level.

diag online (Catalyst 8540 MSR)

To enable switch router online diagnostic tests, use the **diag online** command. To disable the online diagnostic tests, use the **no** form of the command.

diag online [**access** | **oir** | **snake**]

no diag online

Syntax Description

access	The access tests ensure connectivity at a configurable interval between the primary route processor and the following: • Active switch processors • Standby switch processor, if it is present • Feature cards • Port adapters • Interface modules Whenever the access test detects a hardware failure, the system issues an error message to the console. If the access test detects a hardware problem with an active switch processor, the standby switch processor, if present, automatically takes over and becomes an active switch processor. The system generates an SNMP trap when the switchover occurs.
oir	Online insertion and removal (OIR) tests check the functioning of the switch fabric and interfaces on a per-port basis. The switch router performs these tests when the system boots up and when you insert a port adapter or interface module into a slot. The OIR test sends a packet to the interface loopback and expects to receive it back within a certain time period. If the packet does not reach the port within the expected time period, or the route processor receives a corrupted packet, the system issues an error message to the console, generates an SNMP trap, and brings the port to an administrative down state.
snake	The snake test establishes a connection across all the active ports in the switch router, originating and terminating at the primary route processor. The route processor establishes a connection by sending a packet to each port in turn, which then terminates at the route processor. If the packet does not reach the route processor within the expected time period, or the received packet is corrupted, further testing is performed to isolate and disable the port causing the problem.The size of the packet and frequency of the test are configurable to minimize the impact on system performance. The snake test supports all ATM interface modules and enhanced Gigabit Ethernet interface modules. It does not support ATM port adapters, Fast Ethernet interface modules, or Gigabit Ethernet interface modules.

Defaults

Enabled.

Command Modes

Global configuration

Command History

Release	Modification
12.0(13)W5(19)	New command

Usage Guidelines

Use the **diag online** command to enable or disable specified diagnostic tests and set test variables. To enable a diagnostic test, use the **diag online access**, **diag online snake**, or **diag online OIR** command. Use test defaults by running the **diag online access freq**, **diag online OIR pktsize** or **diag online snake timer** commands.

Examples

The following example shows how to enable the access diagnostic test.

```
Switch(config)# diag online access
Enabling Access test
Switch(config)#
```

Related Commands

Command	Description
debug diag online (Catalyst 8540 MSR)	Enables or disables system debugging.
show diag online (Catalyst 8540 MSR)	Reports diagnostic test results.
diag online access freq (Catalyst 8540 MSR)	Tests proper functionality of all ATM port adapters, ATM and layer 3 interface modules, switch processors and daughter cards.
diag online oir pktsize (Catalyst 8540 MSR)	Tests are performed on all ATM and Layer 3 interface modules. The OIR test occurs at system boot-up and when a new interface module is inserted into a slot.
diag online snake timer (Catalyst 8540 MSR)	The snake test establishes a connection, which includes all the active ports in the switch router, originating and terminating at the primary route processor. The route processor sends a packet through this connection. If the packet does not reach the route processor within the expected time period, or the received packet is corrupted, then further testing is performed to isolate and disable the port causing the problem.

diag online access freq (Catalyst 8540 MSR)

To enable the access diagnostic test and set the test variable, use the **diag online access freq** command. To disable the access diagnostic test, use the **no** form of the command.

diag online access freq [*seconds*]

no diag online access freq

Syntax Description

seconds	Sets the frequency of how often the **diag online access freq** test should run. Valid frequency range is 10 to 600 seconds. Results are stored and can be displayed with the **show diag online** command.

Defaults

10 seconds.

Command Modes

Global configuration

Command History

Release	Modification
12.0(1)W5(19)	New command

Usage Guidelines

Tests proper functionality of all ATM port adapters, ATM and Layer 3 interface modules, switch processors and daughter cards.

Examples

The following example shows how to use the **diag online access freq** command to set the access test to run at the default interval of 10 seconds.

```
Switch(config)# diag online access freq
ONLINE-DIAG: Online Access Test Frequency set to default value of 10 sec
Switch(config)#
```

The following example shows how to use the **diag online access freq** command to set the access test to run at 100 second intervals.

```
Switch(config)# diag online access freq 100
ONLINE-DIAG: Online Access Test Frequency set to 100 sec
Switch(config)#
```

Related Commands

Command	Description
debug diag online (Catalyst 8540 MSR)	Enables or disables system debugging.
show diag online (Catalyst 8540 MSR)	Reports online diagnostic test results.
diag online (Catalyst 8540 MSR)	Enables or disables switch router diagnostic tests.

Command	Description
diag online oir pktsize (Catalyst 8540 MSR)	Tests are performed on all ATM and Layer 3 interface modules. The OIR test occurs at system boot-up and when a new interface module is inserted into a slot.
diag online snake timer (Catalyst 8540 MSR)	Tests the integrity of each port and interface, and reports results.

diag online oir pktsize (Catalyst 8540 MSR)

To enable the OIR diagnostic test and to set the test variable, use the **diag online oir pktsize** command. To disable the OIR diagnostic test, use the **no** form of this command.

diag online oir pktsize [*bytes*]

no daig online oir pktsize

Syntax Description

bytes	Sets the network packet size for the OIR test. Valid packet size range is 200 to 1000 bytes.

Defaults

1000 bytes.

Command Modes

Global configuration

Command History

Release	Modification
12.0(13)W5(19)	New command

Usage Guidelines

The OIR test sends a packet to the interface loopback and expects to receive it back within a certain time period. If the packet does not reach the port within the expect time period, or the received packet is corrupted, then an error is registered and the port is brought to an administrative down state.

Examples

The following example shows how to use the **diag online oir pktsize** command to enable the OIR test using the default packet size of 1000 bytes.

```
Switch(config)# diag online oir pktsize
ONLINE-DIAG: OIR Pkt Size set to default value of 1000 bytes
Switch(config)#
```

The following example shows how to use the **diag online oir pktsize 200** command to enable the OIR test using a packet size of 200 bytes.

```
Switch(config)# diag online oir pktsize 200
ONLINE-DIAG: OIR Pkt Size set to 200 bytes
Switch(config)#
```

Related Commands

Command	Description
debug diag online (Catalyst 8540 MSR)	Enables or disables system debugging.
show diag online (Catalyst 8540 MSR)	Reports online diagnostic test results.
diag online (Catalyst 8540 MSR)	Enables or disables switch router diagnostic tests.

Command	Description
diag online access freq (Catalyst 8540 MSR)	Tests proper functionality of all ATM port adapters, ATM and Layer 3 interface modules, switch processors and daughter cards. The network clock module is not tested because it does not have a diagnostics test register.
diag online snake timer (Catalyst 8540 MSR)	Tests integrity of each port and interface, and reports results.

diag online snake timer (Catalyst 8540 MSR)

To enable the snake diagnostic test and to set the test variable, use the **diag online snake timer** command. To disable the snake diagnostic test, use the **no** form of this command.

diag online snake timer [*seconds*]

no diag online snake timer

Syntax Description

seconds	Sets the test interval of the snake timer test. Valid timer range is 4 to 1800 seconds

Defaults

10 seconds.

Command Modes

Global configuration

Command History

Release	Modification
12.0(13)W5(19)	New command

Usage Guidelines

The snake test establishes a connection, which includes all the active ports in the switch router, originating and terminating at the primary route processor. The route processor sends a packet through this connection. If the packet does not reach the route processor within the expexted time period, or the received packet is corrupted, then further testing is performed to isolate and disable the port causing the problem.

Examples

The following example shows how to set the snake timer test to run at the default of 10 seconds**.**

```
Switch(config)# diag online snake timer
ONLINE-DIAG: Snake timer set to default of 10 seconds
Switch(config)#
```

The following example shows how to set the snake timer test to run at 4 second intervals**.**

```
Switch(config)# diag online snake timer 4
ONLINE-DIAG: Snake timer set to 4 seconds
Switch(config)#
```

Related Commands

Command	Description
debug diag online (Catalyst 8540 MSR)	Enables or disables system debugging.
show diag online (Catalyst 8540 MSR)	Reports online diagnostic test results.
diag online (Catalyst 8540 MSR)	Enables or disables switch router diagnostic tests.

Command	Description
diag online access freq (Catalyst 8540 MSR)	Tests proper functionality of all ATM port adapters, ATM and Layer 3 interface modules, switch processors and daughter cards.
diag online oir pktsize (Catalyst 8540 MSR)	Tests are performed on all ATM and Layer 3 interface modules. The OIR test occurs at system boot-up and when a new interface module is inserted into a slot.

disable

To return to the EXEC mode by exiting the privileged EXEC mode, use the **disable** EXEC command.

disable [*level*]

Syntax Description

level	You can specify up to 16 privilege levels, using numbers 0 through 15. Level 1 is normal EXEC-mode user privileges. If this argument is not specified, the privilege level defaults to level 15 (traditional enable privileges).

Defaults

15

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

In the following example, the user is logging out from privilege level 5.

```
Switch# disable 5
```

Related Commands

Command	Description
enable (EXEC)	Cisco IOS command removed from this manual.

CHAPTER 6

E Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

e164 address

To configure an entry in the ATM E.164 translation table, use the **e164 address** ATM E.164 translation table configuration command.

e164 address *e164-address* **nsap-address** *nsap-address*

Syntax Description

e164-address	Specifies the E.164 address for an entry in the ATM E.164 translation table. The address consists of 7 to 15 decimal digits. See the ITU-T Recommendation E.164 for details on the syntax and semantics of native E.164 addresses.
nsap-address	Specifies the NSAP-encoded ATM end-system address for an entry in the ATM E.164 translation table. The address is specified as 40 hexadecimal digits.

Command Modes

ATM E.164 translation table configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Each entry in the ATM E.164 translation table specifies a one-to-one correspondence between a native E.164 address and an NSAP-encoded ATM end system-address. Refer to the **atm e164 translation** command for more information and usage guidelines about the ATM E.164 translation feature.

The **e164 address** command is a subcommand of the **atm e164 translation-table** global configuration command.

Examples

The following example shows setting an entry in the ATM E.164 translation table.

```
Switch# configure terminal
Switch(config)# atm e164 translation-table
Switch(config-atm-e164)# e164 address 1112222 nsap-address
11.111122223333444455556666.112233445566.11
```

election

To configure the PNNI peer group leader election, use the **election** PNNI node configuration command. To set the election parameters to their defaults, use the **no** form of this command.

election [**leadership-priority** *number*] [**override-unanimity-timer** *secs*] [**pgl-init-timer** *secs*] [**relection-timer** *secs*]

no election [**leadership-priority**] [**override-unanimity-timer**] [**pgl-init-timer**] [**reelection-timer**]

Syntax Description

number	Peer group leadership priority that this node should advertise, in the range of 0 to 205. The default is 0.
override-unanimity-timer	Specifies the amount of time, in seconds, a node waits to be declared the preferred PGL by unanimous agreement among its peers. This timer is used to prevent nodes from waiting forever for unanimity. The default is 30 seconds.
pgl-init-timer	Specifies the amount of time, in seconds, allowed to initialize the PGL before starting the election process. This timer is used to ensure that every node casts a vote only after waiting for topology information to propagate across the group. The default is 15 seconds.
reelection-timer	Specifies the amount of time, in seconds, to wait before the reelection process is restarted after connectivity to the PGL is lost. This timer is used to delay each node in the peer group from voting for the PGL upon loss of connectivity until the nodes in the peer group have received updated topology information. The default is 15 seconds.
secs	The number of seconds for each timer, in the range of 1 to 120.

Defaults

See "Syntax Description."

Command Modes

PNNI node configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

The node with the highest configured leadership priority in the peer group is normally elected to become the peer group leader. The timers are defined in the PNNI PGL election state machine.

Examples

The following example shows how to enter PNNI node configuration mode and specify a node.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)#
```

The following example specifies the peer group leadership priority for this node using the default timers.

```
Switch(config-pnni-node)# election leadership-priority 1
```

Related Commands

Command	Description
show atm pnni election	Displays information relevant to the PNNI peer group leader election process.

encapsulation frame-relay

Before you can use a serial port for Frame Relay, use the **encapsulation frame-relay** interface configuration command to enable encapsulation on the Frame Relay interface. To disable configuration, use the **no** form of this command.

encapsulation frame-relay ietf

no encapsulation frame-relay ietf

Syntax Description

ietf	Sets the encapsulation method to comply with the IETF standard RFC 1490.

Defaults

None

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

To correctly support Frame Relay-to-ATM service interworking connections that use translation mode, the Frame Relay interface on the adjacent router must also be configured with IETF encapsulation.

Examples

The following example configures a serial interface for Frame Relay encapsulation type IETF.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1Switch(con
```

Related Commands

Command	Description
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

epc port-reload

To indicate whether a stuck port should be shut down, or reset and reloaded, use the **epc port-reload** interface configuration command. To restore the default, use the **no** form of this command.

epc port-reload

no epc port-reload

Syntax Description

This command has no arguments or keywords.

Defaults

Shutdown mode.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(10)W5(18)	New command
12.0((7)W5(15c)	Command first documented in Release Notes for the Catalyst 8540 MSR.

Usage Guidelines

The **epc port-reload** command is used in conjunction with the **epc portstuck-wait** command for the configuration of stuck port detection and recovery. The **epc port-reload** command enables automatic resetting and reloading of the Ethernet interface module microcode after detecting a port stuck failure.

The **epc portstuck-wait** command specifies the delay before signalling a port stuck failure (from the time the failure is detected). The default is 180 seconds. The valid range is 0 to 1200 seconds inclusive. A value of 0 sconds causes a port stuck failure to *not* be detected.

Together, these two commands provide a mechanism to troubleshoot and recover from port stuck failures. The port-stuck detection mechanism detects a stuck port, and prints a message indicating which port is stuck. The mechanism checks for responses sent by the port to the CPU requests. When the port stops responding to the messages sent by the CPU within a certain time (measured in seconds and configured by the user), it is identified as stuck. If it is only a port stuck failure, the port is isolated from the other functional ports, and Cisco IOS is informed that the line is down/down.

Then, depending on the configuration option for reset of the stuck port, the following action will be taken:

- Default Behavior

  If the switch router is not configured to reset the port upon detecting a port stuck failure, the port will be isolated, thus preserving the integrity of the switch router.

- Nondefault Behavior

  If the switch router is configured to reset the port upon detection of a port stuck failure, the switch router will isolate the port from the rest of the functioning ports, and reset the port. This might affect up to three other ports in the case of Fast Ethernet 10/100 modules.

Note If you configure the switch router as described in the nondefault behavior after a port stuck failure is detected, the switch router will *not* reset the Ethernet ports. The Ethernet interface must be configured to reset before the port stuck failure occurs. Also, the default behavior is to *not* reset the port if a port stuck failure is detected. If the Ethernet interface is not configured to reset when a port stuck failure is detected, schedule the switch router for downtime to remove and reinsert the module.

The following example puts the port in reload mode:

```
Switch(config)# epc port-reload
```

The following example restores the default (shutdown mode):

```
Switch(config)# no epc port-reload
```

This command is NOVRAM writeable, and can be verified using the **show running-config** command.

Related Commands

Command	Description
epc portstuck-wait	Determines the length of time a port-stuck detection mechanism waits until declaring a stuck port.
show running-config	Displays the configuration information currently running on the termina.l

epc portstuck-wait

To specify the amount of time before signalling a port stuck failure from the time of detection, use the **epc portstuck-wait** interface configuration command. To restore the default value, use the **no** form of this command.

epc portstuck-wait [*value*]

no epc portstuc-wait

Syntax Description

value	The amount of time, expressed in seconds, that the port-stuck mechanism waits after the port has stopped r esponding to th e CPU requests. The valid range is 0 to 1200 seconds inclusive (20 minutes).

Defaults

Default is 180 seconds (3 minutes).

Command Modes

Interface configuration

Command History

Release	Modification
12.0(8)W5(18)	Command introduced into this manual.
12.0((7)W5(15c)	Command first documented in Release Notes for the Catalyst 8540 MSR.

Usage Guidelines

This command is used to configure the amount of time that the port-stuck detection mechanism will wait after the port has stopped responding to the CPU requests, and prior to actually declaring the port to be stuck. The valid range is from 0 to 1200 seconds (20 minutes), with the default value at 180 seconds (3 minutes). A port can be declared stuck only after there is no response to any of the requests made by the CPU within this pre-configured period of time

Caution Due to the nature of microcode architecture, do not configure low values for the wait time in the **epc portstuck-wait** command.The default value of 180 seconds has been carefully chosen, allowing for the hello intervals of protocols such as HSRP, EIGRP, OSPF. Configuring a low value might lead to incorrectly detecting *temporary* port stuck failures as real port stuck failures, and could likely cause temporary connectivity loss. It is highly recommended to keep this value at least at 60 seconds. Lower values are provided to allow for some specific network designs when you can absolutely rule out temporary port stuck failure scenarios, and also as a debugging aid. For most networks, 180 seconds should work very well.

Examples

The following example configures the portstuck-wait time to 240 seconds:

```
Switch(config)# epc portstuck-wait 240
```

The following example restores the portstuck-wait time to the default of 180 seconds:

```
Switch(config)# no pec portstuck-wait
```

Related Commands

Command	Description
epc port-reload	Used to specify whether a stuck port should be shut down, or reset and reloaded.
show running-config	Displays the configuration information currently running on the termina.l

erase

To erase flash or configuration memory, use one of the **erase** privileged EXEC commands. The **erase startup-config** command replaces the **write erase** command.

erase {**flash** | **startup-config**}

Syntax Description

flash	Erases internal Flash memory.
startup-config	Erases the startup configuration in memory.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

When you use the **erase startup-config** command, the switch router erases or deletes the configuration pointed to by the *config_file* environment variable. The *config_file* environment variable specifies the configuration file used for initialization. If the *config_file* environment variable specifies a Flash memory device and configuration filename, the switch router deletes the configuration file. That is, the switch router marks the file as "deleted."

If you attempt to erase the configuration file specified by the *config_file* or BOOTLDR environment variables, the system prompts you to confirm the deletion. Also, if you attempt to erase the last valid system image specified in the BOOT environment variable, the system prompts you to confirm the deletion.

Examples

The following example deletes the startup configuration file.

```
Switch# erase startup-config
```

Related Commands

Command	Description
bert (Catalyst 8510 MSR and LightStream 1010)	Checks the bit errors on a line for a particular interval.
cd	Cisco IOS command removed from this manual.
dialer-list list	This command or some of its parameters might not function as expected in an ATM environment.
show bootflash:	Displays information about the bootflash: file system.
show startup-config	Shows the configuration file pointed to by the *config_file* environment variable.
undelete	Cisco IOS command removed from this manual.

exclude-node

To specify a node to exclude from all segments of a partially specified ATM PNNI explicit path, use the **exclude-node** PNNI explicit path configuration command.

exclude-node {*name-string* | *node-id* | *node-id-prefix*} [**port** *hex-port-id* | **agg-token** *hex-agg-token-id*]

Syntax Description

name-string	Name of the PNNI node to be excluded from all segments of the ATM PNNI explicit path.
node-id	Full 22-byte node ID for a PNNI node.
node-id-prefix	The first 15 or more bytes of a node ID for a PNNI node.
port *hex-port-id*	Specifies an exit port to exclude for a PNNI node, specified as a hexadecimal port ID.
agg-token *hex-agg-token-id*	Optionally specifies the exit aggregation token, which is used in place of the port ID for higher-level PNNI LGNs. The default is to allow any valid exit port.

Defaults

None

Command Modes

PNNI explicit-path configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Note See the **atm pnni explicit-path** command for a description of how to edit or delete an existing **exclude-node** path entry.

Unlike other explicit-path entries, **exclude-node** entries do not need to appear in any order. They apply to all segments on the path.

Node IDs can be entered with either the full 22-byte length address, or as a node ID prefix with a length of 15 bytes or more. To specify routes that include higher level nodes (parent LGNs) for other peer groups, we recommend that you enter exactly 15 bytes so that the address remains valid in the event of a PGL update.

Node IDs appear in the following format:

dec: dec: 13-20 hex digits

Note To display the node IDs that correspond to named nodes in a network, use either the **show atm pnni identifiers** command or the **show atm pnni topology** command with the **node** keyword.

Node names can be entered instead of node IDs. If names are used to identify higher-level LGNs, the resulting explicit paths are not guaranteed to remain valid if the PGL changes in the neighboring peer group. To prevent invalid paths, configure all parent LGNs (for all potential PGL nodes) with the same node name.

An exit port can be specified for any entry. The port should be specified as a hexadecimal port ID rather than as a port name. For excluded entries, only this port is excluded from the path.

Note To display the corresponding *hex-port-ids* for a node, use either the **show atm pnni identifiers** command with the **port** keyword, or the **show atm pnni topology** command with the **node** and **hex-port-id** keywords.

Normally, **aggregation tokens** are used in place of port IDs for nodes that are higher level LGNs. However, aggregation tokens are not allowed for excluded tokens.

Examples

The following example shows how to perform the following PNNI explicit path configuration tasks.

- Enter PNNI explicit-path configuration mode
- Add two segment-target nodes
- Specify a node to be excluded from all path segments
- Exit PNNI explicit-path configuration mode

```
Switch# configure terminal
Switch(config)# atm pnni explicit-path name boston_2.path1
Switch(cfg-pnni-expl-path)# segment-target dallas_4
Switch(cfg-pnni-expl-path)# segment-target 40:72:47.009181000000106000000000
Switch(cfg-pnni-expl-path)# exclude-node st_louis_2
```

Related Commands

Command	Description
atm pnni explicit-path	Used to enter PNNI explicit path configuration mode, or to create or modify PNNI explicit paths.
next-node	Specifies the next adjacent entry in a fully-specified ATM PNNI explicit path.
segment-target	Specifies a target entry in a partially specified PNNI explicit-path.
show atm pnni explicit-paths	Displays a summary of explicit paths that have been configured.

CHAPTER 7

F Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

facility-alarm (Catalyst 8540 MSR)

To configure the temperatures so that the ATM switch router declares a major or minor alarm condition, use the **facility-alarm** command. You can configure explicit threshold temperatures (in degrees Celsius [°C]) to override the defaults for major and minor alarms. Use the **no** form of this command to disable alarms for that threshold and reset the threshold to the default value.

facility-alarm core-temperature {**major** [*temperature*] | **minor** [*temperature*]}

no facility-alarm core-temperature {**major** [*temperature*] | **minor** [*temperature*]}

Syntax Description

major [*temperature*]	Major alarm threshold temperature threshold in degrees C. The default value is 53°C.
minor [*temperature*]	Minor alarm threshold temperature threshold in degrees C. The default value is 45°C.

Defaults

major is 53°C.
minor is 45°C.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

You cannot disable or adjust the system critical alarms threshold. A "critical" alarm is standard Telco terminology for the alarm just before the system powers itself off.

Examples

The following example shows how to configure facility alarms to 50°C for major alarms, and 38°C for minor alarms.

```
Switch(config)# facility-alarm core-temperature major 50
Switch(config)# facility-alarm core-temperature minor 38
```

Related Commands

Command	Description
clear facility-alarm (Catalyst 8540 MSR)	Clears alarm conditions and resets the alarm contacts.
show facility-alarm status (Catalyst 8540 MSR)	Displays the current major and minor alarm status, if any, and displays the configuration of the alarm thresholds.

failed-attempts

To configure the writing of records for initial connection attempts, use the **failed-attempts** ATM accounting file subcommand. To disable this feature, use the **no** form of this command.

failed-attempts [**none** | [**regular** | **soft**]]

no failed-attempts

Syntax Description

none	Does not record failed attempts.
regular	Records regular SVC/SVP numbers that originate or terminate at the switch router interface.
soft	Records soft PVC/PVP numbers that originate or terminate at the switch router interface.

Defaults

regular and **soft**

Command Modes

ATM accounting file

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Examples

The following example shows entering the ATM accounting file configuration mode and configuring **failed-attempts** to record failed attempts for SVC/SVP connections in the accounting file.

```
Switch(config)# atm accounting file acctng_file1
Switch(config-acct-file)# failed-attempts regular
```

Related Commands

Command	Description
atm accounting file	Enables an ATM accounting file and employs the accounting file configuration mode.
collection-modes	Initializes the collection mode and specifies at what time accounting data is recorded in the accounting file.
min-age	Configures the value of the minimum age of the VC for on-release or periodic collection of accounting records.

fdl (Catalyst 8510 MSR and LightStream 1010)

To enable the FDL capability provided on the T1 board, use the **fdl** interface configuration command. To restore the default, use the **no** form of this command.

fdl {**ansi** | **att**}

no fdl

Syntax Description

ansi	Enables ANSI mode for FDL queries from the remote end.
att	Enables ATT mode for FDL queries from the remote end.

Defaults

Both **ansi** and **att** are disabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

The T1 board responds to requests in both ANSI and ATT format, but is only able to gather the remote end data in ANSI format. The T1 board complies to ANSI standard T1.403

FDL packets are used to collect data from the remote end. To enable the FDL capability, it is necessary to know whether the remote end supports FDL functionality.

The mode selected depends upon which mode is supported on the remote end.

Examples

The following example shows how to enable FDL capabilities in both ANSI and ATT mode.

```
Switch(Config)# interface atm 0/1/0
Switch(Config-if)# fdl ansi
Switch(Config)# interface atm 0/1/0
Swith(Config-if)# fdl att
```

The following example shows how to disable FDL capabilities in both ANSI and ATT mode.

```
Switch(Config)# interface atm 0/1/0
Switch(Config-if)# no fdl ansi
Switch(Config)# interface atm 0/1/0
Swith(Config-if)# no fdl att
```

Related Commands

None

format

To format Flash memory, use the **format** privileged EXEC command.

format *device1***:** [[*device2***:**] [*monlib-filename*]]

Caution The following formatting procedure erases all information in the Flash memory. To prevent the loss of important data, proceed carefully.

Syntax Description

device1:	Device to format. The colon (**:**) is required. Valid devices are as follows: • **bootflash**: This device is the internal Flash memory. • **slot0:** This device is the first PC slot on the route processor card. • **slot1:** This device is the second PC slot on the route processor card.
device2:	Device containing the monlib file to use for formatting *device1*. The colon (**:**) is required. Valid devices are as follows: • **bootflash:** This device is the internal Flash memory. • **slot0:** This device is the first PC slot and is the initial default device. • **slot1:** This device is the second PC slot on the route processor card.
monlib-filename	Name of the ROM monitor library file (monlib file) to use for formatting *device1*. The default monlib file is the one bundled with the system software.

Defaults

The default monlib file is the one bundled with the system software.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Use the **format** command to format internal Flash memory (bootflash) or your Flash memory cards.

In some cases, you might need to insert a new PCMCIA Flash memory card and load images or backup configuration files onto it. Before you can use a new Flash memory card, you must format it.

Flash memory cards have sectors that can fail. You can reserve certain Flash memory sectors as "spares" for use when other sectors fail. Use the **format** command to specify between 0 and 16 sectors as spares. If you reserve a small number of spare sectors for emergencies, you do not waste space because you can use most of the Flash memory card. If you specify zero spare sectors and some sectors fail, you must reformat the Flash memory card and thereby erase all existing data.

The monlib file is the ROM monitor library. The ROM monitor uses the monlib file to access files in the Flash file system.

In the command syntax, *device1* is the device to format, and *device2* contains the monlib file to use. When you omit the [[*device2***:**][*monlib-filename*]] argument, the system formats *device1* using the monlib file that is bundled with the system software. When you omit *device2* from the [[*device2***:**][*monlib-filename*]] argument, the system formats *device1* using the named monlib file from the device specified by the **cd** command. When you omit *monlib-filename* from the [[*device2***:**][*monlib-filename*]] argument, the system formats *device1* using *device2*'s monlib file. When you specify the whole [[*device2***:**][*monlib-filename*]] argument, the system formats *device1* using the specified monlib file from the specified device. Note that you can specify *device1*'s own monlib file in this argument. When the system cannot find a monlib file, the system terminates the formatting process.

Examples

The following example shows the **format** command that formats a Flash memory card inserted in slot 0 of the route processor card.

```
Switch# format slot0:
Running config file on this device, proceed? [confirm]y
All sectors will be erased, proceed? [confirm]y
Enter volume id (up to 31 characters): <Return>
Formatting sector 1 (erasing)
Format device slot0 completed
```

When the switch returns you to the EXEC prompt, the new Flash memory card is successfully formatted and ready for use.

Related Commands

Command	Description
copy flash	Copies a file from Flash memory to another destination.
dialer-list list	This command or some of its parameters might not function as expected.

frame-relay bc-default

To configure the committed burst size for ABR or UBR soft VCs terminating on an interface, use the **frame-relay bc-default** interface configuration command. To disable the committed burst size, use the **no** form of this command.

frame-relay bc-default *bc_default*

no frame-relay bc-default

Syntax Description

bc_default	Default committed burst size in bits for ABR or UBR soft VCs terminating on this interface.

Defaults

32768

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

Use the **frame-relay bc-default** interface parameter to configure the committed burst size (in bits) on the destination interface of a UBR or ABR soft VC connection.

The configured committed burst size is then effective for any subsequent connections.

Examples

The following example shows how to configure the Frame Relay committed burst size to 16384 for serial interface 11/0/0:1.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay bc-default 16384
```

Related Commands

Command	Description
show frame-relay connection-traffic-table-row	Displays the Frame Relay traffic table.

frame-relay connection-traffic-table-row

To create a table entry in the Frame Relay connection-traffic table, use the **frame-relay connection-traffic table-row** global configuration command. To delete an entry, use the **no** form of this command.

frame-relay connection-traffic table-row [**index** *row-index*] *cirval bcval pirval* [*beval*] {**abr | vbr-nrt | ubr**} [*arrow-index*]

no frame-relay connection-traffic table-row [**index** *row-index*]

Syntax Description

index *row-index*	Specifies the index of the entry created in the Frame Relay connection-traffic table. A positive integer from 1 to 1073741823.
cirval	CIR, in bps. A positive integer from 0 to 2048000.
bcval	Bc, in bits. A positive integer from 0 to 32768.
pirval	Peak information rate, in bps. A positive integer from 0 to 2048000.
beval	Excess burst size, in bits. A positive integer from 0 to 32768. The default is 32768.
**abr	vbr-nrt	ubr**	Selects the ATM service category for an interworking connection.
arrow-index	Specifies the index of the entry created in the ATM connection-traffic table, a positive integer from 1 to 1073741823.

Defaults

See "Syntax Description."

Command Modes

Global configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

When you create a connection traffic table row, the Frame Relay parameters are converted into the ATM equivalent parameters and a row is added to the ATM connection-traffic table. The table index values are shared by the Frame Relay connection table and the ATM connection table. If you specify the index in the command, the index value is available in the ATM connection table.

Note Since the index value is linked to the ATM connection-traffic table, the index values in the Frame Relay connection-traffic table might not be contiguous.

Examples

The following example shows how to create a table entry with a row index of 150, committed information rate of 1024000, committed burst size of 16334, peak information rate of 1024000, excess burst size of 20, and the **abr** service category with an ATM row index of 250.

```
Switch# configure terminal
Switch(config)# frame-relay connection-traffic-table-row index 150 1024000 16334 1024000
16334 20 abr 250
```

Related Commands

Command	Description
show frame-relay connection-traffic-table-row	Displays the Frame Relay traffic table.

frame-relay input-queue

To configure discard marking thresholds on a Frame Relay interface in the input direction, use the **frame-relay input queue** interface configuration command. Use the **no** form of the command to revert to default values for the threshold.

frame-relay input-queue {**abr** | **ubr** | **vbr-nrt**} {**discard-threshold** | **marking-threshold**} *percent*

no frame-relay input-queue {**abr** | **ubr** | **vbr-nrt**} {**discard-threshold** | **marking-threshold**} *percent*

Syntax Description

abr | **ubr** | **vbr-nrt**	Service categories for which the threshold is configured
discard-threshold	Threshold where the cell is discarded. If the queue fills up above this level, any frame arriving from an external device with the DE bit set is discarded by the interface. The default is 87 percent.
marking-threshold	Threshold where the cell is marked for EFCI. If the queue fills up above this level, all frames arriving from an external device have the EFCI bit set as they are converted into cells. For cells entering the Frame Relay interface from the switch fabric, the BECN bit is set in the outgoing frame header. The default is 75 percent.
percent	Threshold number as percent of queue size.

Defaults

See "Syntax Description."

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

This command affects all existing connections on the interface, as well as subsequent connections.

Examples

The following example sets the Frame Relay input queue for ABR connects to allow EFCI marking for cells over 75 percent of capacity.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay input-queue abr marking-threshold 75
```

Related Commands

Command	Description
show frame-relay connection-traffic-table-row	Displays the Frame Relay traffic table.
frame-relay output-queue	Configures discard marking thresholds on a Frame Relay interface in the output direction.

frame-relay intf-type

To configure an interface as DCE or NNI, use the **frame-relay intf-type** interface configuration command. To disable the configuration, use the **no** form of this command.

frame-relay intf-type {**dce** | **nni**}

no frame-relay intf-type {**dce** | **nni**}

Syntax Description

dce	Data communications equipment.
nni	Network-to-Network Interface.

Defaults

nni

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

When you specify DCE, the ATM switch router supports only network-side PVC status management procedures. When you specify NNI, the ATM switch router supports both user-side and network-side PVC status management procedures.

Note Frame Relay DTE is not supported.

Examples

The following example configures serial interface 11/0/0:1 as Frame Relay interface, type DCE.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay intf-type dce
```

Related Commands

Command	Description
show frame-relay interface resource	Displays the current resource allocation on a Frame Relay interface.

frame-relay lmi-n391dte

To set a full status polling interval, use the **frame-relay lmi-n391dte** interface configuration command. To restore the default interval value, use the **no** form of this command.

frame-relay lmi-n391dte *keep-exchanges*

no frame-relay lmi-n391dte *keep-exchanges*

Syntax Description

keep-exchanges	Number of keep exchanges to be completed before requesting a full status message. The value must be a positive integer from 1 to 255.

Defaults

6 keep exchanges

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

To set the full status message polling interval, use this command when the interface is configured as NNI.

Examples

The following example shows how to set one out of every four status inquiries to request a full status response from the switch. The remaining three status inquiries request only keepalive exchanges.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay intf-type nni
Switch(config-if)# frame-relay lmi-n391dte 4
```

Related Commands

Command	Description
show frame-relay lmi	Displays LMI specific status for an interface.

frame-relay lmi-n392dce

To set the error threshold on DCE and NNI interfaces, use the **frame-relay lmi-n392dce** interface configuration command. To remove the setting, use the **no** form of this command.

frame-relay lmi-n392dce *threshold*

no frame-relay lmi-n392dce *threshold*

Syntax Description

threshold	Error threshold value. The value must be a positive integer from 1 to 10.

Defaults

Two errors

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

N392 errors must occur within the number defined by the N393 event count for the link to be down. Therefore, the threshold value for this command must be less than the count value defined in the **frame-relay lmi-n393dce** command.

Examples

The following example configures serial interface 11/0/0:1 with Frame Relay LMI monitoring event count to four.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay lmi-n392dce 4
```

Related Commands

Command	Description
frame-relay lmi-n393dce	Sets the monitored events count on DCE and NNI interfaces.
show frame-relay lmi	Displays LMI specific status for an interface.

frame-relay lmi-n392dte

To set the error threshold on DTE or NNI interfaces, use the **frame-relay lmi-n392dte** interface configuration command. To remove the setting, use the **no** form of this command.

frame-relay lmi-n392dte *threshold*

no frame-relay lmi-n392dte *threshold*

Syntax Description

threshold	Error threshold value. This value must be a positive integer from 1 to 10.

Defaults

Three errors

Command Modes

Interface configuration

Command History

Release	Modification
TBD	

Usage Guidelines

The **frame-relay lmi-n392dte** and **frame-relay lmi-n393dte** commands define the condition that causes the link to be declared down. Two "threshold" errors must occur within N393 number of events for the link to be declared down.

Examples

The following example shows how to set the LMI error threshold to six.

```
Switch# configure terminal
Switch(config)# interface serial 1/0/0:1
Switch(config-if)# frame-relay intf-type nni
Switch(config-if)# frame-relay lmi-n392dte 6
```

Related Commands

Command	Description
show frame-relay lmi	Displays LMI specific status for an interface.

frame-relay lmi-n393dce

To set the monitored events count on DCE and NNI interfaces, use the **frame-relay lmi-n393dce** interface configuration command. To remove the setting, use the **no** form of this command.

frame-relay lmi-n393dce *events*

no frame-relay lmi-n393dce *events*

Syntax Description

events	Monitored events count value. The value must be a positive integer from 1 to 10.

Defaults

Two events

Command Modes

Interface configuration

Command History

Release	Modification
TBD	

Usage Guidelines

This command and the **frame-relay lmi-n392dce** command define the condition that causes the link to be down. In the Cisco implementation, N392 errors must occur within the events count for the link to be down. Therefore, the events value that you define for this command must be greater than the threshold value defined in the **frame-relay lmi-n392dce** command.

Examples

The following example shows how to set the LMI monitored event count to three.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay intf-type dce
Switch(config-if)# frame-relay lmi-n393dce 3
```

Related Commands

Command	Description
show frame-relay lmi	Displays LMI specific status for an interface.

frame-relay lmi-n393dte

To set the monitored event count on DTE and NNI interfaces, use the **frame-relay lmi-n393dte** interface configuration command. To remove the setting, use the **no** form of this command.

frame-relay lmi-n393dte *events*

no frame-relay lmi-n393dte *events*

Syntax Description

events	Monitored events count value. This value must be a positive integer from 1 to 10.

Defaults

Four events

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

The **frame-relay lmi-n393dte** and the **frame-relay lmi-n392dte** commands define the condition that causes the link to be declared down. N392 errors must occur within the events count for the link to be declared down.

Note The events value defined in this command must be greater than the threshold value defined in the **frame-relay lmi-n392dte** command.

Examples

The following example shows how to set the LMI monitored events count to three.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay intf-type NNI
Switch(config-if)# frame-relay lmi-n393dte 3
```

Related Commands

Command	Description
show frame-relay lmi	Displays LMI specific status for an interface.

frame-relay lmi-t392dce

To set the polling verification timer on DCE and NNI interfaces, use the **frame-relay lmi-t392dce** interface configuration command. To remove the current setting, use the **no** form of this command.

frame-relay lmi-t392dce *seconds*

no frame-relay lmi-t392dce *seconds*

Syntax Description

seconds	Polling verification timer value, in seconds. This value must be a positive integer from 5 to 30.

Defaults

15 seconds

Command Modes

Interface configuration

Command History

Release	Modification
TBD	

Usage Guidelines

The value for the timer must be greater than the DTE or NNI keepalive timer.

Examples

The following example shows how to set a polling verification timer on a DCE or NNI interface set to 20 seconds.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay intf-type dce
Switch(config-if)# frame-relay lmi-t392dce 20
```

Related Commands

Command	Description
show frame-relay lmi	Displays LMI specific status for an interface.

frame-relay lmi-type

To select the LMI type, use the **frame-relay lmi-type** interface configuration command. To return to the default LMI type, use the **no** form of this command.

frame-relay lmi-type [**ansi** | **cisco** | **q933a**]

no frame-relay lmi-type [**ansi** | **cisco** | **q933a**]

Syntax Description

ansi	Annex D defined by the ANSI standard T1.617.
cisco	The LMI type defined jointly by Cisco Systems and three other companies.
q933a	ITU-T Q.933 Annex A.

Defaults

cisco

Command Modes

Interface configuration

Command History

Release	Modification
11.4(1)	New command

Usage Guidelines

The LMI type is set on a per-interface basis. If you want to display the type that is configured, use the **show interfaces** EXEC command.

Examples

The following example shows how to configure an interface for the ANSI LMI type.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# encapsulation frame-relay ietf
Switch(config-if)# frame-relay lmi-type ansi
Switch(config-if)# keepalive 15
```

Related Commands

Command	Description
show frame-relay lmi	Displays LMI specific status for an interface.
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

frame-relay output-queue

To configure discard marking thresholds on a Frame Relay interface in the output direction, use the **frame-relay output-queue** interface configuration command. To restore tthe default values for the threshold, use the **no** form of this command .

frame-relay output-queue {**abr** | **ubr** | **vbr-nrt**} {**discard-threshold** | **marking-threshold**} *percentage*

no frame-relay output-queue {**abr** | **ubr** | **vbr-nrt**} {**discard-threshold** | **marking-threshold**} *percentage*

Syntax Description

abr | **ubr** | **vbr-nrt**	Service categories for which the threshold is configured: • **ABR** • **UBR** • **VBR-NRT**
discard-threshold	Threshold where the cell is discarded. If the queue fills above this level, any frame arriving from the switch router with DE bit set is discarded by the interface. The default is 87 percent.
marking-threshold	Threshold where the cell is marked for EFCI. If the queue fills above this level, all frames arriving from the switch router will have the FECN bit set in the frame header as they exit the interface. For cells entering the Frame Relay interface from an external device, the BECN bit is set in the frame header as it enters the switch. The default is 75 percent.
percentage	Percentage number.

Defaults

See “Syntax Description.”

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

This command affects all existing connections on the interface, as well as subsequent connections.

Examples

The following example shows how to set the Frame Relay output queue for ABR connects to allow EFCI marking for cells over 65 percent of capacity.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay output-queue abr marking-threshold 65
```

Related Commands

Command	Description
frame-relay input-queue	Configures discard marking thresholds on a Frame Relay interface in the input direction.
show frame-relay interface resource	Displays the current resource allocation on a Frame Relay interface.

frame-relay overbooking

To set the percentage of CIR overbooking, use the **frame-relay overbooking** command. To disable CIR overbooking, use the **no** form of this command.

frame-relay overbooking *percent*

no frame-relay overbooking

Syntax Description

percent	The percent of interface bandwidth from 101 to 1000.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

The allowable overbooking on an access link or interface is a number times the access link or interface speed (access rate), for example, 200 percent of the access rate. The total of all CIRs for all Frame Relay PVCs and Frame Relay soft VCs cannot exceed the CIR overbooking factor times the access rate.

Once configured and used to admit Frame Relay PVCs and Frame Relay soft VCs on an interface, the CIR overbooking factor can only be adjusted within the upper limit and the level which has been overbooked by the existing connections. Disabling the CIR overbooking factor is allowed only when the total of all CIRs for all Frame Relay PVCs and Frame Relay soft VCs does not exceed the interface access rate.

Configuring the CIR overbooking factor increases the available bit rates for the Frame Relay PVC and soft VC but does not increase the actual bandwidth (access rate) and resources available to the Frame Relay interface.

The CIR of a connection is not allowed to exceed the actual access rate of an interface even if the CIR overbooking factor is configured.

Note You should have a thorough understanding of network traffic patterns when using the **frame relay overbooking** command. Excess traffic arriving at an overbooked Frame Relay interface might lead to discarded or DE tagged frames.

Examples

The following example configures the Frame Relay serial interface to allow overbooking the CIR to 200 percent.

```
Switch(config)# interface serial 1/1/0:5
Switch(config-if)# encapsulation frame-relay ietf
Switch(config-if)# frame-relay overbooking 200
```

Related Commands

Command	Description
show frame-relay interface resource	Displays the current resource allocation on a Frame Relay interface.

frame-relay pvc

To create a Frame Relay-to-ATM network interworking or service interworking PVC or Frame-Relay-to-Frame Relay cross-connected PVC, use the **frame-relay pvc** interface configuration command. To remove a Frame Relay PVC, use the **no** form of this command.

For Frame Relay-to-ATM network interworking, use the following syntax:

frame-relay pvc *dlci* [**upc** {**pass** | **tag-drop**}] [**rx-cttr** *index*] [**tx-cttr** *index*] **network** [**clp-bit** {**0** | **1** | **map-de**}] [**de-bit** {**map-de** | **map-clp-or-de**}] [**interface atm** *card/subcard/port vpi vci*] [**upc** {**drop** | **pass** | **tag**}] [**pd** {**off** | **on**}] [**rx-cttr** *index*] [**tx-cttr** *index*]

no frame-relay pvc *dlci*

For Frame Relay-to-ATM service interworking, use the following syntax:

frame-relay pvc *dlci* [**upc** {**pass** | **tag-drop**}] [**rx-cttr** *index*] [**tx-cttr** *index*] **service** {**transparent** | **translation**} [**clp-bit** {**0** | **1** | **map-de**}] [**de-bit** {**0** | **1** | **map-clp**}] [**efci-bit** {**0** | **map-fecn**}] [**interface atm** *card/subcard/port* [*vci* | **any-vci**] [**upc** {**drop** | **pass** | **tag**}] [**pd** {**off** | **on**}] [**rx-cttr** *index*] [**tx-cttr** *index*] [**encap** {**aal5mux ip** | **aal5snap**}] [**inarp** *minutes*]

no frame-relay pvc *dlci*

Note The **any-vci** feature is only available for interface ATM 0.

For Frame Relay-to-Frame Relay cross-connection, use the following syntax:

frame-relay pvc *dlci* [**upc** {**pass** | **tag-drop**}] [**rx-cttr** *index*] [**tx-cttr** *index*] **interface serial** *card/subcard/port*:*cgn* **dlci** *dlci* [**upc** {**drop** | **pass** | **tag**}] [**rx-cttr** *index*] [**tx-cttr** *index*]

no frame-relay pvc *dlci*

Syntax Description

dlci	Data-link connection identifier, ranging from 16 to 1007, which specifies a PVC in a Frame Relay network.
upc *upc*	Usage parameter control, specified as **pass** or **tag-drop**. The default is **pass**, which derives from the per-interface default value configured through the **frame-relay upc-intent** command.
rx-cttr *index*	Frame Relay connection-traffic table row index in the received direction. The default is 100.
tx-cttr *index*	Frame Relay connection-traffic table row index in the transmitted direction. The default is 100.
network|**service** {**transparent** | **translation**}	Specifies the interworking function that can be either network interworking, service interworking in transparent mode, or service interworking in translation mode.

clp-bit {**0** | **1** | **map-de**}	• Sets the mode of DE/CLP mapping in Frame Relay to the ATM direction. Options **0**, **1**, or **map-DE** are allowed for both network interworking and service interworking. The default is **map-de**. • **map-de**—Specifies mode 1, described in 4.2.1 of FRF.8: "The DE field in the Q.922 core frame shall be mapped to the ATM CLP field of every cell generated by the segmentation process of the AAL5 PDU containing the information of that frame." Similarly, it applies to mode 1 of 4.4.1 of FRF.5. • **0** or **1**—Specifies mode 2, described in 4.2.1 of FRF.8: "The ATM CLP of every ATM cell generated by the segmentation process of the AAL5 PDU containing the information of that frame shall be set to a constant value (either 0 or 1) configured at service subscription time." Similarly, it applies to mode 2 of 4.4.1 of FRF.5.
de-bit [**0** | **1** | **map-de** | **map-clp** | **map-clp-or-de**]	Sets the mode of CLP/DE mapping in ATM to the Frame Relay direction. For *network* interworking: Options **map-de**, or **map-clp-or-de** are allowed. The default value is **map-clp-or-de**. • **map-clp-or-de**—Specifies mode 1 described in 4.4.2 of FRF.5: "If one or more ATM cells belonging to a frame has its CLP field set to 1 or if the DE field of the FR-SSCS PDU is set to 1, the IWF shall set the DE field of the Q.922 core frame." • **map-de**—Specifies mode 2 described in 4.4.2 of FRF.5: "No mapping is performed from the ATM layer to Q.922 core layer. The FR-SSCS PDU DE field is copied unchanged to the Q.922 core frame DE field, independent of CLP indication(s) received at the ATM layer." For *service* interworking: • Options **0**, **1**, or **map-clp** are allowed. The default value is **map-clp**. • **map-clp**—Specifies mode 1, described in 4.2.2 of FRF.8: "If one or more cells belonging to a frame has its CLP field set, the IWF shall set the DE field of the Q.922 Core frame." • **0** or **1**—Specifies mode 2, described in 4.2.2 of FRF.8: "The DE field of the Q.922 Core frame shall be set to a constant value (either 0 or 1) configured at service subscription time."
card/subcard/port	Card, subcard, and port number for the ATM interface.
vpi	VPI of this PVC, from 0 to 255. The VPI is an 8-bit field in the header of the ATM cell. The VPI value is unique only on an interface, not throughout the ATM network (it has local significance only).

vci	VCI of this PVC. The range is normally 32 to 16383, but can be expanded from 5 to 16383 in manual-well-known-vc mode. The VCI is a 16-bit field in the header of the ATM cell. The VCI value is unique only on a single interface, not throughout the ATM network (it has local significance only).
pd {**off** | **on**}	Specifies the intelligent packet discard option as **on** or **off**. The default is **off**.
efci-bit {**0** | **map-fecn**}	Sets the mode of FECN/EFCI mapping in Frame Relay to the ATM direction. The default value is 0.
card/subcard/port:cgn	Card, subcard, port number, and channel group number for the serial interface.
encap {aal5mux ip | aal5snap}	AAL encapsulation type applies only to *terminating* connections. (For service interworking connections only.) • **aal5mux ip**—A MUX-type virtual connection. (For *transparent* mode only.) • **aal5snap**— LLC/SNAP precedes the protocol datagram. This is the only encapsulation supported for Inverse ARP. (For *translation* mode only.)
inarp *minutes*	Specifies how often Inverse ARP datagrams are sent on this virtual connection and applies only to *terminating* connections. (For service interworking *translation* mode only.) The default value is 15 minutes.

Defaults

See "Syntax Description."

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

You can set the **upc** option to **tag** or **drop** only under the following conditions:

- The ATM interface in UNI is on the network side.
- The ATM interface is not the route processor port (ATM 0) or a logical port (VP tunnel).
- The connection is not the leaf of a point-to-multipoint connection.
- Refer to the **frame-relay connection-traffic-table-row** command for information on configuring the connection-traffic table specified by index.

Examples

The following example creates a service translation cross-connection between Frame Relay interface 11/0/0:1 on PVC 66 and ATM interface 10/0/0 100 250.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay pvc 66 rx-cttr 5 tx-cttr 5 service translation interface
atm 10/0/0 100 250
```

Related Commands

Command	Description
show vc	Displays active virtual circuits (PVCs, SVCs, and soft VCs).

frame-relay soft-vc

To create Frame Relay soft PVCs on the switch router, use the **frame-relay soft-vc** interface configuration command. You can use this command to create soft PVCs between two Frame Relay connections or between a Frame Relay connection and an ATM connection.

To create a soft PVC between two Frame Relay connections, use the following syntax:

frame-relay soft-vc *dlci_a* **dest-address** *address* [**dlci** *dlci_b*] [**upc** *upc*]
[**rx-cttr** *index*] [**tx-cttr** *index*] [**retry-interval** [**first** *retry-interval*]
[**maximum** *max-retry-interval*]] [**network** [**clp-bit** {**0 | 1 | map-de**}]
[**de-bit** {**0 | 1 | map-de | map-clp-or-de**}]]
[**explicit-path** *precedence* {**name** *path-name* | **identifier** *path-id*}
[**upto** *partial-entry-index*]] [*only-explicit*]

To create a soft PVC between a Frame Relay connection and an ATM connection, use the following syntax:

frame-relay soft-vc *dlci_a* **dest-address** *address* **vc** *vpi_b vci_b* [**upc** *upc*]
[**rx-cttr** *index*] [**tx-cttr** *index*] [**pd** {**on | off**}]
[**retry-interval** [**first** *retry-interval*] [**maximum** *max-retry-interval*]]
[**network | service** [**transparent | translation**] [**efci-bit** {**0 | map-fecn**}]]
[**clp-bit** {**0 | 1 | map-de**}] [**de-bit** {**0 | 1 | map-de | map-clp-or-de**}]]
[**explicit-path** *precedence* {**name** *path-name* | **identifier** *path-id*}
[**upto** *partial-entry-index*]] [*only-explicit*]

For existing Frame Relay soft PVCs, you can enable or disable the connection and use the **redo-explicit** keyword to respecify the explicit-path configuration.

frame-relay soft-vc *dlci_a* [**enable | disable**]
[**redo-explicit** [**explicit-path** ***precedence*** {**name** *path-name* | **identifier** *path-id*}
[**upto** *partial-entry-index*]] [**only-explicit**]]

To remove Frame Relay soft PVCs, use the **no** form of this command.

no frame-relay soft-vc *dlci-a*

Syntax Description

dlci_a	Specifies the data-link connection identifier, ranging from 16 to 1007, which specifies a PVC in a Frame Relay network.
dest-address *address*	Specifies the destination address.
dlci *dlci_b*	Specifies the data-link connection identifier, ranging from 16 to 1007, which specifies a PVC in a Frame Relay network.
vbi_b	ATM virtual path identifier.
vci_b	ATM virtual channel identifier.
upc *upc*	Usage parameter control, specified as **pass**	**tag-drop**. It gets its default value from the per-interface default value configured with the **frame-relay upc-intent** command.

rx-cttr *index*	Connection traffic table row index in the received direction. The default is 100. The **cttr** should be configured before using the **atm pvc** command. Refer to the **atm connection-traffic-table-row** command for information on configuring the **rx-cttr**.
tx-cttr *index*	Connection traffic table row index in the transmitted direction. The default is 100. The **cttr** should be configured before using the **atm pvc** command. Refer to the **atm connection-traffic-table-row** command for information on configuring the **tx-cttr**.
pd {**on** | **off**}	Specifies the intelligent packet discard option as **on** or **off**. The default is **off**.
retry-interval	Configures retry interval timers for a soft PVC.
first *retry-interval*	Retry interval for the first retry after the first failed attempt, specified in milliseconds. If the first retry after the first failed attempt also fails, the subsequent attempts are made at intervals computed using the **first** *retry-interval*, as follows: (2 ** (*k*-1)) * **first** *retry-interval* Where the value of *k* is 1 for the first retry after the first failed attempt and is incremented by 1 for every subsequent attempt. Range is from 100 to 3600000 milliseconds; the default is 5000 milliseconds.
maximum *retry-interval*	The maximum retry interval between any two attempts, specified in seconds. Once the retry interval is computed in the **first** *retry-interval* and becomes equal to or greater than the **maximum** *retry-interval* configured, the subsequent retries are done at regular intervals of **maximum** *retry-interval* seconds until the call is established. Range is from 1 to 65535 seconds; the default is 60.
network [**clp-bit** {**0** | **1** | **map-de**}] [**de-bit** {**0** | **1** | **map-de** | **map-clp-or-de**}]	Specifies the interworking function, which can be either network or service interworking. For soft PVCs that originate from a Frame Relay interface and end on a Frame Relay interface, the default is network interworking. For soft PVCs that originate from a Frame Relay interface and end on an ATM interface, the default is service interworking.
clp-bit	Sets the mode of DE/CLP mapping in the Frame Relay to ATM direction. Values **0**, **1**, or **map-de** are allowed for both network interworking and service interworking. The default is **map-de**.
de-bit	Sets the mode of DE/CLP mapping in ATM to Frame Relay direction. • For network interworking, values **map-de** or **map-clp-or-de** are allowed.The default value is **map-clp-or-de**. • For service interworking, values **0**, **1**, or **map-clp** are allowed. The default is **map-clp**.

[**network** | **service** [**transparent** | **translation**]]	Specifies the interworking function, which can be either network interworking or service interworking in transparent mode, or service interworking in translation mode.
efci-bit {**0** | **map-fecn**}	For service interworking only. Sets the mode of FECN/EFCI mapping in the Frame Relay-to-ATM direction. The default value is **0**. Values **0** or **map-fecn** are allowed.
enable	Enables the soft connection, and allows it to be set up. This is the default for the initial soft connection configuration. However, if the **frame-relay soft-vc** command is reentered for an existing connection, the default is to remain in the current enabled or disabled state.
disable	Disables the soft connection, which prevents it from being set up initially, or tears down an existing connection.
explicit-path	The PNNI explicit path that is manually configured for routing a soft PVC, using the **atm pnni explicit-path** command.
precedence	The precedence number by which ATM PNNI explicit paths are assigned, from 1 to 3. Up to three explicit paths can be assigned to a soft PVC.
name *path-name*	The name of the ATM PNNI explicit path for routing soft PVCs.
identifier *path-id*	The name of the ATM PNNI explicit path for routing soft PVCs.
upto *partial-entry-index*	Allows a subset of a longer explicit path to be used, so that all included nodes after the specified entry-index are disregarded. If the destination is reachable at any next node or segment target, the remaining included nodes in the explicit path are disregarded automatically.
only-explicit	If one or more explicit paths have been specified and the explicit path fails, the soft connection remains down until it is retried at its next retry interval. If this option is not specified, the system uses the standard on-demand routing instead of waiting for the next retry interval.
redo-explicit	Applies only to existing soft connections and allows explicit paths to be respecified without tearing down connections. Existing connections are unaffected unless a reroute takes place, and then they use the newer explicit-path configuration.

Defaults

See "Syntax Description."

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

Obtain the destination port address before configuring a soft PVC by using the **show atm interface** or **show atm addresses** command on the destination switch**.**

The following list identifies reasons why the creation of a soft PVC is unsuccessful:

- There is a VPI or VCI collision at the source or destination switch.
- The source or destination interface is not up (or autoconfiguration is not complete).
- The specified destination address is not correct.

Up to three explicit paths can be assigned to a soft VC, using precedence numbers 1 through 3. The precedence 1 explicit path is considered the primary path and is tried first. If it fails, then the next precedence path is tried. Explicit paths can be specified either by **name** or by **identifier**.

The explicit-path options can be changed without tearing down an existing Frame Relay soft PVC. Use the **redo-explicit** form of the command to respecify all of the explicit-path options.

After configuring a Frame Relay soft PVC, use the **show vc** command on the source node (specifying the serial interface and DLCI) to verify that the soft PVC has succeeded and to see the explicit path taken.

Note The show configuration displayed for soft connections with explicit paths is always shown as two separate lines, with the **redo-explicit** keyword on the second line, even if it was originally configured using a single command line.

Examples

The following example shows how to create a soft PVC between two Frame Relay connections.

```
Switch# configure terminal
Switch(config-if)# frame-relay soft-vc 50 dest-address
47.0091.8100.0000.00e0.1e79.8803.4000.0c81.8020.00 dlci 50 upc pass
```

The following example shows how to create a soft PVC between a Frame Relay connection and an ATM connection.

```
Switch# configure terminal
Switch(config-if)# frame-relay soft-vc 60 dest-address
47.0091.8100.0000.0060.3e5b.7201.4000.0c80.8000.00 vc 0 100
```

The following example shows these connections via the **show vc** command.

```
Switch# show vc interface serial3/0/0:1
Interface      Conn-Id    Type   X-Interface     X-Conn-Id   Encap  Status
Serial3/0/0:1     50      SoftVC  Serial3/0/0:2       50              UP
Serial3/0/0:1     55      PVC     Serial3/0/0:2       55              UP
Serial3/0/0:1     60      SoftVC  ATM1/1/1          0/35              UP
Serial3/0/0:1     66      PVC     Serial3/0/0:2       66              UP
```

In the **show vc** example above, the Frame Relay-to-Frame Relay connection originates from Serial 3/0/0:1 and terminates at Serial 3/0/0:2. The Frame Relay-to-ATM connection originates from Serial 3/0/0:1 and goes out through ATM 1/1/1 and ends on an ATM interface on an adjacent switch.

The following example shows how to manually configure an explicit path between two Frame Relay connections. In this example, if the explicit path fails, standard routing is used.

```
Switch# configure terminal
Switch(config)# interface atm 0/1/3
Switch(config-if)# frame-relay soft-vc 100 dest-address
47.0091.8100.0000.1061.705b.d900.4000.0c81.9000.00 dlci 100 explicit-path 1 name
chicago.path1
```

The following example shows how to use the **redo-explicit** keyword to modify an existing explicit-path configuration to add a second alternate explicit path and to prevent standard routing from being used should both explicit paths fail. Note that the system prompts you to confirm the changes.

```
Switch(config)# interface atm 0/1/3
Switch(config-if)# frame-relay soft-vc 100 redo-explicit explicit-path 1 name
chicago.path1 explicit-path 2 name chicago.path2 only-explicit
Modify with new explicit path options [yes], or abort changes [no]? [yes/no]:y
```

The following example shows how to remove all explicit paths from an existing Frame Relay soft PVC by using the **redo-explici**t keyword, with no other options specified. The path will not be changed until a reroute occurs.

```
Switch(config)# interface atm 0/1/3
Switch(config-if)# frame-relay soft-vc 100 redo-explicit
Modify with new explicit path options [yes], or abort changes [no]? [yes/no]:y
```

Related Commands

Command	Description
atm pnni explicit-path	Used to enter PNNI explicit path configuration mode to create or modify PNNI explicit paths.
atm route-optimization (interface)	Enables and configures soft PVC route optimization on an ATM interface.
atm route-optimization (EXEC)	Initiates route optimization immediately for a specific interface or specific soft VC.
atm soft-vc	Used to create a soft PVC on the switch router.
atm soft-vp	Used to create a soft PVP on the switch router.
show atm pnni explicit-paths	Displays a summary of explicit paths that have been configured.
show atm vc	Displays the ATM layer connection information about the virtual connection.
show vc	Displays active virtual circuits (PVCs, SVCs, and soft VCs).

frame-relay upc-intent

To configure the UPC to be programmed for the soft VCs terminating on an interface, and to configure the default value for the **upc** option in the **frame-relay pvc** command, use the **frame-relay upc-intent** interface configuration command. To assign the default value, use the **no** form of this command.

frame-relay upc-intent {**pass** | **tag-drop**}

no frame-relay upc-intent

Syntax Description

pass | **tag-drop**	Usage parameter control, specified as **pass** or **tag-drop**.

Defaults

Pass

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

This command determines the UPC to use for SVCs and for the destination leg of soft VCs. If you want to configure policing, you can apply it once for traffic entering a network.

Examples

The following example shows how to set the intended UPC for SVCs on an interface to **tag-drop**.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# frame-relay upc-intent tag-drop
```

Related Commands

Command	Description
show running-config	Displays the configuration information currently running on the terminal.

framing (controller)

To specify the type of framing used by the port on a Frame Relay port adapter, use the **framing** controller configuration command. To restore the default framing type, use the **no** form of this command.

For the channelized DS3 (CDS3) Frame Relay port adapter, use the following syntax:

framing {**c-bit** | **m23**}

no framing {**c-bit** | **m23**}

For the channelized E1 (CE1) Frame Relay port adapter, use the following syntax:

framing {**crc** | **no-crc4**}

no framing {**crc** | **no-crc4**}

Syntax Description

c-bit | **m23**	Specifies that either C-bit framing or M23 framing is used for the CDS3 Frame Relay controller.
crc4| **no-crc4**	Specifies CRC-4 E1 framing for the CE1 Frame Relay controller. To select E1 framing without CRC-4 generation, use the **no-crc4** option.

Defaults

CDS3 Frame Relay port adapters: **m23**

CE1 Frame Relay port adapters: **crc4**

Command Modes

Controller configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

The DS3 port adapter has a similar command, but the Frame Relay port adapter does not support the same command options.

Examples

The following example shows how to set the framing for the CE1 Frame Relay port adapter to **no** CRC4.

```
Switch# configure terminal
Switch(config)# controller e1 11/0/0
Switch(config-controller)# framing no-crc4
```

Related Commands

Command	Description
show controllers e1	Displays information about a physical port device and specifies a channelized E1 interface.

framing (interface)

To select the frame type for the data line, use the **framing** interface configuration command. To restore the default values, use the **no** form of this command.

framing *framingmode*

no framing *framingmode*

Syntax Description

framingmode	Specifies *framingmode* as follows: • For DS3: **m23adm** | **m23plcp** | **cbitadm** | **cbitplcp** • For E3: **g832adm** | **g751adm** | **g751plcp** • For E1: **crc4adm** | **crc4plcp** | **pcm30adm** | **pcm30plcp** • For E1 IMA: **cleare1** | **crc4adm** | **pcm30adm** • For T1: **esfplcp** | **sfplcp** | **sfadm** | **esfadm** • For T1 IMA: **esfadm** | **sfadm** • For OC-12: **stm-4c** | **sts-12c**

Defaults

For DS3: **cbitplcp**

For E3: **g832adm**

For E1: **pcm30adm**

For E1 IMA: **no-crc4**

For T1: **esfplcp**

For T1 IMA: **esf**

For OC-12: **sts-12c**

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	Modified: Formerly **interface configuration**

Usage Guidelines

In the DS3 environment, the **framing (interface)** subcommand allows selection of DS3 framing mode to M23 ADM, M23 PLCP, C-Bit ADM, or C-Bit PLCP.

In the E3 environment, the **framing (interface)** subcommand allows selection of E3 framing mode to G.751 PLCP, G.751 ADM, or G.832 ADM.

In the E1 environment, the **framing (interface)** subcommand allows selection of E1 framing mode to ADM with CRC, PLCP with CRC, PCM 30 ADM, PCM 30 PCLP.

In the E1 IMA environment, the **framing (interface)** subcommand allows selection of E1 IMA framing mode to clear channel, ADM with CRC, PCM 30 ADM.

In the T1 environment, the **framing (interface)** subcommand allows selection of T1 framing mode to ESF PLCP, SF PLCP, SF ADM, ESF ADM.

In the T1 IMA environment, the **framing (interface)** subcommand allows selection of T1 IMA framing mode to SF ADM, ESF ADM.

In the OC-12 environment, the **framing (interface)** subcommand allows selection of OC-12 framing mode to SONET (STS-12c), SDH (STM-4c).

Note This command is only supported on a system with an OC-12 or OC-48c interface module.

Examples

The following example shows how to select **g751plcp** as the frame type.

```
Switch(config-if)# framing g751plcp
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.
sonet overhead	Sets SONET/SDH overhead bytes.

CHAPTER 8

H Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

hw-module

To reset a specific port adapter, use the **hw-module** EXEC command.

hw-module {**slot** *number* | **subslot** *subslot*/*subcard*} **reset**

Syntax Description

slot *number*	Physical slot number of the port adapter you want to reset.
subslot *subslot*/*subcard*	Indicates either a half-width card or daughter card attached to full-width cards. If the subcard is not specified, in the case of a half-width card, both the cards in the slot are reset. In case of full-width cards, the motherboard in the slot is reset.
reset	Reset is performed on the hardware module selected using **slot** or **subslot** options.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

If the subcard is not provided, both subcards in the slot are reset. In the case of a full-width card, the motherboard in the selected slot is reset. The subcard argument indicates a specific subcard in a selected slot. If the subcard is not given, the full-width card in the selected slot is reset.

This command is available to reset port adapters only. The **hw-module** command cannot be used to reset route processor controllers and switch controllers.

Caution If any active connections are configured on this port, they will be lost until the port adapter restarts. The running configuration is restored only when the port adapter returns to normal operation.

Examples

The following example resets the port adapter in slot 3.

```
Switch# hw-module slot 3 reset
```

Related Commands

Command	Description
reprogram	Upgrades nonvolatile microcode or programmable logic on a selected card from a Flash file.

I Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

ima active-links-minimum

To configure the minimum active links for an IMA group to function, use the **ima active-links-minimum** interface configuration command. To restore the default value, use the **no** form of this command.

ima active-links-minimum *number*

no ima active-links-minimum

Syntax Description

number	Configures the minimum number (1 to 8) of active links for an IMA group to function.

Defaults

1

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

An IMA group might be configured to require a minimum amount of bandwidth or active links to function correctly. However, if you reduce the minimum number of active links to below the minimum active links configured, the far-end connection receives an ICP cell with a failure error, and the interface changes to the down state.

Note This command is only supported on systems equipped with FC-PFQ.

Examples

The following example uses the **ima active-links-minimum** command to configure the minimum number of active links that must be active for the IMA group to function correctly.

```
Switch(config)# interface atm 0/0/ima1
Switch(config-if)# ima active-links-minimum 2
```

Related Commands

Command	Description
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

ima clock-mode

To configure the clocking mode for the IMA group, use the **ima clock-mode** interface configuration command. To restore the default value, use the **no** form of this command.

ima clock-mode {**common** | **independent**}

no ima clock-mode

Syntax Description

common	Configures the clocking as CTC, where the same clocking is used for all interfaces.
independent	Configures the clocking as ITC, where each interface derives its clocking from a different clock source.

Defaults

common

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

The transmit clock of members of an IMA group can be derived from one single clock source or driven individually from different sources.

The term ITC is used when the transmit clock on each link is independently derived from a clock source. The transmit clock source for each member interface is configured using the **clock source (Catalyst 8540 MSR)** command at interface configuration.
The term CTC applies when the same clock is used for all links. In CTC mode, the network clock as configured by the **network-clock-select** command is the source that drives the transmit clock of all the members of an IMA group.

Note This command is only supported on systems equipped with FC-PFQ.

Examples

The following example uses the **ima clock-mode** command to configure the IMA group clocking mode as independent.

```
SwitchA(config)# interface atm 0/0/ima1
SwitchA(config-if)# ima clock-mode independent
```

The following example uses the **ima clock-mode** command to configure the IMA group clocking mode as common with network clock from interface ATM 0/0/6.

```
Switch(config)# network 1 atm 0/0/6
Switch(config)# interface atm 0/0/ima1
Switch(config-if)# ima clock-mode common
```

Related Commands

Command	Description
clock source (interface) (Catalyst 8510 MSR and LightStream 1010)	Used to select a transmit clock source for a physical device, such as a port.
network-clock-select	Enables the recovered clock to specify a particular port to provide network clocking.
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

ima differential-delay-maximum

To configure the maximum differential delay used to align the transmission of IMA frames on all links, use the **ima differential-delay-maximum** interface configuration command. To restore the default value, use the **no** form of this command.

ima differential-delay-maximum *msecs*

no ima differential-delay-maximum

Syntax Description

msecs	Configures the maximum differential delay in milliseconds as follows: • For T1 the range is 25 to 250 milliseconds. • For E1 the range is 25 to 190 milliseconds.

Defaults

25 milliseconds

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

The transmitter on the T1/E1 IMA port adapter must align the transmission of IMA frames on all interfaces that are members of the IMA group. This allows the receiver to adjust for differential link delays among the interfaces that are members of the IMA group. Based on this required behavior, the receiver can detect the differential delays by measuring the arrival times of the IMA frames on each link.

At the transmitting end, the cells are transmitted continuously. If no ATM layer cells need to be sent between ICP cells within an IMA frame, then the transmit IMA sends filler cells to maintain a continuous stream of cells at the physical layer.

Note This command is only supported on systems equipped with FC-PFQ.

Examples

The following example configures the maximum allowable differential delay to 100 milliseconds for all interfaces assigned to the IMA group.

```
Switch(config)# interface atm 0/0/ima1
Switch(config-if)# ima differential-delay-maximum 100
```

Related Commands

Command	Description
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

ima frame-length

To configure the IMA interface frame length (number of cells per frame), use the **ima frame-length** interface configuration command. To restore the default value, use the **no** form of this command.

ima frame-length {**128** | **256** | **32** | **64**}

no ima frame-length

Syntax Description

128	Configures IMA frame length to 128 cells (default).
256	Configures IMA frame length to 256 cells.
32	Configures IMA frame length to 32 cells.
64	Configures IMA frame length to 64 cells.

Defaults

128

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

An IMA group uses the frame length parameter to set the insertion of the ICP cells at the beginning of frames in the transmit direction.

Note This command is only supported on systems equipped with FC-PFQ.

Examples

The following example uses the **ima frame-length** command to configure the frame length transmitted as 256 cells for the IMA group:

```
Switch(config)# interface atm 0/0/ima1
Switch(config-if)# ima frame-length 256
```

Related Commands

Command	Description
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

ima-group

To assign an interface as a member of an IMA group, use the **ima-group** interface configuration command. To remove an interface from an IMA group, use the **no** form of this command.

ima-group *number*

no ima-group

Syntax Description

number	Specifies the IMA group number (0 to 3).

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

Use the **ima-group** interface command to configure a T1/E1 IMA port adapter interface as part of an IMA group. IMA allows you to aggregate multiple low-speed links into one larger virtual trunk or IMA group which appears to your ATM switch router as one logical pipe. This IMA group provides modular bandwidth for user access to ATM networks for connections between ATM network elements at rates between the traditional order of multiplex levels, such as between T1 or E1, and T3 or E3.

IMA requires inverse multiplexing and demultiplexing of ATM cells in a cyclical fashion among links grouped to form a higher bandwidth logical group with a rate approximately the sum of the link rates. This grouping is called an IMA group.

Note This command is only supported on systems equipped with FC-PFQ.

Note To configure a T1/E1 IMA port adapter interface as a member of an IMA group, you must shut down the interface before using the **ima-group** command when no shutdown has been previously configured .

Examples

The following example uses the **ima-group** command to assign ATM interface 0/0/0 as part of IMA group 1.

```
Switch(config)# interface atm 0/0/0
Switch(config-if)# shutdown
Switch(config-if)# ima-group 1
Switch(config-if)# no shutdown
```

Related Commands

Command	Description
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.
show interfaces	Displays the interface configuration, status, and statistics.

ima test

To configure an IMA group test pattern transmitted in the ICP cells, use the **ima test** interface configuration command. To restore the default value, use the **no** form of this command.

ima test [**link** *link-value*] [**pattern** *pattern-value*]

no ima test

Syntax Description

link	Configures the link transmitting the test pattern.
link-value	Specifies which IMA group member link is transmitting the test pattern.
pattern	Configures the test pattern.
pattern-value	Specifies the test pattern transmitted in the ICP cells.

Defaults

The link-value: First link in the IMA group
The pattern-value: Default is the link-value

For example, suppose an IMA group includes ATM interfaces 0/0/3, 0/0/4 and 0/0/6. If the link or pattern value is not specified in the **ima test** command, then interface 0/0/3 (default) is chosen as test-link, and the pattern value used is 03 (default).

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

The test pattern procedure verifies the connectivity of a link within an IMA group. The procedure uses a test pattern sent over one link to verify the connectivity to the other links in the IMA group. The test pattern should be looped over all the other links in the group at the far end of the connection. All of the IMA test pattern procedures are performed over the ICP cells exchanged between both ends of the IMA virtual links. After the test is configured on the IMA group, the test continues until explicitly configured to the default.

Note This command is only supported on systems equipped with FC-PFQ.

Examples

The following example uses the **ima test** command to configure the test pattern 0x010 (octal 8) to transmit over ATM interface 0/0/3 of IMA group 1.

```
Switch(config)# interface atm 0/0/ima1
Switch(config-if)# ima test link 3 pattern 010
```

Related Commands

Command	Description
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

incoming-port

To filter ATM signalling call failures based on the incoming interface of the call, use the **incoming-port** ATM signalling diagnostics configuration command. To return the incoming port to the default, use the **no** form of this command.

incoming-port atm *card/subcard/port*

no incoming-port atm *card/subcard/port*

Syntax Description

card/subcard/port	Specifies the card, subcard, and port number of the ATM interface. The card number is displayed using the **show interfaces** command. The subcard number can be either 0 or 1.

Defaults

0

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

The default 0 means the incoming interface is not considered during filtering.

Examples

The following example configures ATM 0/1/1 so all previous records collected on the incoming port are purged.

```
Switch# configure terminal
Switch(config)# controller atm 0/0/0
Switch(config-if)# atm signalling diagnostics 1
Switch(cfg-atmsig-diag)# incoming-port atm 0/1/1
```

interface

To configure an interface type and enter interface configuration mode, use the **interface** global configuration command.

interface *type card/subcard/port*
interface atm *card*/*subcard*/**ima***group*
interface *type number*

To configure a subinterface, use the **interface** global configuration command.

interface *type card/subcard/port.vpt#*

interface *type card/subcard/port.subinterface#* [**multipoint** | **point-to-point**]

Syntax Description

type	Specifies the type of interface to be configured. Refer to Table 9-1 for a list of keywords.
card	Specifies the interface card number. The numbers are assigned at the factory at the time of installation or when added to a system, and can be displayed with the **show interfaces** command.
subcard	Specifies the backplane slot number. The value is either 0 or 1. The slots are numbered from left to right.
port	Specifies the port number of the interface.
ima *group*	Specifies the IMA group number (0 to 3).
number	Specifies the integer used to identify the interface.
.*vpt#*	Specifies the virtual path tunnel number for the subinterface on physical ATM ports.
.*subinterface#*	Specifies the subinterface number in the range of 1 to 4294967293. The number that precedes the periods (**.**) must match the number where this subinterface belongs.
multipoint	Specifies a multipoint subinterface. This option only applies to the route processor interface ATM 0.
point-to-point	Specifies a point-to-point subinterface. The default is **multipoint**. This option only applies to the route processor interface ATM 0.

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Multiple subinterfaces can be configured on a single route processor interface. The route processor and Ethernet interface address is 0 in the ATM switch router environment.

Multiple subinterfaces for VP tunneling can be configured on a single ATM interface (not on a route processor interface). VP tunnels are useful when you want to run signalling, ILMI, and possibly PNNI routing between two switches that are not directly connected to each other. Before configuring the subinterface, a permanent virtual path must be configured on the ATM interface using the **atm pvp** command. The subinterface for the VP tunnel is created by specifying the VPI used to define the permanent virtual path as the subinterface number.

Table 9-1 lists typical interface keywords.

Table 9-1 Interface Type Keywords

Keyword	Interface Type
atm	ATM interface.
async	Auxiliary port line used as an asynchronous interface.
bvi	Bridge-group virtual interface.
cbr	CBR interface.
cable	CMTS interface.
dialer	Dialer interface.
ethernet	Ethernet IEEE 802.3 interface.
group-async	Master asynchronous interface.
lex	Lex interface.
loopback	Software-only loopback interface that emulates a continually running interface. All platforms support this virtual interface. The interface *number* (0 to 2147483647) is the number of the loopback interfaces you want to create or configure.
null	Null interface.
Port-channel	Ethernet channel of interfaces.
serial	Serial interface.
tunnel	Tunnel interface, used to declare a TSP tunnel interface. The tunnel interface *number* is in the range of 0 to 2147483647.
virtual-template	Virtual template interface.
virtual-tokenring	Virtual Token Ring interface.
vlan	Catalyst 5000 VLAN interface.

Examples

The following example shows how to begin configuration of the ATM interface on card 0, subcard 0, and port 1 using the **interface** global configuration command.

```
Switch(config)# interface atm 0/0/1
Switch(config-if)#
```

The following example shows how to create a VP tunnel with VPI 50 on card 0, subcard 0, and port 1, and enter the subinterface configuration mode for the VP tunnel using the **interface** global configuration command.

```
Switch(config)# interface atm 0/0/1
Switch(config-if)# atm pvp 50
Switch(config-if)# interface atm 0/0/1.50
Switch(config-subif)#
```

The following example shows how to begin configuration of the route processor interface using the **interface** global configuration command.

```
Switch(config)# interface atm 0
Switch(config-if)#
```

The following example shows how to create a point-to-point subinterface on the SAP port and enter the subinterface configuration mode, using the **interface** global configuration command.

```
Switch(config)# interface atm 0.1 point-to-point
Switch(config-subif)#
```

The following example shows how to begin configuration of the Ethernet interface on the ATM switch router using the **interface** global configuration command.

```
Switch(config)# interface ethernet 0
Switch(config-if)#
```

The following example shows how to begin configuration of a CBR interface using the **interface** global configuration command.

```
Switch(config)# interface cbr 1/1/1
Switch(config-if)#
```

The following example shows how to use the **interface tunnel** command to declare a TSP tunnel interface with interface number 2100.

```
Switch(config)# interface tunnel 2100
Switch(config-if)#
```

The following example shows how to begin configuration of an IMA group interface using the **interface** global configuration command.

```
Switch(config)# interface atm 0/0/ima1
Switch(config-if)#
```

Related Commands

Command	Description
show interfaces	Displays the interface configuration, status, and statistics.
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

ip address

To set a primary or secondary IP address for an interface, use the **ip address** interface configuration command. To remove an IP address or disable IP processing, use the **no** form of this command.

ip address *ip-address mask* [**secondary**]

no ip address *ip-address mask* [**secondary**]

Syntax Description

ip-address	IP address.
mask	Mask for the associated IP subnet.
secondary	Specifies that the configured address is a secondary IP address. If this keyword is omitted, the configured address is the primary IP address.

Defaults

No IP address is defined for the interface.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

An interface can have one primary IP address and multiple secondary IP addresses. Packets generated by the switch always use the primary IP address. Therefore, all switch routers on a segment should share the same primary network number.

Hosts can determine subnet masks using the ICMP Mask Request message. Switch routers respond to this request with an ICMP Mask Reply message.

You can disable IP processing on a particular interface by removing its IP address with the **no ip address** command. If the switch router detects another host using one of its IP addresses, it prints an error message on the console.

The optional keyword **secondary** allows you to specify an unlimited number of secondary addresses. Secondary addresses are treated like primary addresses, except the system never generates datagrams other than routing updates with secondary source addresses. IP broadcasts and ARP requests are processed properly, as are interface routes in the IP routing table.

Secondary IP addresses can be used in a variety of situations. The following are the most common applications:

- There might not be enough host addresses for a particular network segment. For example, your subnetting allows up to 254 hosts per logical subnet, but on one physical subnet you need to have 300 host addresses. Using secondary IP addresses on the switch routers allows you to have two logical subnets using one physical subnet.
- Two subnets of a single network might otherwise be separated by another network. This situation is not permitted when subnets are in use. In these instances, the first network is *extended*, or layered on top of the second network by using secondary addresses.

Note If any switch router on a network segment uses a secondary address, all other switch routers on that same segment must also use a secondary address from the same network or subnet. Inconsistent use of secondary addresses on a network segment can cause routing loops to occur very quickly.

Examples

In the following example, 131.108.1.27 is the primary address and 192.31.7.17 and 192.31.8.17 are secondary addresses for main Ethernet 0 interface.

```
Switch# configure terminal
Switch(config)# interface ethernet 0
Switch(config-if)# ip address 131.108.1.27 255.255.255.0
Switch(config-if)# ip address 192.31.7.17 255.255.255.0 secondary
Switch(config-if)# ip address 192.31.8.17 255.255.255.0 secondary
```

Related Commands

Command	Description
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

ip broadcast-address

To define a broadcast address for an interface, use the **ip broadcast-address** interface configuration command. To restore the default IP broadcast address, use the **no** form of this command.

ip broadcast-address [*ip-address*]

no ip broadcast-address [*ip-address*]

Syntax Description

ip-address	IP broadcast address for a network.

Defaults

Default address is 255.255.255.255 (all ones).

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command sets the broadcast address of an interface.

Examples

The following example specifies an IP broadcast address of 172.10.50.4.

```
Switch# configure terminal
Switch(config)# ip broadcast-address 172.10.50.4
```

Related Commands

Command	Description
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

ip directed-broadcast

To enable the translation of directed broadcasts to physical broadcasts, use the **ip directed-broadcast** interface configuration command. To return the directed broadcast to the default, use the **no** form of this command.

ip directed-broadcast [*access-list-number*]

no ip directed-broadcast [*access-list-number*]

Syntax Description

access-list-number	Number of the access list. If specified, a broadcast must pass the access list to be forwarded. If not specified, all broadcasts are forwarded.

Defaults

Enabled with no list specified

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This feature is enabled only for those protocols configured using the **ip forward-protocol** global configuration command. An access list might be specified to control which broadcasts are forwarded. When an access list is specified, only those IP packets permitted by the access list are eligible to be translated from directed broadcasts to physical broadcasts.

Examples

The following example enables forwarding of IP directed broadcasts on the main Ethernet 0 interface.

```
Switch# configure terminal
Switch(config)# interface ethernet 0
Switch(config-if)# ip directed-broadcast
```

Related Commands

None

ip mtu

To set the MTU size of IP packets sent on an interface, use the **ip mtu** interface configuration command. To restore the default MTU size, use the **no** form of this command.

ip mtu *bytes*

no ip mtu

Syntax Description

bytes	MTU in bytes.

Defaults

Minimum: 128 bytes

Maximum: Depends on the interface medium

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

If an IP packet exceeds the MTU set for the interface of the switch router, the switch router fragments the packet.

All devices on a physical medium must have the same protocol MTU in order to operate.

Note Changing the MTU value (with the **mtu** interface configuration command) can affect the IP MTU value. If the current IP MTU value is the same as the MTU value and you change the MTU value, the IP MTU value is modified automatically to match the new MTU. However, the reverse is not true; changing the IP MTU value has no effect on the value for the **mtu** command.

Examples

The following example sets the maximum IP packet size for the first interface to 300 bytes.

```
Switch# configure terminal
Switch(config)# interface ethernet 0
Switch(config-if)# ip mtu 300
```

Related Commands

Command	Description
mtu	Used to adjust the maximum packet size or MTU size.

ip proxy-arp

To enable proxy ARP on an interface, use the **ip proxy-arp** interface configuration command. To disable proxy ARP on the interface, use the **no** form of this command.

ip proxy-arp

no ip proxy-arp

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Used to enable proxy ARP.

Examples

The following example enables proxy ARP on Ethernet interface 0.

```
Switch# configure terminal
Switch(config)# interface ethernet 0
Switch(config-if)# ip proxy-arp
```

ip rarp-server

Use the **ip rarp-server** interface configuration command to allow the switch router to act as a RARP server. To return the RARP server to the default, use the **no** form of this command.

ip rarp-server *ip-address*

no ip rarp-server *ip-address*

Syntax Description

ip-address	IP address that is to be provided in the source protocol address field of the RARP response packet. Normally, this is set to whatever address you configure as the primary address for the interface.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This feature makes diskless booting of clients possible between network subnets where the client and server are on separate subnets.

RARP server support can be configured on a per-interface basis so the switch router does not interfere with RARP traffic on subnets that do not need RARP assistance from the switch router.

The switch router answers incoming RARP requests only if both of the following two conditions are met:

- The **ip rarp-server** command has been configured for the interface on which the request was received.
- There is a static entry found in the IP ARP table that maps the MAC address contained in the RARP request to an IP address.

Use the **show ip arp** EXEC command to display the contents of the IP ARP cache.

Sun Microsystems makes use of RARP-based and UDP-based network services to facilitate network-based booting of SunOS on their workstations. By bridging RARP packets and using both the **ip mtu** interface configuration command and the **ip forward-protocol** global configuration command, the switch should be able to perform the necessary packet switching to enable booting of Sun workstations across subnets. However, some Sun workstations assume that the sender of the RARP response, in this case the switch router, is the host that the client can contact to TFTP-load the bootstrap image. This causes the workstations to fail to boot.

By using the **ip rarp-server** feature, the switch router can be configured to answer these RARP requests, and the client machine should be able to reach its server by having its TFTP requests forwarded through the switch router that acts as the RARP server.

ip route

To establish static routes, use the **ip route** global configuration command. To remove static routes, use the **no** form of this command.

ip route *destination-prefix destination-prefix-mask* [*interface-type card/subcard/port*] *forward-addr* [*metric* | **permanent** | **tag** *tag-value*]

no ip route *destination-prefix destination-prefix-mask* [*interface-type card/subcard/port*] *forward-addr* [*metric* | **permanent** | **tag** *tag-value*]

Syntax Description

destination-prefix	IP address of the target network or subnet.
destination-prefix-mask	Address mask for the destination address.
interface-type	Interface type, specified as **atm**, **atm-p**, **cbr**, **ethernet**, or **null**.
card/subcard/port	Identifier of the interface specified by *interface-type*.
forward-addr	Forwarding router's IP address.
metric	Distance metric for this route, in the range of 1 to 255.
permanent	Specifies this route as a permanent route.
tag-value	Sets the tag value for this route, in the range of 1 to 4294967295.

Defaults

No IP route is specified.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command does not apply to the route processor interface main ATM 0.

Examples

In the following example, an administrative distance of 110 was chosen. In this case, packets for network 10.0.0.0 are routed to the switch at 131.108.3.4 if dynamic information with an administrative distance less than 110 is not available.

```
Switch# configure terminal
Switch(config)# ip route 10.0.0.0 255.0.0.0 131.108.3.4 110
```

In the following example, packets for network 131.108.0.0 are routed to the switch at 131.108.6.6.

```
Switch(config)# ip route 131.108.0.0 255.255.0.0 131.108.6.6
```

ip security add

To add a basic security option to all outgoing packets, use the **ip security add** interface configuration command. To disable the adding of a basic security option to all outgoing packets, use the **no** form of this command.

ip security add

no ip security add

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled when the security level of the interface is "Unclassified Genser" (or unconfigured). Otherwise, the default is enabled.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

If an outgoing packet does not have a security option present, this interface configuration command adds one as the first IP option. The security label added to the option field is the label that was computed for this packet when it first entered the switch. Because this action is performed after all the security tests have been passed, this label is either the same as or is in the range of the interface.

Examples

The following example adds a basic security option to each packet leaving main Ethernet interface 0.

```
Switch# configure terminal
Switch(config)# interface ethernet 0
Switch(config-if)# ip security add
```

Related Commands

Command	Description
ip security dedicated	Sets the level of classification and authority on the interface.

ip security aeso

To attach AESOs to an interface, use the **ip security aeso** interface configuration command. To disable AESOs on an interface, use the **no** form of this command.

ip security aeso *source compartment-bits*

no ip security aeso [*source compartment-bits*]

Syntax Description

source	AESO source. This can be an integer from 0 through 255.
compartment-bits	Compartment bits, in hexadecimal.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Compartment bits are specified only if this AESO is to be inserted in a packet. On every incoming packet at this level on this interface, these AESOs should be present.

Beyond being recognized, no further processing of AESO information is performed. AESO contents are not checked and are assumed to be valid if the source is listed in the configurable AESO table.

Configuring any per-interface extended IPSO information automatically enables **ip security extended-allowed** (disabled by default).

Examples

In the following example, the extended security option source is defined as 5, and the compartment bits are set to 5.

```
Switch# configure terminal
Switch(config)# interface ethernet 0
Switch(config-if)# ip security aeso 5 5
```

Related Commands

Command	Description
ip security eso-info	Cisco IOS command removed from this manual.
ip security eso-max	Specifies the maximum sensitivity level for an interface.

ip security dedicated

To set the level of classification and authority on the interface, use the **ip security dedicated** interface configuration command. To reset the interface to default (disabled), use the **no** form of this command.

ip security dedicated *level authority* [*authority...*]

no ip security dedicated [*level authority* [*authority...*]]

Syntax Description

level	Degree of sensitivity of information. The *level* keywords are listed in Table 9-2.
authority	Organization that defines the set of security levels that is used in a network. The *authority* keywords are listed in Table 9-3.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

All traffic entering the system on this interface must have a security option that exactly matches this label. Any traffic leaving through this interface has this label attached.

The following definitions apply to the descriptions of the IPSO in this section:

- **level**—The degree of sensitivity of information. For example, data marked TOPSECRET is more sensitive than data marked SECRET. The level keywords and their corresponding bit patterns are shown in Table 9-2.

Table 9-2 PSO Level Keywords and Bit Patterns

Level Keyword	Bit Pattern
Reserved4	0000 0001
TopSecret	0011 1101
Secret	0101 1010
Confidential	1001 0110
Reserved3	0110 0110
Reserved2	1100 1100
Unclassified	1010 1011
Reserved1	1111 0001

- **authority**—An organization that defines the set of security levels used in a network. For example, the Genser authority consists of level names defined by the DCA. The authority keywords and their corresponding bit patterns are shown in Table 9-3.

Table 9-3 PSO Authority Keywords and Bit Patterns

Authority Keyword	Bit Pattern
Genser	1000 0000
Siop-Esi	0100 0000
DIA	0010 0000
NSA	0001 0000
DOE	0000 1000

- **label**—A combination of a security level and an authority or authorities.

Examples

The following example sets a confidential level with Genser authority.

```
Switch# configure terminal
Switch(config)# ip security dedicated confidential Genser
```

Related Commands

Command	Description
ip security add	Adds a basic security option to all outgoing packets.

ip security eso-max

To specify the maximum sensitivity level for an interface, use the **ip security eso-max** interface configuration command. To return to the default, use the **no** form of this command.

ip security eso-max *source compartment-bits*

no ip security eso-max *source* [*compartment-bits*]

Syntax Description

source	ESO source. This is an integer from 1 through 255.
compartment-bits	Compartment bits, in hexadecimal.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command is used to specify the minimum sensitivity level for a particular interface. Before the per interface compartment information for a particular NLESO source can be configured, the **ip security eso-info** global configuration command must be used to specify the default information.

On every incoming packet on the interface, these extended security options should be resent at the minimum level and should match the configured compartment bits. Every outgoing packet must have these ESOs.

On every packet transmitted or received on this interface, any NLESO sources present in the IP header should be limited by the minimum sensitivity level and by the maximum sensitivity level configured for the interface.

When transmitting locally generated traffic out this interface or adding security information (with the **ip security add** command), the maximum compartment bit information can be used to construct the NLESO sources placed in the IP header.

A maximum of 16 NLESO sources can be configured per interface. Due to IP header length restrictions, a maximum of nine of these NLESO sources appear in the IP header of a packet.

Examples

In the following example, the specified ESO source is 240, and the compartment bits are specified as 500.

```
Switch# configure terminal
Switch(config)# interface ethernet 0
Switch(config-if)# ip security eso-max 240 500
```

Related Commands

Command	Description
ip security eso-info	Cisco IOS command removed from this manual.
ip security add	Adds a basic security option to all outgoing packets.

ip tcp chunk-size

To alter the TCP maximum read size for Telnet or rlogin, use the **ip tcp chunk-size** global configuration command. To restore the default value, use the **no** form of this command.

ip tcp chunk-size *characters*

no ip tcp chunk-size

Syntax Description

characters	Maximum number of characters that Telnet or rlogin can read in one read instruction.

Defaults

0, which Telnet and rlogin interpret as the largest possible 32-bit positive number.

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Do not use this command unless you understand why you need to change the default value.

Examples

The following example sets the maximum TCP read size to 64000 bytes.

```
Switch# configure terminal
Switch(config)# ip tcp chunk-size 64000
```

ip tcp queuemax

To alter the maximum TCP outgoing queue per connection, use the **ip tcp queuemax** global configuration command. To restore the default value, use the **no** form of this command.

ip tcp queuemax *packets*

no ip tcp queuemax

Syntax Description

packets	Outgoing queue size of TCP packets.

Defaults

The default value is 5 segments if the connection has a TTY associated with it. If there is no TTY associated with it, the default value is 20 segments.

Command Modes

Global configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Changing the default value only changes the queue that has a TTY associated with the connection.

Examples

The following example sets the maximum TCP outgoing queue to 10 packets.

```
Switch(config)# ip tcp queuemax 10
```

ip tcp synwait-time

To set a period of time the switch router waits while attempting to establish a TCP connection before it times out, use the **ip tcp synwait-time** global configuration command. To restore the default time, use the **no** form of this command.

ip tcp synwait-time *seconds*

no ip tcp synwait-time *seconds*

Syntax Description

seconds	Time in seconds the switch router waits while attempting to establish a TCP connection. It can be an integer from 5 to 300 seconds. The default is 30 seconds.

Defaults

30 seconds

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

If your network contains PSTN DDR, it is possible that the call setup time exceeds 30 seconds. This amount of time is not sufficient in networks that have dialup asynchronous connections because it affects your ability to Telnet over the interface (from the switch router) if the interface must be brought up. If you have this type of network, you might want to set this value to the UNIX value of 75.

Because this is a host parameter, it does not pertain to traffic going *through* the switch, just for traffic originating *at* the switch. Because UNIX has a fixed 75-second timeout, hosts are unlikely to see this problem.

Examples

The following example configures the switch router to continue attempting to establish a TCP connection for 180 seconds.

```
Switch(config)# ip tcp synwait-time 180
```

CHAPTER 10

K Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

keepalive

To set the keepalive timer for a specific interface, use the **keepalive** interface configuration command. To turn off keepalives entirely, use the **no** form of this command.

keepalive [*seconds*]

no keepalive [*seconds*]

Syntax Description

seconds	Number of seconds, from 0 to 32767, that defines the keepalive interval. The default is 10 seconds.

Defaults

10 seconds

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command does not apply to ATM interfaces. Refer to the **atm ilmi-keepalive** command for configuration of keepalives on ATM interfaces.

You can configure the keepalive interval, which is the frequency at which the switch sends messages to itself (Ethernet) or to the other end (auxiliary), to ensure a network interface is alive. The interval is adjustable in one-second increments down to one second. An interface is declared down after three update intervals pass without receiving a keepalive packet.

You must set the interval as a positive integer that is less than the interval set on the neighboring switch. Setting the keepalive timer to a low value is useful for detecting Ethernet interface failures (transceiver cable disconnecting, cable unterminated, and so on). On a Frame Relay interface, the interval that you enter must be a positive integer that is less than the interval set on the ATM switch router. Refer to the **frame-relay lmi-n392dte** interface configuration command description.

A typical serial line failure involves losing CD. Since this sort of failure is typically noticed within a few milliseconds, adjusting the keepalive timer for faster routing recovery is generally not useful.

When adjusting the keepalive timer for a low bandwidth auxiliary interface, datagrams can delay the smaller keepalive packets long enough to cause the line protocol to go down. You might need to experiment to determine the best value.

Examples

The following example shows how to set the keepalive interval to 3 seconds.

```
Switch(config)# interface ethernet 0
Switch(config-if)# keepalive 3
```

Related Commands

Command	Description
atm ilmi-keepalive	Enables or disables ILMI connectivity procedures and to change the ILMI keepalive poll interval.
frame-relay lmi-n392dte	Sets the error threshold on DTE or NNI interfaces.

CHAPTER 11

L Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

lane auto-config-atm-address

To specify that the configuration server ATM address is computed by the ATM switch router automatic method, use the **lane auto-config-atm-address** interface configuration command.
To remove the previously assigned ATM address, use the **no** form of this command.

lane [**config**] **auto-config-atm-address**

no lane [**config**] **auto-config-atm-address**

Syntax Description

config	Specifies the configuration server's ATM address.

Defaults

No specific ATM address is set.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command only applies to the route processor interface ATM 0.

When the **config** keyword is not present, this command causes the LANE server and LANE client on the subinterface to use the automatically assigned ATM address for the configuration server.

When the **config** keyword is present, this command assigns the automatically generated ATM address to the configuration server (LECS) configured on the interface. Multiple commands that assign ATM addresses to the LANE configuration server can be issued on the same interface to assign different ATM addresses to the configuration server. These commands include **lane auto-config-atm-address**, **lane config-atm-address**, and **lane le-arp**.

Examples

The following example associates the LANE configuration server with the database named *network1*, and specifies that the configuration server's ATM address is assigned by the automatic method.

```
Switch# configure terminal
Switch(config)# interface atm 0
Switch(config-if)# lane database network1
Switch(config-if)# name eng server-atm-address 39.0000014155551211.0800.AA00.1001.02
Switch(config-if)# name mkt server-atm-address 39.0000014155551211.0800.AA00.4001.01
Switch(config-if)# lane config database network1
Switch(config-if)# lane config auto-config-atm-address
```

Related Commands

Command	Description
lane config-atm-address	Specifies a configuration server's ATM address explicitly.

Command	Description
lane database	Cisco IOS command removed from this manual.
lane le-arp	Specifies that the fixed-configuration server ATM address assigned by the ATM Forum is used.

lane bus-atm-address

To specify an ATM address—and override the automatic ATM address assignment—for the broadcast-and-unknown server on the specified subinterface, use the **lane bus-atm-address** interface configuration command. To remove the ATM address previously specified for the broadcast-and-unknown server on the specified subinterface and thus revert to the automatic address assignment, use the **no** form of this command.

lane bus-atm-address *atm-address-template*

no lane bus-atm-address [*atm-address-template*]

Syntax Description

atm-address-template	ATM address or a template in which wildcard characters are replaced by any nibble or group of nibbles of the prefix bytes, ESI bytes, or selector byte of the automatically assigned ATM address.

Defaults

Automatic ATM address assignment

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command only applies to the route processor interface.

This command gives the client the ATM address of the broadcast-and-unknown server. The client will use this address rather than sending LE_ARP requests for the broadcast address.

When applied to a selected interface but with a different ATM address than used previously, this command replaces the broadcast-and-unknown server's ATM address.

ATM Addresses. A LANE ATM address has the same syntax as an NSAP (but it is not a network-level address):

- A 13-byte prefix that includes the following fields defined by the ATM Forum: AFI field (1 byte), DCC or ICD field (2 bytes), DFI field (1 byte), Administrative Authority field (3 bytes), Reserved field (2 bytes), Routing Domain field (2 bytes), and the Area field (2 bytes).
- A 6-byte ESI.
- A 1-byte Selector field.

Address Templates. LANE ATM address templates can use two types of wildcards: an asterisk (*) to match any single character, and an ellipsis (...) to match any number of leading or trailing characters.

The values of the digits that are replaced by wildcards come from the automatic ATM assignment method.

In LANE, a *prefix template* explicitly matches the prefix, but uses wildcards for the ESI and selector fields. An *ESI template* explicitly matches the ESI field, but uses wildcards for the prefix and selector.

In the Cisco implementation of LANE, the prefix corresponds to the switch router, the ESI corresponds to the ATM interface, and the Selector field corresponds to the specific subinterface of the interface.

Examples

The following example uses an ESI template to specify the part of the ATM address corresponding to the interface; the remaining values in the ATM address come from automatic assignment.

```
Switch(config-if)# lane bus-atm-address ...0800.200C.1001.**
```

The following example uses a prefix template to specify the part of the ATM address corresponding to the switch; the remaining values in the ATM address come from automatic assignment.

```
Switch# configure terminal
Switch(config)# interface atm 0
Switch(config-if)# lane bus-atm-address 45.000014155551212f.00.00...
```

Related Commands

Command	Description
lane server-atm-address	Specifies an ATM address, and overrides the automatic ATM address assignment, for the LANE server on the specified subinterface.

lane client

To activate a LANE client on the specified subinterface, use the **lane client** interface configuration command. To remove a previously activated LANE client on the subinterface, use the **no** form of this command.

lane client {**ethernet** | **tokenring**} [*elan-name*]

no lane client {**ethernet** | **tokenring**} [*elan-name*]

Syntax Description

ethernet	Identifies the type of emulated LAN attached to this subinterface as Ethernet.
tokenring	Identifies the type of emulated LAN attached to this subinterface as Token Ring.
elan-name	Name of the emulated LAN. This argument is optional because the client obtains its emulated LAN name from the configuration server. Maximum length is 32 characters.

Defaults

No LANE clients are enabled on the interface.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command only applies to the route processor interface.

If a **lane client** command has already been entered on the subinterface for a different emulated LAN, the client initiates termination procedures for that emulated LAN and joins the new emulated LAN.

If you do not provide an *elan-name* value, the client contacts the server to find which emulated LAN to join. If you do provide an emulated LAN name, the client consults the configuration server to ensure that no conflicting bindings exist.

Examples

The following example shows how to enable a Token Ring LANE client on a subinterface.

```
Switch(config)# interface atm 0.1
Switch(config-subif)# lane client tokenring
```

Related Commands

Command	Description
lane server-atm-address	Specifies an ATM address, and overrides the automatic ATM address assignment for the LANE server on the specified subinterface.

lane client-atm-address

To specify an ATM address—and override the automatic ATM address assignment—for the LANE client on the specified subinterface, use the **lane client-atm-address** interface configuration command. To remove the ATM address previously specified for the LANE client on the specified subinterface and revert to the automatic address assignment, use the **no** form of this command.

lane client-atm-address *atm-address-template*

no client-atm-address [*atm-address-template*]

Syntax Description

atm-address-template	ATM address or a template in which wildcard characters are replaced by any nibble or group of nibbles of the prefix bytes, ESI bytes, or selector byte of the automatically assigned ATM address.

Defaults

Automatic ATM address assignment

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command only applies to the route processor interface.

Use of this command on a selected subinterface, but with a different ATM address than used previously, replaces the LANE client's ATM address.

ATM Addresses. A LANE ATM address has the same syntax as an NSAP (but it is not a network-level address):

- A 13-byte prefix that includes the following fields defined by the ATM Forum: AFI field (1 byte), DCC or ICD field (2 bytes), DFI field (1 byte), Administrative Authority field (3 bytes), Reserved field (2 bytes), Routing Domain field (2 bytes), and the Area field (2 bytes).
- A 6-byte ESI.
- A 1-byte Selector field.

Address Templates. LANE ATM address templates can use two types of wildcards: an asterisk (*) to match any single character, and an ellipsis (...) to match any number of leading or trailing characters. The wildcard characters come from the automatically assigned ATM address.

In LANE, a *prefix template* explicitly matches the ATM address prefix, but uses wildcards for the ESI and selector fields. An *ESI template* explicitly matches the ESI field, but uses wildcards for the prefix and selector.

In the ATM switch router implementation of LANE, the prefix corresponds to the switch router, the ESI corresponds to the ATM interface, and the Selector field corresponds to the specific subinterface of the interface.

For a discussion of the Cisco method for automatically assigning ATM addresses, refer to the "Configuring LAN Emulation" chapter in the *Router Products Configuration Guide*.

Examples

The following example uses an ESI template to specify the part of the ATM address corresponding to the interface; the remaining parts of the ATM address come from automatic assignment.

```
Switch# configure terminal
Switch(config)# interface atm 0
Switch(config-if)# lane client-atm-address ...0800.200C.1001.**
```

The following example uses a prefix template to specify the part of the ATM address corresponding to the switch router; the remaining parts of the ATM address come from automatic assignment.

```
Switch(config)# interface atm 0
Switch(config-if)# lane client-atm-address 47.000014155551212f.00.00...
```

Related Commands

Command	Description
lane client	Activates a LANE client on the specified subinterface.

lane config-atm-address

To specify a configuration server's ATM address explicitly, use the **lane config-atm-address** interface configuration command. To remove an assigned ATM address, use the **no** form of this command.

lane [**config**] **config-atm-address** *atm-address-template*

no lane [**config**] **config-atm-address** *atm-address-template*

Syntax Description

atm-address-template	ATM address or a template in which wildcard characters are replaced by any nibble or group of nibbles of the prefix bytes, ESI bytes, or selector byte of the automatically assigned ATM address.
config	Used to specify the configuration server ATM address.

Defaults

No specific ATM address or method is set.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command. Originally **lane fixed-config-atm-address**.
11.2(5)	Modified: Command name changed to **lane config-atm-address**.

Usage Guidelines

This command only applies to the route processor interface.

If the **config** keyword is not present, this command causes the LANE server and LANE client on the subinterface to use the specified ATM address for the configuration server.

When the **config** keyword is present, this command adds an ATM address to the configuration server configured on the interface. A LANE configuration server can listen on multiple ATM addresses. Multiple commands that assign ATM addresses to the LANE configuration server can be issued on the same interface to assign different ATM addresses to the LANE configuration server.

ATM Addresses. A LANE ATM address has the same syntax as an NSAP (but it is not a network-level address) and consists of the following:

- A 13-byte prefix that includes the following fields defined by the ATM Forum: AFI field (1 byte) DCC or ICD field (2 bytes) DFI field (1 byte) Administrative Authority field (3 bytes) Reserved field (2 bytes) Routing Domain field (2 bytes) Area field (2 bytes)
- A 6-byte ESI
- A 1-byte Selector field

Address Templates. LANE ATM address templates can use two types of wildcards: an asterisk (*) to match any single character (nibble), and an ellipsis (...) to match any number of leading, middle, or trailing characters. The values of the characters replaced by wildcards come from the automatically assigned ATM address.

In LANE, a *prefix template* explicitly matches the ATM address prefix, but uses wildcards for the ESI and selector fields. An *ESI template* explicitly matches the ESI field, but uses wildcards for the prefix and selector.

In the Cisco implementation of LANE, the prefix corresponds to the switch prefix, the ESI corresponds to a function of ATM interface's MAC address, and the Selector field corresponds to the specific subinterface of the interface.

For a discussion of the Cisco method of automatically assigning ATM addresses, refer to the "Configuring LAN Emulation" chapter in the *Cisco IOS Switching Services Configuration Guide*.

Related Commands

Command	Description
lane auto-config-atm-address	Specifies that the configuration server ATM address is computed by the ATM switch router automatic method.
lane config database	Associates a named configuration table (database) with the configuration server on the selected ATM interface.
lane database	Cisco IOS command removed from this manual.
lane le-arp	Specifies that the fixed-configuration server ATM address assigned by the ATM Forum is used.

lane config database

To associate a named configuration table (database) with the configuration server on the selected ATM interface, use the **lane config database** interface configuration command. To remove the association between a named database and the configuration server on the specified interface, use the **no** form of this command.

lane config database *database-name*

no lane config database

Syntax Description

database-name	Name of the LANE database.

Defaults

No configuration server is defined, and no database name is provided.

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command only applies to the route processor interface.

This command is not available on a subinterface, because only one LANE configuration server can exist per interface.

The named database must exist before the **lane config database** command is entered. Refer to the **lane database** command for more information.

Multiple **lane config database** commands cannot be entered multiple times on the same interface. You must delete an existing association by using the **no** form of this command before you create a new association on the specified interface.

To activate a LANE configuration server, you need to use the **lane config database** command and one of the following commands:

- lane auto-config-atm-address
- lane config-atm-address
- lane le-arp

Related Commands

Command	Description
lane auto-config-atm-address	Specifies that the configuration server ATM address is computed by the ATM switch router automatic method.
lane config-atm-address	Explicitly specifies a configuration server's ATM address.

Command	Description
lane database	Cisco IOS command removed from this manual. See Appendix D.
lane le-arp	Specifies that you use the fixed-configuration server ATM address assigned by the ATM Forum.

lane le-arp

To add a static entry to the LE_ARP table of the LANE client configured on the specified subinterface, use the **lane le-arp** interface configuration command. To remove a static entry from the LE_ARP table of the LANE client on the specified subinterface, use the **no** form of this command.

lane le-arp {*mac-address* | **route-desc segment** *seg-num* **bridge** *bridge-num*} *atm-address*

no lane le-arp {*mac-address* | **route-desc segment** *seg-num* **bridge** *bridge-num*} *atm-address*

Syntax Description

mac-address	MAC address to bind to the specified ATM address.
atm-address	ATM address.
seg-num	Segment number of the next-hop route descriptor. The segment number ranges from 1 to 4095.
bridge-num	Bridge number of the next-hop route descriptor. The bridge number ranges from 1 to 15.

Defaults

No static address bindings are provided.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command only applies to the route processor interface.

This command only adds or removes a static entry binding a MAC address or next-hop route descriptor (for Token Ring) to an ATM address. It does not add or remove dynamic entries. Removing the static entry for a specified ATM address from an LE_ARP table does not release the data-direct VCC established to that ATM address. However, clearing a static entry clears any fast-cache entries that were created from the MAC address-to-ATM address binding.

Static LE_ARP entries are not aged and are not removed automatically.

To remove dynamic entries from the LE_ARP table of the LANE client on the specified subinterface, use the **clear lane le-arp** command.

Examples

The following example shows how to add a static entry to the LE_ARP table on the route processor main ATM interface 0.

```
Switch# configure terminal
Switch(config)# interface atm 0
Switch(config-if)# lane le-arp 0800.aa00.0101 47.000014155551212f.00.00.0800.200C.1001.01
```

Related Commands

Command	Description
clear lane le-arp	Used to clear the dynamic LE_ARP table or a single LE_ARP entry of the LANE client configured on the specified subinterface or emulated LAN.

lane server-atm-address

To specify an ATM address—and override the automatic ATM address assignment—for the LANE server on the specified subinterface, use the **lane server-atm-address** interface configuration command. To remove the ATM address previously specified for the LANE server on the specified subinterface and revert to the automatic address assignment, use the **no** form of this command.

lane server-atm-address *atm-address-template*

no server-atm-address [*atm-address-template*]

Syntax Description

atm-address-template	ATM address or a template in which wildcard characters are replaced by any nibble or group of nibbles of the prefix bytes, ESI bytes, or selector byte of the automatically assigned ATM address.

Defaults

The LANE client finds the LANE server by consulting the configuration server.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command only applies to the route processor interface.

This command also instructs the LANE client configured on this subinterface to reach the LANE server by using the specified ATM address instead of the ATM address provided by the configuration server.

When used on a selected subinterface, but with a different ATM address than was used previously, this command replaces the LANE server's ATM address.

ATM Addresses. A LANE ATM address has the same syntax as an NSAP (but it is not a network-level address):

- A 13-byte prefix that includes the following fields defined by the ATM Forum: AFI field (1 byte), DCC or ICD field (2 bytes), DFI field (1 byte), Administrative Authority field (3 bytes), Reserved field (2 bytes), Routing Domain field (2 bytes), and the Area field (2 bytes).
- A 6-byte ESI.
- A 1-byte selector field.

Address Templates. LANE ATM address templates can use two types of wildcards: an asterisk (*) to match any single character, and an ellipsis (...) to match any number of leading or trailing characters. The values of characters replaced by wildcards come from automatic ATM address assignment.

In LANE, a *prefix template* explicitly matches the prefix, but uses wildcards for the ESI and selector fields. An *ESI template* explicitly matches the ESI field, but uses wildcards for the prefix and selector.

In the LightStream 1010 ATM switch implementation of LANE, the prefix corresponds to the switch, the ESI corresponds to the ATM interface, and the Selector field corresponds to the specific subinterface of the interface.

For a discussion of the Cisco method for automatically assigning ATM addresses, refer to the "Configuring LAN Emulation" chapter of the *Router Products Configuration Guide*.

Examples

The following example uses an ESI template to specify the part of the ATM address corresponding to the interface; the remaining parts of the ATM address come from automatic assignment.

```
Switch# configure terminal
Switch(config)# interface atm 0
Switch(config-if)# lane server-atm-address ...0800.200C.1001.**
```

The following example uses a prefix template to specify the part of the ATM address corresponding to the switch; the remaining parts of the ATM address come from automatic assignment.

```
Switch(config)# interface atm 0
Switch(config-if)# lane server-atm-address 45.000014155551212f.00.00...
```

lane client-atm-address

lane server-bus

To enable a LANE server and a broadcast-and-unknown server on the specified subinterface, use the **lane server-bus** interface configuration command. To disable a LANE server and broadcast-and-unknown server on the specified subinterface, use the **no** form of this command.

lane server-bus {**ethernet** | **tokenring**} *elan-name*

no lane server-bus [**ethernet** | **tokenring** *elan-name*]

Syntax Description

ethernet	Identifies the type of emulated LAN attached to this subinterface as Ethernet.
tokenring	Identifies the type of emulated LAN attached to this subinterface as Token Ring.
elan-name	Name of the emulated LAN. Maximum length is 32 characters.

Defaults

No LAN type and emulated LAN name are provided.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(5)	New command

Usage Guidelines

The LANE server and the broadcast-and-unknown server are located on the same switch.

If a **lane server-bus** command was entered on the subinterface for a different emulated LAN, the server initiates termination procedures with all clients and comes up as the server for the new emulated LAN.

Use of the **no** form of this command removes a previously configured LANE server and broadcast-and-unknown server on the subinterface.

Examples

The following example enables a LANE server and broadcast-and unknown server for a Token Ring ELAN.

```
Switch# configure terminal
Switch(config)# interface atm 0.1
Switch(config-subif)# lane server-bus tokenring
```

Related Commands

Command	Description
lane server-atm-address	Used to specify an ATM address—and override the automatic ATM address assignment—for the LANE server on the specified subinterface.

lbo

To set the line build-out to various lengths, use the **lbo** interface configuration command. To restore the default in all instances, use the **no** form of this command.

For the channelized DS3 port adapter the syntax is:

lbo [**short** | **long**]

no lbo

For the channelized E1 and T1 port adapter the syntax is:

lbo [**0_110** | **110_220** | **220_330** | **330_440** | **440_550** | **550_660** | **gt_600**]

For the T1 IMA port adapter the syntax is:

lbo {{**long** {**gain26** | **gain36**} {**-15db** | **-22.5db** | **-7.5db** | **0db**}} | {**short** {**133ft** | **266ft** | **399ft** | **53ft** | **655ft**}}}

For the E1 IMA port adapter the syntax is:

lbo {{**long gain43** {**120db** | **75db**}} | {**short gain12 22db**}}

Syntax Description

short	Cable length under 225 feet.
long	Cable length over 225 feet.
0_110	Cable length is 0 to 100 feet.
110_220	Cable length is 110 to 220 feet.
220_330	Cable length is 220 to 330 feet.
330_440	Cable length is 330 to 440 feet.
440_550	Cable length is 440 to 550 feet.
550_660	Cable length is 550 to 660 feet.
gt_600	Cable length is over 600 feet.
gain26	26db gain.
gain36	36db gain.
-15db	-15 db pulse.
-22.5db	-22.5 db pulse.
-7.5db	-7.5 db pulse.
0db	0 db pulse.
133ft	Cable length is 0 to 133 feet.
266ft	Cable length is 134 to 266 feet.
399ft	Cable length is 267 to 399 feet.
533ft	Cable length is 400 to 533 feet.
655ft	Cable length is 534 to 655 feet.
gain43	43 db gain.
120db	120 db gain.

75db	75 db gain.
gain12	12 db gain.
22db	22 db gain.

Defaults

For DS3 interfaces: **short**

For T1 and E1 interfaces: **110_220**

For T1 IMA interfaces: **short 133**

For E1 IMA interfaces: **short gain 12 22db**

Command Modes

Interface configuration

Command History

Release	Modification
TBD	

Usage Guidelines

The **lbo** command applies on T1, E1, T1 IMA, E1 IMA, and DS3 interfaces.

Examples

The following example illustrates how to set the line build-out for an E1 port adapter to l10.

```
Switch# configure terminal
Switch(config)# interface atm 3/1/0
Switch(config-if)# lbo 110
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.

linecode

To select the linecode type for the T1 or E1 line, use the **linecode** interface configuration command. To revert to the default, use the **no** form of this command.

linecode {**ami** | **b8zs** | **hdb3**}

no lincode {**ami** | **b8zs** | **hdb3**}

Syntax Description

ami	Specifies AMI as the linecode type. Valid for T1 or E1 interfaces.
b8zs	Specifies B8ZS as the linecode type. Valid for T1 interfaces only.
hdb3	Specifies HDB3 as the linecode type. Valid for E1 interfaces only.

Defaults

For T1 lines: **b8zs**

For E1 lines: **hdb3**

Command Modes

Interface configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use this command in configurations where the switch router or access server must communicate with T1 fractional data lines.

The T1 service provider determines which linecode type, either **ami** or **b8zs**, is required for your T1 circuit.

The E1 service provider determines which linecode type, either **ami** or **hdb3**, is required for your E1 circuit.

Examples

The following example specifies AMI as the linecode type.

```
Switch# configure terminal
Switch(config)# interface atm 3/0/0
Switch(config-if)# lihnecode ami
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.

load-interval

To change the length of time for which data is used to compute load statistics, use the **load-interval** interface configuration command. To revert to the default setting, use the **no** form of this command.

load-interval *seconds*

no load-interval

Syntax Description

seconds	Length of time for which data is used to compute load statistics; a value that is a multiple of 30, and between 30 and 600 (30, 60, 90, 120, and so on).

Defaults

300 seconds (or 5 minutes)

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command only applies to the interfaces on the route processor card: Ethernet 0 or ATM 0. To load computations to be more reactive to short bursts of traffic rather than to those averaged over 5-minute periods, shorten the length of time over which load averages are computed.

If the load interval is set to 30 seconds, new data is used for load calculations over a 30-second period. This data is used to compute load statistics, including input rate in bits and packets per second, output rate in bits and packets per second, load, and reliability.

Load data is gathered every 5 seconds on the switch. This data is used for a weighted average calculation in which more recent load data has more weight in the computation than older load data. If the load interval is set to 30 seconds, the average is computed for the last 30 seconds of load data.

The **load-interval** command enables you to change the default interval of 5 minutes to a shorter or longer period of time. If you change it to a shorter period of time, the input and output statistics that are displayed when you use the **show interfaces** command are more current and are based on instantaneous data, rather than reflecting an average load over a longer period of time.

This command is often used for dial backup purposes to increase or decrease the likelihood of a backup interface being implemented, but it can be used on any interface.

Examples

In the following example, the default 5-minute average is set to a 30-second average. A burst in traffic that does not trigger a dial backup for an interface configured with the default 5-minute interval might trigger a dial backup for this interface that is set for a shorter, 30-second interval.

```
Switch# configure terminal
Switch(config)# interface atm 0
Switch(config-if)# load-interval 30
```

logging event link-status

Configure logging for interface link-status event, use the **logging event link-status** interface configuration command. To disable logging, use the **no** form of this command.

logging event link-status

no logging event link-status

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Examples

The following example shows how to enable logging link-status events on serial interface 11/0/0:1.

```
Switch# configure terminal
Switch(config)# interface serial 11/0/0:1
Switch(config-if)# logging event link-status
```

Related Commands

Command	Description
show logging	Displays the state of logging to the syslog.

loopback (controller)

To enable controller loopback for the channelized DS3 (CDS3) and channelized E1 (CE1) Frame Relay port adapters, use the **loopback** controller configuration command. To disable loopback, use the **no** form of this command.

For the CDS3 Frame Relay port adapter, use the following syntax:

loopback {**diagnostic** | **line** | **dual** | **pif**}

no loopback {**diagnostic** | **line** | **dual** | **pif**}

For the CE1 Frame Relay port adapter, use the following syntax:

loopback {**diagnostic** | **line**}

no loopback {**diagnostic** | **line**}

Syntax Description

diagnostic	The transmit frames are looped back to the switch at the Frame Relay port adapter as receive frames.
line	The frames that are received by the ports on the Frame Relay port adapter in the receive direction are passed to the switch router and are looped back in the transmit direction. The transmit direction of the Frame Relay port adapter transmits only the frames that it received on its port.
dual	This option is similar to a combination of the line and diagnostic loopback options. The frames sent from the switch fabric to the Frame Relay port adapter are looped back and sent back to the switch as the receive frames. The frames received by the port on the Frame Relay port adapter in the receive direction are looped back out of the port as transmit frames. This option is not available for the CE1 Frame Relay port adapter.
pif	The cells being sent to the Frame Relay port adapter are looped back towards the switch at the PIF. This option is not available for the CE1 Frame Relay port adapter.

Defaults

No loopback

Command Modes

Controller configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

Use this command for testing, diagnostics, and troubleshooting.

Examples

The following example configures the E1 interface to line loopback mode.

```
Switch# configure terminal
Switch(config)# controller e1 11/0/0
Switch(config-controlle)# loopback line
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.

loopback (interface)

To enable a loopback on the physical device associated with a port, use the **loopback** interface configuration command. To remove the loop, use the **no** form of this command.

loopback *looptype*

no loopback

Syntax Description

looptype	Specifies the loopback type as one of the following: • **diagnostic**—Transmit data is looped to receive data at the PHY layer. • **diagnostic-path**—Transmit payload is sent to the receive path overhead processor. • **line**—Receive signal is looped to transmit at the PHY device. • **cell**—Cells received by PHY are sent out through the transmit cell in first-in-first-out order. • **payload**—Received payload stream is looped through the transmit stream. • **pif**—Transmit is looped to receive before the cells enter the PHY device.

Defaults

No loopback

Command Modes

Interface configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

The **cell** and **payload** loopbacks are only available on DS1/E1 and DS3/E3 interfaces. The **diagnostic-path** loopback is only available for the OC-12 interface to loop the payload.

To show interfaces currently in loopback operation, use the **show ima interface** EXEC command. To isolate problems in the field, use the **diagnostic** or **line** options.

Examples

The following example shows how to configure diagnostic loopback on the ATM 3/1/0 line.

```
Switch# configure terminal
Switch(config)# interface atm 3/1/0
Switch(config-if)# loopback diagnostic
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

CHAPTER 12

M Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

mac-address

To configure the MAC address associated with an LEC, use the **mac-address** LANE configuration server database command. To remove the MAC address, use the **no** form of this command.

mac-address *ieee-address*

Syntax Description

ieee-address	48-bit IEEE MAC address written as a dotted triplet of four-digit hexadecimal numbers.

Defaults

No MAC layer address is set.

Command Modes

LANE configuration server database

Command History

Release	Modification
12.0.1	New command

Examples

The following example shows configuring the MAC address for the LEC where xx.xxxx is an appropriate second half of the MAC address to use.

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# lane database
Switch(lane-config-database)# mac-address 5000.5axx.xxxx
```

main-cpu (Catalyst 8540 MSR)

To switch to the main-cpu submode of the redundancy mode, use the **main-cpu** redundancy command.

main-cpu

Syntax Description

This command has no arguments or keywords.

Command Modes

Redundancy

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

After you enter the main-cpu submode, you can use the **auto-sync** command to synchronize the configuration between the primary and secondary route processors based on the primary configuration. In addition, you can use all of the redundancy commands that are applicable to the main CPU.

Examples

The following example shows how to switch to the main-cpu submode of the redundancy mode.

```
Switch(config)# redundancy
Switch(config-r)# main-cpu
Switch(config-r-mc)#
```

Related Commands

Command	Description
sync config (Catalyst 8540 MSR)	Used to synchronize the configuration between the primary and secondary route processors based on the primary configuration.

map-class

To enter map-class configuration mode to define parameters that you will use in specifying a request for an SVC (the SETUP message), use the **map-class** global configuration command. To delete this class, use the **no** form of this command.

map-class {**atm** | **dialer** | **frame-relay**} *class-name*

no map-class {**atm** | **dialer** | **frame-relay**} *class-name*

Syntax Description

atm	Specifies the ATM map class for an SVC.
dialer	Specifies a class of shared configuration parameters associated with the dialer map for an SVC.
frame-relay	Specifies QoS values for an SVC.
class-name	User-assigned name of the traffic parameters table.

Defaults

No traffic parameters are defined.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

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

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

Most parameters specified through a map class are used to dictate the contents of the ATD IE present in a SETUP message used to initiate an SVC. These parameters are as follows:

- **forward-peak-cell-rate-clp0**
- **forward-peak-cell-rate-clp1**
- **backward-peak-cell-rate-clp0**
- **backward-peak-cell-rate-clp1**
- **forward-sustainable-cell-rate-clp0**
- **forward-sustainable-cell-rate-clp1**
- **backward-sustainable-cell-rate-clp0**
- **backward-sustainable-cell-rate-clp1**

- **forward-max-burst-size-clp0**
- **forward-max-burst-size-clp1**
- **backward-max-burst-size-clp0**
- **backward-max-burst-size-clp1**

Note The 1-parameters specify the traffic characteristics of the aggregate of CLP-0 and CLP-1 cells; the 0-parameters are CLP-0 only.

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

It is important that Best Effort is signalled, because this causes a switch to interpret the SETUP as a request for a UBR connection. UBR requests do not cause bandwidth to be reserved per-connection.

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

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

- The maximum length of the contents of the ATD IE is 30 bytes. All of the cell-rate and burst parameters require 4 bytes in the IE. This means that no more than 7 of the 4-byte parameters should be specified.
- The allowable combinations of cell-rate and burst-size parameters from the UNI 3 specifications are (per direction):
  - peak-cell-rate0, peak-cell-rate0+1
  - peak-cell-rate0+1, sustained-cell-rate0, max-burst0
  - peak-cell-rate0+1
  - peak-cell-rate0+1, sustained-cell-rate0+1, max-burst0+1
- A clp0+1 parameter should be greater than or equal to the clp0 parameter for the same direction.

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

Examples

The following example establishes traffic parameters for map-class atmclass1.

```
Switch# configure terminal
Switch(config)# map-class atm atmclass1
ip 172.21.180.121 atm-nsap 12.3456.7890.abcd.0000.00 broadcast class atmclass1
map-class atm atmclass1
atm forward-peak-cell-rate-clp0 8000
atm backward-peak-cell-rate-clp0 8000
main-atm 0
map-group atm atmlist1
```

Related Commands

Command	Description
show atm map	Displays the list of all configured ATM static maps to remote hosts on an ATM network.

map-group

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

map-group *name*

no map-group *name*

Syntax Description

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

Defaults

No ATM map lists are associated.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

More than one map group can be configured for an interface. This command only applies to interfaces on the route processor card and to terminating connections.

Examples

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

```
Switch# configure terminal
Switch(config)# interface atm 0
Switch(config-if)# map-group atm
```

Related Commands

Command	Description
main-cpu (Catalyst 8540 MSR)	Used to switch to the main-cpu submode of the redundancy mode.
map-list	Defines an ATM map statement for either a PVC or SVC.

map-list

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

map-list *name*

no map-list *name*

Syntax Description

name	Name of the map list.

Defaults

No map statements are defined.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command only applies to interfaces on the route processor card and to terminating connections. To allow the switch router to propagate routing updates and ARP requests, a static map that maps the protocol address and the ATM address of the next-hop ATM station must be configured. The switch router supports a mapping scheme that identifies the ATM address of remote hosts or switch routers. This address can be specified either as a VCI descriptor for a PVC or an NSAP address for an SVC.

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

Examples

In the following example, to configure ATM static maps for a PVC, a map list named *atm* is followed by one map statement for protocol addresses being mapped.

```
Switch# map-list atm
Switch(config-map-list)# ip 172.21.168.112 atm-vc 1 broadcast
```

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

```
Switch# map-list atm
Switch(config-map-list)# ip 172.21.97.165 atm-nsap
BC.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.13
Switch(config-map-list)# ip 172.21.97.166 atm-nsap
BC.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12
```

Related Commands

Command	Description
main-cpu (Catalyst 8540 MSR)	Used to switch to the main-cpu submode of the redundancy mode.
map-group	Associates an ATM map list to an interface or subinterface for either a PVC or SVC.
show atm map	Displays the list of all configured ATM static maps to remote hosts on an ATM network.

max-admin-weight-percentage

To configure the maximum administrative weight percentage used to determine if an alternate route is acceptable, use the **max-admin-weight-percentage** ATM router PNNI configuration command. To remove the constraint on administrative weight for alternate routes, use the **no** form of this command.

max-admin-weight-percentage *percentage*

no max-admin-weight-percentage

Syntax Description

percentage	Specifies the maximum acceptable administrative weight for alternate routes as a percentage of the least administrative weight of any route to the destination.

Defaults

Infinity (no constraint on administrative weight for alternate routes).

Command Modes

ATM router PNNI configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command increases network efficiency by preventing alternate routes that use too many network resources from being specified. The command provides a generalized form of a hop-count limit.

This command only takes effect when background route computation is enabled.

The maximum acceptable administrative weight is equal to the specified percentage of the least administrative weight of any route to the destination (from the background routing tables). For example, if the least administrative weight to the destination is 5040 and the percentage is 300, the maximum acceptable administrative weight for the call is 5040 x 300/100 or 15120.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following script shows how to configure the maximum administrative weight percentage to 300 percent using the **max-admin-weight-percentage** ATM router PNNI configuration command.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# max-admin-weight-percentage 300
```

Related Commands

Command	Description
administrative-weight	Configures the mode of default administrative weight assignment for PNNI interfaces.
atm pnni admin-weight	Specifies the administrative weight of the ATM PNNI interface.
show atm pnni background routes	Displays the precalculated background route table to other PNNI nodes.
show atm pnni local-node	Displays information about a PNNI logical node running on the switch router.

max-diameter

To specify the maximum network diameter, use the **max-diameter** command. To delete the maximum network diameter, use the **no** form of this command.

max-diameter *diameter*

no max-diameter *diameter*

Syntax Description

diameter	The greatest distance between two nodes that are participants in protocol. The units of measurement are hops.

Defaults

None

Command Modes

NCDP

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Specifies the maximum network diameter.

Related Commands

None

max-records

To configure the maximum number of records to be collected for a particular signalling diagnostics filter table entry, use the **max-records** ATM signalling diagnostics configuration command. To return the maximum records to the default, use the **no** form of this command.

max-records *max-num-records*

no max-records

Syntax Description

max-num-records	Specifies the number of records to be collected.

Defaults

20

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

This value denotes the number of call failure records to be collected and stored. When the maximum value is reached, the older records are deleted, making way for the newly created records.

The collected records are overwritten when the **max-records** value is reached. If this field is set to -1, the records are not overwritten. Setting this field to -1 requires increased memory consumption for call failure records storage, and can lead to shortages of available system memory.

Examples

The following example shows setting the maximum number of records to 18.

```
Switch(config)# max-records 20
```

mdl

To configure and transmit the MDL messages, use the **mdl** interface configuration command. To disable the transmission of MDL messages, use the **no** form of this command.

mdl {**transmit** {*path* | **idle-signal** | **test-signal**} | **string** {**eic** | **lic** | **fic** | **unit** | **pfi** | **port** | **generator**} *string*}

no mdl {**transmit** {**path** | **idle-signal** | **test-signal**} | **string** {**eic** | **lic** | **fic** | **unit** | **pfi** | **port** | **generator**} *string*}

Syntax Description

transmit *path*	Enables transmission of the MDL path message.
transmit idle-signal	Enables transmission of the MDL idle signal message.
transmit test-signal	Enables transmission of the MDL test signal message.
string eic *string*	Specifies the Equipment Identification Code. Can be up to 10 characters.
string lic *string*	Specifies the Location Identification Code. Can be up to 11 characters.
string fic *string*	Specifies the Frame Identification Code. Can be up to 10 characters
string unit *string*	Specifies the Unit Identification Code. Can be up to six characters.
string pfi *string*	Specifies the Facility Identification Code sent in the MDL path message. Can be up to 38 characters.
string port *string*	Specifies the port number string sent in the MDL idle signal message. Can be up to 38 characters.
string generator *string*	Specifies the generator number string sent in the MDL test signal message. Can be up to 38 characters.

Defaults

No MDL message is configured.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

This command first appeared in Cisco IOS Release 11.3.

Use the **show controllers t3** command to display MDL information (received strings). MDL information is displayed only when framing is set to C-bit.

Note MDL is supported only when the CDS3 framing is C-bit parity.

Examples

The following examples show several of the **mdl** commands for the Frame Relay port adapter in slot 9.

```
Switch# configure terminal
Switch(config)# controller t3 4/0/0
Switch(config-controller)# mdl string eic Router A
Switch(config-controller)# mdl string lic Test Network
Switch(config-controller)# mdl string fic Building B
Switch(config-controller)# mdl string unit ABC
```

Related Commands

Command	Description
show controllers t3	Displays information about a physical port device, and specifies a channelized DS3 (CDS3) interface.

min-age

To configure the value of the minimum age of the VC for on-release or periodic collection of accounting records, use the **min-age** ATM accounting file subcommand. To return the min-age value to the default, use the **no** form of this command.

min-age *seconds*

no min-age

Syntax Description

seconds	Specifies the number of seconds.

Defaults

3600 seconds

Command Modes

ATM accounting file

Command History

Release	Modification
12.0.1	New command

Usage Guidelines

None

Examples

None

Related Commands

Command	Description
atm accounting file	Used to employ accounting file configuration mode and to enable an ATM accounting file.
collection-modes	Used to initialize the collection mode and specifies at what time accounting data is recorded in the accounting file.
failed-attempts	Configures the writing of records for initial connection attempts.

mtu

To adjust the maximum packet size or MTU size, use the **mtu** interface configuration command. To restore the MTU value to its original default value, use the **no** form of this command.

mtu *bytes*

no mtu

Syntax Description

bytes	Specifies the desired size, in bytes.

Defaults

Table 12-1 lists default MTU values according to media type.

Table 12-1 Default Media MTU Values

Media Type	Default MTU
Ethernet	1500
ATM	4470
ARM	

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Each interface has a default maximum packet size or MTU size. This number generally defaults to the largest size possible for that type interface.

Note Changing the MTU value with the **mtu** interface configuration command can affect values for the protocol-specific versions of the command (**ip mtu** for example). If the value specified with the **ip mtu** interface configuration command is the same as the value specified with the **mtu** command and you change the value for the **mtu** command, the **ip mtu** value automatically matches the new **mtu** value. However, changing the value for the **ip mtu** command has no effect on the value for the **mtu** command.

Examples

The following example specifies an MTU of 4470 bytes.

```
Switch# configure terminal
Switch(config)# interface atm 0
Switch(config-if)# mtu 4470
```

Related Commands

Command	Description
ip mtu	Sets the MTU size of IP packets sent on an interface.

multiring

To enable collection and use of RIF information on a subinterface, use the **multiring** interface configuration command. To disable the use of RIF information, use the **no** form of this command.

multiring ip [**all-routes** | **spanning**]

no multiring ip [**all-routes** | **spanning**]

Syntax Description

ip	Protocol type for which to enable multiring.
all-routes	Uses all-routes explorers.
spanning	Uses spanning-tree explorers.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

In source-route bridged or Token Ring switched networks, only packets with RIF are forwarded by intermediate source-route bridges. To ensure that IP datagrams are transmitted across a Token Ring switch or source-route bridge to and from an ATM switch router, use the **multiring** command.

When multiring is enabled, the Token Ring LEC strips the RIF information and caches it in its RIF table for incoming IP/ARP packets. It adds a RIF for subsequent IP/ARP response packets to be sent back across the network. Use the **show rif** command to display the RIF table entries. To configure static RIF entries, use the **rif** command.

Examples

The following example shows how to configure a subinterface with an IP address and Token Ring LANE LEC, and then enable multiring.

```
Switch# configure terminal
Switch(config)# interface atm 0.1
Switch(config-subif)# ip address 1.1.1.2 255.255.255.0
Switch(config-subif)# lane client tokenring cisco
Switch(config-subif)# multiring ip
```

Related Commands

Command	Description
rif	Used to enter static source-route information into the RIF cache.
show rif	Displays the current contents of the RIF cache.

CHAPTER 13

N Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

name

To configure a name for a PNNI node, use the **name** node-level subcommand. To return to the default value, use the **no** form of this command.

name *name*

no name

Syntax Description

name	Specify the ASCII name for the PNNI node.

Defaults

The value assigned by the **hostname** command.

Command Modes

PNNI node command

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The PNNI node name is distributed to all other nodes via PNNI flooding. This allows all PNNI nodes to use this node name in the following PNNI **show** commands:

- **show atm pnni database**
- **show atm pnni identifiers**
- **show atm pnni interface**
- **show atm pnni neighbor**
- **show atm pnni local-node**
- **show atm pnni topology**

This command only applies to PNNI nodes.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following example configures the node name to be eng_1.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)# name eng_1
```

Related Commands

Command	Description
hostname	Cisco IOS command removed from this manual.
show atm pnni local-node	Displays information about a PNNI logical node running on the switch.

name local-seg-id

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

name *elan-name* **local-seg-id** *seg-num*

no name *elan-name* **local-seg-id** *seg-num*

Syntax Description

elan-name	Name of the emulated LAN. The maximum length of the name is 32 characters.
seg-num	Segment number to be assigned to the emulated LAN. The number ranges from 1 to 4095.

Defaults

No emulated LAN name or segment number is provided.

Command Modes

Database configuration

Command History

Release	Modification
11.1(3a)	New command

Usage Guidelines

This command is used for Token Ring LANE.

Refer to the **lane database** command for instructions on how to enter database configuration mode.

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

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

Examples

The following example specifies a ring number of 1024 for the emulated LAN red.

```
Switch# configure terminal
Switch(config)# lane database eng_dbase
Switch(lane-config-database)# name red local-seg-id 1024
```

Related Commands

Command	Description
delay	This command or some of its parameters might not function as expected.
lane config-atm-address	Specifies that the fixed-configuration server ATM address assigned by the ATM Forum is used.

name server-atm-address

To specify or replace the ATM address of the LANE server for the emulated LAN in the configuration server's configuration database, use the **name server-atm-address** global database configuration command. 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** *n*] [**preempt**]

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

Syntax Description

elan-name	Name of the emulated LAN. Maximum length is 32 characters.
atm-address	LANE server's ATM address.
restricted | **un-restricted**	Membership in the named emulated LAN is restricted to the LANE clients explicitly defined to the emulated LAN in the configuration server's database.
index	Priority number. When specifying multiple LANE servers for fault tolerance, you can specify a priority for each server. The highest priority is 0.
preempt	Turns ON higher priority LES preemption.

Defaults

No emulated LAN name or server ATM address is provided.

Command Modes

Database configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use the **lane database** command to enter database configuration mode.

Emulated LAN names must be unique within one named LANE configuration database.

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

By default, when a higher-priority LES comes online, it does not preempt the current LES on the same emulated LAN. However, a higher-priority LES configured as preemptable does bump the current LES on the same emulated LAN when the LES comes online.

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

Examples

The following example configures the *example3* database with two restricted and one unrestricted emulated LANs. The clients that can be assigned to the eng and mkt emulated LANs are specified using the **client-atm-address** command. All other clients are assigned to the man emulated LAN.

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

Related Commands

Command	Description
client-atm-address name	To add a LANE client address entry to the configuration servers configuration database.
delay	This command or some of its parameters might not function as expected. See Appendix D.
lane database	Cisco IOS command removed from this manual. See Appendix D.

national reserve (Catalyst 8510 MSR and LightStream 1010)

To select the national bits for E1 IMA interfaces, use the **national reserve** interface configuration command. To restore the default, use the **no** form of this command.

national reserve *international-bit sa4-bit sa5-bit sa6-bit sa7-bit sa8-bit*

no national reserve

Syntax Description

international-bit	Specifies the national reserve international bit, either 0 or 1.
sa4-bit	Specifies the national reserve sa4 bit, either 0 or1.
sa5-bit	Specifies the national reserve sa5 bit, either 0 or 1.
sa6-bit	Specifies the national reserve sa6 bit, either 0 or 1.
sa7-bit	Specifies the national reserve sa7 bit, either 0 or 1.
sa8-bit	Specifies the national reserve sa8 bit, either 0 or 1.

Defaults

1 1 1 1 1 1

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

To change the national reserve bit used by the controller, select 0 or 1 for each bit.

Note This command applies only to E1 IMA.

Examples

The following example sets the national reserve bits for ATM interface 0/0/0:

```
Switch(config)# interface atm 0/0/0
Switch(config-if)# national reserve 1 1 1 1 1 0
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.

ncdp (global)

To enable NCDP (Network Clock Distribution Protocol) and configure the network clocking hardware of the switch router, use the **ncdp** command. To exit NCDP mode, use the **no** form of this command.

ncdp [**max-diameter** *hops* | **revertive** | **source** priority {{{**atm** | **cbr**} *card/subcard/port* | **bits** {**0** | **1**}} *stratum* | **system**} | **timer** {**hello** | **hold**} *time_in_msec*] [*percentage*]

no ncdp [**max-diameter** *hops* | **revertive** | **source** priority {{{**atm** | **cbr**} *card/subcard/port* | **bits** {**0** | **1**}} *stratum* | **system**} | **timer** {**hello** | **hold**} *time_in_msec*] [*percentage*]

Syntax Description

ncdp	Enables NCDP.
max-diameter	Specifies the maximum network diameter for the protocol.
hops	Specifies the maximum distance between any two nodes participating in the protocol, measured in hops. Values are 3 to 255. The default is 20. Each node must be configured with the same **max-diameter** value for the protocol to operate properly.
revertive	Configures clock sources to be revertive. When clock sources are configured as revertive, a clock source that is selected and then fails is selected again once it becomes operational. When clock sources are nonrevertive (the default), a failed clock source is prevented from being selected again. This nonrevertive behavior only applies to locally configured clock sources.
source	Configures a clocking source for the given interface. See Table 13-1 for a list of keywords.
timer	Specifies, in milliseconds, the hello time or hold time for the NCDP protocol.
hello	Rate at which NCDP hello messages (configuration protocol data units) are sent. Specified in milliseconds. The default is 500.
hold	Delay between transmission of hello messages. Specified in milliseconds. The default is 500.
time_in_msec	Hello rate or hold delay time, in milliseconds. The range is 75-60000.
percentage	Specifies percentage **hello** or **hold** timer should be jittered. Range is 0-100.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Use the NCDP protocol to configure network clocking hardware to distribute a clock signal through the node (for use by physical interfaces) and to distribute a clock signal between nodes on the network.

When NCDP is enabled, network clock sources are selected by the protocol. When NCDP is disabled, network clock sources are selected according to the definitions entered through the **network-clock-select** command. Table 13-1 describes the key words by source type.

Table 13-1 Source Type Keywords

Keyword	Description
priority	Specifies a network-wide priority for the clock source. The range is 1 to 255.
interface-type	Specifies the interface type as **atm** or **cbr**.
card/subcard/port	Card, subcard, and port number for the ATM interface.
stratum	The level in the Bellcore stratum hierarchy. (See Bellcore GR-436-CORE and Bellcore GR-1244-CORE for more details.)
bits	Displayed and accepted when the platform supports the building integrated timing system (BITS). **bits** is only displayed or accepted if the system is equipped with a telco module.
system	Specifies the system clock as the clock source.

Examples

The following example shows how to set the maximum network diameter (number of hops between nodes) to 11.

```
Switch# configure terminal
Switch(config)# ncdp max-diameter 11
```

The following example shows how to configure clock sources, as follows:

- ATM interface 0/0/0 is configured to priority 1 and stratum 2e
- BITS interface 0 (can be BITS 0 or BITS 1) is configured to priority 2 and stratum 2e
- CBR interface 0/0/0 is configured to priority 3 and stratum 3
- System clock is configured to priority 1

```
Switch(config)# ncdp source 1 atm 0/0/0 2e
Switch(config)# ncdp source 2 BITS 0 2e
Switch(config)# ncdp source 3 cbr 0/0/0 3
Switch(config)# ncdp source 1 system
```

The following example shows how to configure the locally defined clock sources to be revertive.

```
Switch(config)# ncdp revertive
```

The following example shows how to configure the NCDP hello timer to 500 milliseconds.

```
Switch(config)# ncdp timer hello 500
```

Related Commands

Command	Description
debug ncdp	Displays NCDP errors, events, and packet information.
ncdp (interface)	Used to enable NCDP and configure the network clocking hardware at the interface level.
show ncdp path root	Displays the NCDP path from the current node to its root clock source.
show ncdp ports	Displays NCDP information at the port level.
show ncdp sources	Displays all of the NCDP clock sources configured on the node and their attributes.
show ncdp status	Displays NCDP status information.
show ncdp timers	Displays NCDP information for the node-level timers.

ncdp (interface)

To enable NCDP and configure the network clocking hardware at the interface level, use the **ncdp** command. To exit NCDP mode, use the **no** form of this command.

ncdp [**admin-weight** *weight* | **control-vc** *vpi vci*]

no ncdp [**admin-weight** *weight* | **control-vc** *vpi vci*]

Syntax Description

ncdp	Enables NCDP for the interface. For all ATM NNI interfaces, NCDP is enabled by default. For all other interfaces, NCDP is disabled by default.
admin-weight	Specifies the cost metric associated with the given port. The default is 10.
weight	A strictly positive integer in the range 1 to 16777215.
control-vc	Changes the control virtual circuit used to transport protocol messages between adjacent protocol entities on the given interface.
vpi vci	Specifies the virtual path identifier and virtual channel identifier.

Defaults

Enabled for all ATM NNI interfaces.

Disabled for all other interfaces.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Use the NCDP interface-level commands to enable or disable NCDP on the interface or to change interface-level parameters.

NCDP also allows you to enable or disable NCDP on a given port to specify the cost metric associated with a given port and to change the control virtual circuit used to transport protocol messages between adjacent protocol entities on the given interface.

Examples

The following example shows how to set a link cost of 75 for ATM interface 0/0/0:

```
Switch# configure terminal
switch(config)# interface atm 0/0/0
switch(config-if)# ncdp admin-weight 75
```

The following example shows how to change the control virtual circuit used by the protocol to VPI=0, VCI=75.

```
switch(config)# interface atm 0/0/0
switch(config-if)# ncdp control-vc 0 75
```

Related Commands

Commaned	Description
debug ncdp	Displays NCDP errors, events, and packet information.
national reserve (Catalyst 8510 MSR and LightStream 1010)	Used to select the national bits for E1 IMA interfaces.
show ncdp path root	Displays the NCDP path from the current node to its root clock source.
show ncdp ports	Displays NCDP information at the port level.
show ncdp sources	Displays all of the NCDP clock sources configured on the node and their attributes.
show ncdp status	Displays NCDP status information.
show ncdp timers	Displays NCDP information for the node-level timers.

network-clock-select

To allow the recovered clock to specify a particular port to provide network clocking, use the **network-clock-select** global configuration command. To disable this feature, use the **no** form of this command.

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network-clock-select *priority* {{{**atm** | **cbr**} *card/subcard/port*} | **system** | **BITS** {**E1** | **T1**}}**revertive**

no network-clock-select *priority* {{{**atm** | **cbr**} *card/subcard/port*} | **system** | **BITS** {**E1** | **T1**}}**revertive**

Catalyst 8510 MSR and LightStream 1010

network-clock-select *priority* {{{**atm** | **cbr**} *card/subcard/port*} | **system**} **revertive**

no network-clock-select *priority* {{{**atm** | **cbr**} *card/subcard/port*} | **system**} **revertive**

Syntax Description

priority	Specifies the priority between 1 and 4.
atm	ATM interface.
cbr	Constant bit rate.
card/subcard/port	Specifies the card, subcard, and port number of the ATM interface or CBR.
system	The free running clock provided by the route processor, which is the source for all network derived ports.
BITS	Selects a BITS port as the network clock source. (Catalyst 8540 MSR)
E1	Specifies an E1 interface. (Catalyst 8540 MSR)
T1	Specifies a T1 interface. (Catalyst 8540 MSR)
revertive	Causes the clock to revert to a higher-priority clock if the current clock goes offline.

Defaults

System clock

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command applies to all interfaces except older versions of the DS3 interface. The system clock can be selected at any priority.

Examples

The following example shows how to configure ATM 3/0/1 as a network clock source of priority 2, and configure ATM 0/1/0 to use a network-derived clock source.

```
Switch# configure terminal
Switch(config)# network-clock-select 2 atm 3/0/1
Switch(config)# interface atm 0/1/0
Switch(config)# clock source network-derived
```

The following example shows how to configure ATM 0/0/0 as a network clock source of priority 1, and revert to a higher-priority clock.

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# network-clock-select 1 atm 0/0/0
Switch(config)# network-clock-select revertive
```

Caution Configure a network clock-source before a port uses it as the clock source. Otherwise, by default, the system clock (route processor resident local oscillator) is used and the transmit clock is configured as network-derived.

Related Commands

Command	Description
clock source (interface) (Catalyst 8510 MSR and LightStream 1010)	Selects a transmit clock source for a physical device such as a port.
show network-clocks	Shows which ports are designated as network clock sources.

next-node

To specify the next adjacent entry in a fully-specified ATM PNNI explicit path, use the **next-node** PNNI explicit-path configuration command.

next-node {*name-string* | *node-id* | *node-id-prefix*} [**port** *hex-port-id* | **agg-token** *hex-agg-token-id*]

Syntax Description

name-string	Name of the PNNI node.
node-id	Full 22-byte node-id for a PNNI node.
node-id-prefix	The first 15 or more bytes of a node ID for a PNNI node.
port *hex-port-id*	Specifies an exit port to exclude for a PNNI node. Should be specified as a hexadecimal port ID rather than as a port name. The default is to allow any valid exit port.
agg-token *hex-agg-token-id*	Optionally specifies the exit aggregation token, which is used in place of the port ID for higher-level PNNI LGNs. The default allows any valid exit port.

Defaults

See "Syntax Description."

Command Modes

PNNI explicit-path configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Note See the **atm pnni explicit-path** command for a description of how to edit or delete an existing **next-node** path entry.

Node IDs can be entered with either the full 22-byte length address, or as a node ID prefix with a length of 15 bytes or more. To specify routes that include higher-level nodes (parent LGNs) for other peer groups, we recommend that you enter exactly 15 bytes so that the address remains valid in the event of a PGL update.

Node IDs appear in the following format:

dec: dec: 13-20 hex digits

Note To display the node IDs that correspond to named nodes in a network, use either the **show atm pnni identifier** command or the **show atm pnni topology** command with the **node** keyword.

Node names can be entered instead of node IDs. If names are used to identify higher-level LGNs, the resulting explicit paths are not guaranteed to remain valid if the PGL changes in the neighboring peer group. To prevent invalid paths, configure all parent LGNs (for all potential PGL nodes) with the same node name.

An exit port can be specified for any entry. The port should be specified as a hexadecimal port ID rather than as a port name. For excluded entries, only this port is excluded from the path.

Note To display the corresponding hexadecimal port IDs for a node, use either the **show atm pnni identifier** command with the **port** keyword, or the **show atm pnni topology** command with the **node** and **hex-port-id** keywords.

Since the port ID could change if the following neighbor peer group changes PGL leaders, the **aggregation token** is used in place of the port ID for nodes with higher-level LGNs. The LGN aggregation token can only identify the port uniquely if the following entry is the next-node entry. Aggregation tokens are not allowed for excluded tokens.

Note Normally, the first **next-node** entry should specify an adjacent neighbor node. However, if an exit port needs to be specified for the local node, it can appear as entry index 1.

Examples

The following example shows how to perform the following PNNI explicit path configuration tasks:

- Enter PNNI explicit-path configuration mode
- Add three nodes in a fully specified path
- Specify an exit port for the second node
- Specify the third (LGN) node by its 15-byte node ID prefix
- Exit PNNI explicit-path configuration mode

```
Switch# configure terminal
Switch(config)# atm pnni explicit-path name boston_2.path1
Switch(cfg-pnni-expl-path)# next-node dallas_2
Switch(cfg-pnni-expl-path)# next-node dallas_4 port 80003004
Switch(cfg-pnni-expl-path)# next-node 40:72:47.009181000000106000000000
```

Related Commands

Command	Description
atm pnni explicit-path	Used to enter PNNI explicit path configuration mode to create or modify PNNI explicit paths.
exclude-node	Specifies a node to exclude from all segments of a partially specified ATM PNNI explicit path.
segment-target	Specifies a target entry in a partially specified PNNI explicit-path.
show atm pnni explicit-paths	Displays a summary of explicit paths that have been configured.

node

To create, delete, enable, or disable PNNI nodes running on this switch and to specify or change the level of a node, use the **node** ATM router PNNI configuration command. PNNI node configuration mode is started when this command is entered. To remove a previously set node index, use the **no** form of this command.

node *node_index* **level** *level_indicator* [**lowest**] [**peer-group-identifier**] [*pg_id* | **default**] [**enable** | **disable**]

no node *node_index*

Syntax Description

node_index	Specifies the local node index, in the range of 1 to 8, used to identify a PNNI node.
level_indicator	Specifies the PNNI level (position in the PNNI hierarchy), in the range of 1 to 104.
pg_id	Specifies a non-default peer group identifier for the node's peer group. Enter the **default** keyword in place of an identifier to return from a nondefault value to the default peer group identifier.
lowest	Indicates that the node to be created is a lowest-level node (for example, the node runs over physical links and VPCs). If this is not present when a new *node_index* is specified, the new node becomes a logical group node that represents a PNNI peer group. A logical group node only becomes active when its child node is elected peer group leader.

Defaults

With the ATM switch router autoconfiguration capabilities, a lowest-level PNNI node with the node index 1 is automatically created and runs on all PNNI interfaces by default (including interfaces determined by ILMI to be PNNI interfaces, and on interfaces configured to run PNNI).

The default level is 56, the proper level for lowest-level nodes using autoconfigured Cisco ATM addresses in a single-level hierarchy.

Command Modes

ATM router PNNI configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

The level of a node can only be modified when the node is disabled.

The **enable** and **disable** options can be used to reinitialize PNNI. For example, the node ID and peer group ID are recalculated based on the switch router's first ATM address and the node level whenever a node is enabled.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following example shows how to enter PNNI node configuration mode.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)#
```

The following example shows how to create a lowest-level PNNI node with node index 1 at level 96 (assuming no node currently exists on this switch router).

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1 level 96 lowest
Switch(config-pnni-node)#
```

Related Commands

Command	Description
atm address	Used to assign a 20-byte ATM address to the switch router.
atm router pnni	Used to enter the PNNI configuration mode.
show atm pnni local-node	Displays information about a PNNI logical node running on the switch router.

nodal-representation

To specify the type of PNNI LGN representation, use the **nodal-representation** PNNI node configuration command.

nodal-representation {**simple** | **complex** [**threshold** *threshold-value* | **radius-only**]}

Syntax Description

simple	Specifies the simple PNNI node representation, where an entire child peer group is represented as a single node.
complex	Specifies the complex PNNI node representation.
threshold *threshold-value*	Threshold percent for the generation of bypass or spoke exceptions. The threshold value ranges from 0 to 2147483647 percent. The default threshold is 60 percent.
radius-only	Advertises radius metrics only with no bypass or spoke exceptions.

Defaults

simple

Command Modes

PNNI node configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

Larger values for the threshold reduce the number of bypass and spoke exceptions advertised by PNNI. If a metric differs from the default metric and the (larger – smaller)/smaller ratio is greater than the threshold percentage, then an exception spoke, or bypass is advertised.

Lowest-level nodes are not allowed to have complex nodal representation.

The **radius-only** option suppresses all exceptions.

Examples

The following example shows how to specify nodal representation for radius only.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 2
Switch(config-pnni-node)# nodal-representation complex radius-only
```

Related Commands

Command	Description
show atm pnni aggregation link	Shows the aggregated PNNI links on the switch router.
show atm pnni aggregation node	Shows the PNNI nodal aggregation tables for a complex node.
show atm pnni local-node	Displays information about a PNNI logical node running on the switch router.

CHAPTER 14

O Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

outgoing-port

To filter ATM signalling call failure based on the outgoing interface rejected call, use the **outgoing-port** ATM signalling diagnostics configuration command. To return the outgoing port to the default, use the **no** form of this command.

outgoing-port [**atm** *card/subcard/port]*

no outgoing-port

Syntax Description

card/subcard/port	Specifies the card, subcard, and port of the ATM interface. The card number is displayed using the **show interfaces** command.The subcard number can be either 0 or 1.

Defaults

0

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

The default 0 means the incoming interface is not considered during filtering.

Examples

The following example shows the **outgoing-port** command.

```
Switch# configure terminal
Switch(config)# outgoing-port ATM 0/1/1
```

CHAPTER 15

P Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

parent

To specify the PNNI local node index of the parent node, use the **parent** PNNI node configuration command.

parent *node-index*

Syntax Description

node-index	Index number of the PNNI local node to which the command applies, in the range of 1 to 8.

Command Modes

PNNI node configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

This command specifies the local node index of the parent node to be instantiated in the PNNI hierarchy by this switching system when this node is elected peer group leader.

Examples

The following example shows how to enter PNNI node configuration mode and specify a node.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)#
```

The following example shows how to specify a local node index of 2 for the parent node.

```
Switch(config-pnni-node)# parent 2
```

Related Commands

Command	Description
show atm pnni explicit-paths	Displays a summary of explicit paths that have been configured.

ping atm interface atm

To check connectivity of the switch router, use the **ping atm interface atm** privileged EXEC command.

Catalyst 8540 MSR

ping atm interface atm *card/subcard/port vpi* [*vci*] {[**ip-address** *ip-address*] | [**seg-loopback**] | [**end-loopback**]}

Catalyst 8510 MSR and LightStream 1010

ping atm interface atm *card/subcard/port vpi* [*vci*] {[**ip-address** *ip-address*] | [**seg-loopback**] | [**atm-prefix** *prefix*] | [**end-loopback**]}

Syntax Description

card/subcard/port	Card number, subcard number, and port number of the specified ATM interface.
vpi	Virtual path identifier.
vci	Virtual channel identifier.
ip-address	IP address of the destination node.
seg-loopback	Send OAM segment loopback.
prefix	ATM address prefix of the destination node. (Catalyst 8510 MSR and LightStream 1010)
end-loopback	Send OAM ping to end loopback.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

To check reachability and network connectivity, use the **ping** command. You can use either an IP-address or an ATM-address prefix as a ping destination. You can also ping a neighbor switch by selecting the segment loopback option. Note that the **ip-address**, **atm-prefix** (Catalyst 8510 MSR and LightStream 1010), and **seg-loopback** options are mutually exclusive. In privilege extended command mode, you can select various other parameters, such as repeat count, timeout value, and so on.

Examples

(**Catalyst 8540 MSR**)

The following example shows using the **ping** command in normal mode for an ATM switch router.

```
Switch# ping atm interface atm 1/2/3 100 200 atm-prefix 0000a345454545454545464646
```

The following example shows using the **ping** command in normal mode for an ATM switch router, with the **seg-loopback** option.

```
Switch# ping atm interface atm 0/0/0 100 250 seg-loopback 172.20.52.2
```

The following example shows using the **ping** command in extended command mode.

```
Switch# ping
Protocol [ip]: atm
Interface [card/sub-card/port]: 1/1/3
VPI [0]: 200
VCI [0]: 100
Send OAM-Segment-Loopback ? [no]:
Target IP address:
Target NSAP Prefix:
Repeat count [5]:
Timeout in seconds [5]:
```

Examples

(Catalyst 8510 MSR and LightStream 1010)

The following example shows using the **ping** command in extended command mode.

```
Switch# ping
Protocol [ip]: atm
Interface [card/sub-card/port]: 1/1/3
VPI [0]: 200
VCI [0]: 100
Send OAM-Segment-Loopback ? [no]:
Target IP address:
Target NSAP Prefix:
Repeat count [5]:
Timeout in seconds [5]:
```

Examples

The following example shows using the **ping** command in user EXEC mode.

```
Switch# ping james
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.31.7.27, timeout is 2 seconds:
!!!!!
Success rate is 100 percent, round-trip min/avg/max = 1/3/4 ms
```

The following example shows using the **ping** command in privileged EXEC mode. While the precise dialog varies somewhat from protocol to protocol, all are similar to the ping session using default values shown in the following display.

```
Switch# ping
Protocol [ip]:
Target IP address: 192.31.7.27
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.31.7.27, timeout is 2 seconds:
!!!!!
Success rate is 100 percent, round-trip min/avg/max = 1/2/4 ms
```

Table 15-1 describes the default privileged EXEC **ping** fields shown in the previous display.

Table 15-1 ping Field Descriptions

Field	Description
Protocol [ip]:	Prompts for a supported protocol. Enter **appletalk**, **clns**, **ip**, **novell**, **apollo**, **vines**, **decnet**, or **xns**. Default: **ip**.
Target IP address:	Prompts for the IP address or host name of the destination node you plan to ping. If you have specified a supported protocol other than IP, enter an appropriate address for that protocol here. Default: none.
Repeat count [5]:	Number of ping packets that are sent to the destination address. Default: 5.
Datagram size [100]:	Size of the ping packet (in bytes). Default: 100 bytes.
Timeout in seconds [2]:	Timeout interval. Default: 2 (seconds).
Extended commands [n]:	Specifies whether or not a series of additional commands is displayed.
Sweep range of sizes [n]:	Allows you to vary the sizes of the echo packets being sent. This capability is useful for determining the minimum sizes of the MTUs configured on the nodes along the path to the destination address. Packet fragmentation contributing to performance problems can then be reduced.
!!!!!	Each exclamation point (!) indicates receipt of a reply. A period (.) indicates the network server timed out while waiting for a reply. Other characters might be displayed in the ping output, depending on the protocol type.
Success rate is 100 percent	Percentage of packets successfully echoed back to the switch router. Anything less than 80 percent is usually considered problematic.
round-trip min/avg/max = 1/2/4 ms	Round-trip travel time intervals for the protocol echo packets, including minimum/average/maximum expressed in milliseconds.

precedence

To configure the precedence of different types of reachable addresses, use the **precedence** ATM router PNNI configuration command. To return to the default precedence value for a particular reachable address type, use the **no** form of this command.

precedence [**pnni-remote-exterior** | **pnni-remote-exterior-metrics** | **pnni-remote-internal** | **pnni-remote-internal-metrics** | **static-local-exterior** | **static-local-exterior-metrics** | **static-local-internal-metrics**] *value*

no precedence [**pnni-remote-exterior** | **pnni-remote-exterior-metrics** | **pnni-remote-internal** | **pnni-remote-internal-metrics** | **static-local-exterior** | **static-local-exterior-metrics** | **static-local-internal-metrics**]

Syntax Description

pnni-remote-exterior	Sets the priority for the remote exterior prefixes without metrics. The default is 4.
pnni-remote-exterior-metrics	Sets the priority for the remote exterior prefixes with metrics. The default is 2.
pnni-remote-internal	Sets the priority for the remote internal prefixes without metrics. The default is 2.
pnni-remote-internal-metrics	Sets the priority for the remote internal prefixes with metrics. The default is 2.
static-local-exterior	Sets the priority for the static exterior prefixes without metrics. The default is 3.
static-local-exterior-metrics	Sets the priority for the static exterior prefixes with metrics. The default is 2.
static-local-internal-metrics	Sets the priority for the static internal prefixes with metrics. The default is 2.
value	Specifies the precedence of a reachable address type. Smaller values take precedence over larger values. The range of values is 2, 3, or 4.

Defaults

See “Syntax Descriptions.”

Command Modes

ATM router PNNI configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The following naming convention for the precedence option keywords is used:

- The **pnni** prefix (for example **pnni-remote-exterior**) indicates that the routes are learned through PNNI from other nodes.
- The **static** prefix (for example **static-local-exterior**) indicates locally configured routes.

The route selection algorithm chooses routes to particular destinations using the longest match-reachable address prefix known to the switch router. When multiple reachable address types are associated with the longest match-reachable address prefix, the route selection algorithm first attempts to find routes to reachable address types of greatest precedence. Among multiple routes to the same longest match-reachable address prefix with the same reachable address type, routes with the least total administrative weight are preferred.

Use the **precedence** command to change the default values for the different types of reachable addresses.

Local internal reachable addresses, whether learned through ILMI or as static routes, are given the highest priority (level 1).

Related Commands

Command	Description
show atm pnni precedence	Displays the current PNNI prefix priorities for routing.

privilege level (global)

To set the privilege level for a command, use the **privilege level** global configuration command. To revert to default privileges for a given command, use the **no** form of this command.

privilege *mode* **level** *level command* [*type*]

no privilege *mode* **level** *level command*

Syntax Description

mode	Configuration mode. Refer to the *Router Products Command Reference* publication for more information.
level	Privilege level to be associated with the specified command. You can specify up to 16 privilege levels, using numbers 0 through 15.
command	Command to which privilege level is associated.
type	See Table 15-2 for a list of optional keywords.

Defaults

Level 15 is the level of access permitted by the **enable** password.

Level 1 is normal EXEC-mode user privileges.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **alias** command shows the acceptable options for the *mode* argument in the **privilege level** global configuration command.

The password for the privilege level defined using the **privilege level** global configuration mode is configured using the **enable password** command.

Level 0 can be used to specify a more limited subset of commands for specific users or lines. For example, you can allow user "guest" to only use the **show users** and **exit** commands.

If you set a command to a privilege level, all commands that have a syntax that is a subset of the syntax of that command are also set to that level. For example, when you set the **show ip route** command to level 15 and do not set **show** and **show ip** commands to a different level, they are also set to privilege level 15.

Table 15-2 shows the optional keywords you specify to set the privileged level.

Table 15-2 Privilege Level Types

Type	Description
acctng-file	Configure ATM accounting file.
acctng-sel	Configure ATM accounting selection.

Table 15-2 Privilege Level Types (continued)

Type	Description
atm-router	ATM router configuration mode.
atmsig_e164_table_mode	ATMSIG E164 table.
configure	Global configuration mode.
exec	EXEC mode.
interface	Interface configuration mode.
lane	ATM LAN Emulation LECS configuration table.
line	Line configuration mode.
map-class	Map class configuration mode.
map-list	Map list configuration mode.
null-interface	Null interface configuration mode.
pnni-router-node	PNNI router node configuration mode.
route-map	Route map configuration mode.

Examples

In the following example, the **configure** command in global configuration mode is assigned a privilege level of 14. Only users who know the level 14 password are able to use the **configure** command.

```
Switch# privilege exec level 14 configure
Switch# enable password level 14 pswd14
```

Related Commands

Command	Description
configure	Cisco IOS command removed from this manual. Refer to Appendix D.
enable password	Cisco IOS command removed from this manual. Refer to Appendix D.
privilege level (line)	Sets the default privilege level for a specified line.

privilege level (line)

To set the default privilege level for a line, use the **privilege level** line configuration command. To restore the default user privilege level to the line, use the **no** form of this command.

privilege level *level*

no privilege level

Syntax Description

level	Privilege level to be associated with the specified line.

Defaults

Level 15 is the level of access permitted by the enable password.

Level 1 is normal EXEC-mode user privileges.

Command Modes

Line configuration

Command History

Release	Modification
11.1(4)	New command. Originally **privilege**
11.3(3a)	Modified: Changed to **privilege level (line)**

Usage Guidelines

The privilege level that is set using this command can be overridden by a user logging in to the line and enabling a different privilege level. The user can lower the privilege level by using the **disable** command. If the user knows the password to a higher privilege level, the user can use that password to enable the higher privilege level.

Level 0 can be used to specify a more limited subset of commands for specific users or lines. For example, you can allow user "guest" to only use the **show users** and **exit** commands.

You can specify high level privilege for your console line if you are able to restrict who uses that line.

Examples

(Catalyst 8540 MSR)

In the following example, the virtual terminal line is configured for privilege level 5. Anyone using virtual terminal line 0 has privilege level 5 by default.

```
Switch# configure terminal
Switch(config)# line console 0
Switch(config-line)# privilege level 5
```

Examples

(Catalyst 8510 MSR and LightStream 1010)

In the following example, the auxiliary line is configured for privilege level 5. Anyone using the auxiliary line has privilege level 5 by default.

```
Switch(config)# line aux 0
Switch(config-line)# privilege level 5
```

ptse

To set PTSE origination and request parameters (including significant change determination parameters), use the **ptse** PNNI node configuration command. To revert to the default values, use the **no** form of this command.

ptse [**lifetime-factor** *percentage-factor*] [**min-ptse-interval** *tenths-of-seconds*] [**refresh-interval** *seconds*] [**request** *number*] [**significant-change acr-mt** *percent*] [**significant-change acr-pm** *percent*] [**significant-change cdv-pm** *percent*] [**significant-change ctd-pm** *percent*]

no ptse [**lifetime-factor**] [**min-ptse-interval**] [**refresh-interval**] [**request**] [**significant-change acr-mt**] [**significant-change acr-pm**] [**significant-change cdv-pm**] [**significant-change ctd-pm**]

Syntax Description

lifetime-factor	Specifies an initial lifetime of self-originated PTSEs as a percentage of the **refresh-interval**. The default is 200 percent.
percentage-factor	Specifies the percentage factor of the refresh interval, from 101 to 1000. The value 100 represents a quantity equal to the refresh interval.
min-ptse-interval	Specifies the minimum interval between updates of any given PTSE. This means new instances of a PTSE are not issued more often than every **min-ptse-interval** second. The default value is 1 second. The minimum value is 0.1 seconds.
tenths-of-seconds	Specifies the time of the interval in tenths of seconds. Ten *tenths-of-seconds* equals one second.
refresh-interval	Specifies the period the system updates self-originated PTSEs. The default is 1800.
request	Specifies the maximum number of PTSEs requested in one request packet. The default is 32.
number	Specifies the PTSE requests using an integer.
acr-mt	Specifies the available cell rate minimum threshold which is the minimum change of available cell rate considered significant, as a percentage of the maximum cell rate. The default is 3 percent.
acr-pm	Specifies the available cell rate proportional multiplier, which is the percentage of change from the current available cell rate considered significant. The default is 50 percent.
cdv-pm	Specifies the cell delay variation proportional multiplier, which is the percentage of change from the current cell delay variation considered significant.The default is 25 percent.
ctd-pm	Specifies the maximum cell transfer delay proportional multiplier, which is the percentage of change from the current maximum cell transfer delay considered significant. The default is 50 percent.
percent	Specifies the significant change threshold percent, from 1 to 99.

Defaults

See “Syntax Description.”

Command Modes PNNI node configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines Lowering the **refresh-interval** time causes PNNI to reoriginate PTSEs more frequently, allowing insignificant changes to be advertised sooner at the cost of more PNNI traffic. Note that significant changes are advertised immediately.

Decreasing the **lifetime-factor** lowers the initial lifetime of PTSE, which means PTSEs of a PNNI node that has stopped functioning are removed from the database sooner. Lowering **min-ptse-interval** allows PNNI to update PTSEs quickly when changes happen rapidly in the network. This should be adjusted carefully so that you do not overload switch processors. In a normal situation, these parameters are not changed from their default values.

The significant change parameters define the level of changes in metrics that triggers PNNI to update and send its PTSEs. It applies to all PTSE types that include metrics: for example, horizontal link, up link, external reachable address, and nodal state parameters. Any change in administrative weight or cell loss ratio is considered significant.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples The following script shows how to access the **ptse** node-level subcommand.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)# ptse refresh-interval 1900
```

Related Commands

Command	Description
show atm pnni local-node	Displays information about a PNNI logical node running on the switch.
show atm pnni resource-info	Displays information about routing parameters of all PNNI interfaces received from a resource management module.

CHAPTER 16

R Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

redistribute

To instruct the PNNI to redistribute static routes throughout the PNNI routing domain, use the **redistribute** PNNI node configuration command. To disable redistribution of static routes, use the **no** form of this command.

redistribute *protocol*

no redistribute *protocol*

Syntax Description

protocol	The protocol keyword used for static routes is **atm-static**.

Defaults

Enabled for **atm-static**.

Command Modes

PNNI node configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

All redistributed routes are advertised in exterior reachable address PTSE with default scope and without metric. All redistributed routes are summarized by the **summary-address** command.

In autoconfiguration mode, PNNI is set to redistribute the configured static routes.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following script shows how to access the **redistribute** PNNI node configuration command.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)# redistribute atm-static
```

Related Commands

Command	Description
atm route	Specifies a static route to a reachable address prefix.
show atm route	Displays all local or network-wide reachable address prefixes in this switch's ATM routing table.

redundancy (Catalyst 8540 MSR)

To switch to the redundancy mode, use the **redundancy** global configuration command.

redundancy

Syntax Description

This command has no arguments or keywords.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

To enter the main-cpu mode of redundancy mode, use the **main-cpu** command.

Examples

The following example shows how to enter the redundancy mode.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-r)#
```

The following example shows how to switch to the main-cpu submode of redundancy mode.

```
Switch(config-r)# main-cpu
Switch(config-r-mc)#
```

Related Commands

Command	Description
main-cpu (Catalyst 8540 MSR)	Used to switch to the main-cpu submode of the redundancy mode..
redundancy force-failover main-cpu (Catalyst 8540 MSR)	Forces the primary route processor to allow the secondary route processor to take over and become the primary.
show redundancy (Catalyst 8540 MSR)	Displays all redundancy-related information.
sync config (Catalyst 8540 MSR)	Synchronizes the configuration between the primary and secondary route processors based on the primary configuration.

redundancy force-failover main-cpu (Catalyst 8540 MSR)

To force the primary route processor to allow the secondary route processor to take over and become the primary, use the **redundancy force-failover main-cpu** EXEC command.

redundancy force-failover main-cpu

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

If the secondary route processor is in ROMMON mode, it becomes the primary route processor but continues in the ROMMON mode, meaning that the IOS software does not automatically open.

The **force-failover main-cpu** command causes the main processor functions of the switch to change to the secondary route processor, if one is installed. If the command is executed when only one route processor is installed, the **force-failover main-cpu** command is ignored and an error message indicating this condition appears.

Caution Any unsaved configuration and all the SVC connections in the former primary route processor are lost after the failover is complete. Only PVC connections are preserved during failover.

If the new primary route processor does not have the same configuration as the previous primary route processor, functionality provided by the additional resources in the former primary route processor is lost after the failover. For example, if the new primary route processor does *not* have a network clock module installed and the old primary did, network clock functionality will not be available after the switchover.

Examples

The following example shows how to make the secondary route processor the primary.

```
Switch# redundancy force-failover main-cpu
```

Related Commands

Command	Description
show redundancy (Catalyst 8540 MSR)	Displays all redundancy-related information.

Note The **show redundancy** command is available on the primary route processor only.

redundancy manual-sync (Catalyst 8540 MSR)

To manually update the configuration on the secondary processor to be identical with the configuration on the primary processor, use the **redundancy manual-sync** EXEC command. Use this command to update the startup configuration, the running configuration, or both.

redundancy manual-sync [**startup-config** | **running-config** | **both**]

Syntax Description

startup-config	Updates the secondary processor with the startup configuration on the primary processor.
running-config	Updates the secondary processor with the running configuration on the primary processor.
both	Updates the secondary processor with both the startup configuration and the running configuration on the primary processor.

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Normally this command is not required because whenever you exit configuration mode (either using **cntrl-Z** or **end**), the running configuration is updated on the secondary processor. Similarly, the startup configuration is updated whenever you issue the **write memory** command. Use the **redundancy manual-sync (Catalyst 8540 MSR)** command if you see an error and want to manually force a configuration update.

Examples

The following example shows how to update the secondary processor with the startup configuration on the primary processor.

```
Switch# redundancy manual-sync
Switch# startup-config
```

Related Commands

Command	Description
show redundancy (Catalyst 8540 MSR)	Displays all redundancy-related information.

Note The **show redundancy** command is available on the primary route processor only.

redundancy preferred-switch-card-slot (Catalyst 8540 MSR)

If the switch has three switch cards, then by default the switch cards in slots 5 and 7 are the active switch cards and the one in slot 6 is the standby switch card. To change the active switch slots, use the **redundancy preferred-switch-card-slot** EXEC command.

redundancy preferred-switch-card-slot *slot#-1 slot#-2*

Syntax Description

slot#	Slot number in the range of 5 through 7.

Defaults

Slots 5 and 7 are the active slots. Slot 6 is the standby slot.

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Two unique preferred slots must be specified. If one of the preferred slots selected is not a currently active switch card, you are asked if the system should change the active switch cards to the preferred switch cards. If such a switchover occurs, all the active connections in the system are reinitialized. If you wish to continue, then the preferred switch cards become active and the other switch card becomes the standby. This configuration remains in effect until one of the active switch cards is removed. The preferred switch card configuration is preserved across route processor switchovers but not when the system is power cycled or when both route processors are reloaded to ROM monitor mode.

Examples

The following example shows how to change the preferred active slots to slots 5 and 6.

```
Cougar# redundancy preferred-switch-card-slots 5 6
One of the switch cards selected is not currently
active. This command will cause the switch cards
to reinitialize and all active connections will be reinitialized...
Do you want to continue? [yes/no]: [confirm]
shutting down atm-sec0 port
Waiting for existing connections to be removed...
yDone
The switch card driver will reinitialize now
All the active connections in the switch will
now be reinitialized.



Switch Fabric Driver subsystem initializing ...
found
smid=0
smid=2
smid=4
smid=6
smid=1
smid=3
smid=5
smid=7
nshutting atm-sec0 port
... DONE


Cougar#
```

Related Commands

Command	Description
show redundancy (Catalyst 8540 MSR)	Displays all redundancy-related information.

Note The **show redundancy** command is available on the primary route processor only.

redundancy prepare-for-cpu-removal (Catalyst 8540 MSR)

Prior to removing a route processor from the chassis, precautions must be taken. To be sure that a switch router running IOS is in the proper state, use the **redundancy prepare-for-cpu-removal** EXEC command.

redundancy prepare-for-cpu-removal

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

It is safest to have the route processor module in RMON monitor mode before removing it from the chassis. If the switch is running IOS, you can accomplish this using the **reload** command unless the switch is configured to automatically boot IOS again. To ensure that the route processor is in RMON monitor mode, use the **redundancy prepare-for-cpu-removal (Catalyst 8540 MSR)**. After issuing this command the route processor will go to ROM monitor mode and stay there even if the system is configured to automatically boot IOS. At this point it is safe to remove the route processor module from the chassis.

Note Be sure to issue the **redundancy prepare-for-cpu-removal (Catalyst 8540 MSR)** command after connecting to the console port of the route processor module to be removed. If the system has a Y cable, then the Y cable must be removed and a local connection to the route processor being removed must be obtained before issuing the command. Always issue the **redundancy prepare-for-cpu-removal (Catalyst 8540 MSR)** command on a route processor that is in IOS mode, even if it is the secondary route processor.

Examples

The following example shows how to prepare a route processor for removal by putting it into ROM monitor mode.

```
Switch# redundancy prepare-for-cpu-removal
This command will cause this CPU to go to the
rom monitor through a forced crash.
After this cpu goes to the rom monitor prompt, it is
safe to remove it from the chassis
Do you want to continue?[confirm]yPlease DO NOT REBOOT this cpu before removing it
rommon 7 >
```

Related Commands

Command	Description
show redundancy (Catalyst 8540 MSR)	Displays all redundancy-related information.

Note The **show redundancy** command is available on the primary route processor only.

reprogram

To upgrade nonvolatile microcode or programmable logic on a selected card from a flash file, use the **reprogram** EXEC command.

reprogram *flash-file-name* {*slot* | **rommon**} *subcard*

Syntax Description

flash-file-name	Name of the image to download, which can be in the PCMCIA flash or bootflash.
slot	Physical slot number of the controller you want to reprogram. The slot number ranges from 0 to 12 in the Catalyst 8540 MSR and from 0 to 4 in the Catalyst 8510 MSR and LightStream 1010.
rommon	If you select **rommon**, the rommon of the route processorATM switch router on which the command is invoked is reprogrammed with the image in the given file.
subcard	Can indicate a subcard in a slot for half-width cards or daughter cards in full width cards. If you do not specify a subcard number, the motherboard in the given slot is reprogrammed. The subcard number ranges from 0 to 3.

Defaults

The systemboard in the given slot is reprogrammed.

Command Modes

EXEC

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

This command causes nonvolatile change to the controller you select. It also resets the selected controller, which causes active connections and configurations to be lost.

If you reprogram a currently-running controller or switch card, power-cycle the switch router after the reprogram completes to make the newly downloaded image active. If you do not perform a power-cycle, the controller continues to run the older image. For secondary controllers or port adapters, you need not perform a power-cycle.

Caution Do not power-cycle the switch router during a reprogram operation because damage can occur to the controller you are reprogramming. If you power-cycle the switch router while reprogramming is in progress, you also might be unable to boot the switch router after the reprogram is complete.

Examples

The following example shows how to reprogram the image on the route processor in slot 3.

```
Switch# reprogram cpu_3_10.exo 3
```

Related Commands

Command	Description
show functional-image-info	Displays information about the in-system programmable device images (FPGA and PLD images) for a given module in the system.

resource-poll-interval

To configure the period of time that PNNI polls resource management to update the values of the interface metrics and attributes, use the **resource-poll-interval** ATM router PNNI configuration command. To return to the default value, use the **no** form of this command.

resource-poll-interval *seconds*

no resource-poll-interval

Syntax Description

seconds	Specifies the interval, in seconds, at which the values of the interface metrics and attributes are updated.

Defaults

5 seconds

Command Modes

ATM router PNNI configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

The maximum allowable poll interval is 300 seconds. Using this value impacts the number of self-generated PTSEs created by the switch. A larger **resource-poll-interval** can generate a smaller number of PTSE updates, as PNNI polls the interface resource information less frequently. A large **resource-poll-interval** is desirable when reducing the number of self-generated PTSEs caused by interface traffic fluctuation.

Lowering the default allows PNNI to poll the resource manager (for resource information) at a higher frequency. This allows PNNI to track resource information faster, but it costs more in processing time and should be adjusted only when needed.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following example shows how to change the period of time the interface metrics and attributes are updated using the **resource-poll-interval** ATM router PNNI configuration command.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# resource-poll-interval 30
```

Related Commands

Command	Description
show atm pnni resource-info	Displays information about routing parameters of all PNNI interfaces received from a resource management module.

resume

To switch to another open Telnet, LAT, or PAD session, use the resume EXEC command.

resume [*connection*] [**keyword**]

Syntax Description

connection	The name or number of the connection; the default is the most recent connection.
keyword	One of the options listed in Table 16-1.

Defaults

/noline1

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Several concurrent sessions can be open and you can switch back and forth between them. The number of sessions that can be open is defined by the **sessions** command.

You can switch between sessions by escaping one session and resuming a previously opened session, as follows:

Step 1 Escape out of the current session by pressing the escape sequence (**Ctrl^** then x [**Ctrl^x**] by default) and return to the EXEC prompt.

Step 2 Enter the **where** command to list the open sessions. All open sessions associated with the current terminal line are displayed.

Step 3 Enter the **resume** command and the session number to make the connection.

You also can resume the previous session by pressing the **Return** key.

The **Ctrl^x**, **where**, and **resume** commands are available with all supported connection protocols.

Table 16-1 lists the Telnet and rlogin resume options.

Table 16-1 Telnet and rlogin resume options

Option	Description
/debug	Displays parameter changes and messages. In the Cisco IOS software, this option displays informational messages whenever the remote host changes an X.3 parameter, or sends an X.29 control packet.
/echo	Performs local echo.

Table 16-1 Telnet and rlogin resume options (continued)

Option	Description
/line	Enables line-mode editing.
/nodebug	Cancels printing of parameter changes and messages.
/noecho	Disables local echo.
/noline1	Disables line mode and enables character-at-a-time mode. (Default)
/nostream	Disables stream processing.
/set parameter:value	Sets X.3 connection options.
/stream	Enables stream processing.

Examples

The following example shows how to escape out of a connection and to resume connection 2.

```
Swift% ^^X
Switch> resume 2
```

You can omit the command name and simply enter the connection number to resume that connection. The following example illustrates how to resume connection 3.

```
Switch> 3
```

Related Commands

Command	Description
session-timeout	Cisco IOS command removed from this manual.
show sessions	Displays information about open Telnet or rlogin connections.
where	Cisco IOS command removed from this manual.

rif

To enter static source-route information into the routing information field (RIF) cache, use the **rif** global configuration command. To remove an entry from the cache, use the **no** form of this command.

rif *mac-addr* [*rif-string*]

no rif *mac-addr* [*rif-string*]

Syntax Description

mac-addr	MAC address of the RIF entry.
rif-string	Series of 4-digit hexadecimal numbers separated by a period (.). This RIF string is inserted into the packets sent to the specified MAC address.

Defaults

No static source-route information is entered.

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

If a Token Ring host does not support the use of IEEE 802.2 TEST or XID datagrams as explorer packets, you might need to add static information to the RIF cache.

Using the command **rif** *mac-address* without any other arguments puts an entry into the RIF cache indicating that packets for this MAC address do not have RIF information.

Do not configure a static RIF with any of the all rings type codes. Doing so causes traffic for the configured host to appear on more than one ring and leads to unnecessary congestion.

Examples

The following example shows inserting a RIF cache entry with MAC address 1000.5A12.3456 and RIF 0630.0081.0090.

```
Switch# configure terminal
Switch(config)# rif 1000.5A12.3456 0630.0081.0090
```

Related Commands

Command	Description
multiring	Enables collection and use of RIF information on a subinterface.
show rif	Displays the current contents of the RIF cache.

rif always-forward

To specify that RIFs must always be stored in the forward direction, use the **rif always-forward** global configuration command. To disable forward-direction storing of RIFs, use the **no** form of this command.

rif always-forward

no rif always-forward

Syntax Description

This command has no keyword or arguments.

Defaults

RIFs are not stored in the forward direction.

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)	New command

Related Commands

Command	Description
rif	Enters static source-route information into the routing information field (RIF) cache.
show rif	Displays the current contents of the RIF cache.

rif timeout

To specify the number of minutes an inactive entry is kept in the RIF cache, use the **rif timeout** global configuration command. To restore the default time, use the **no** form of this command.

rif timeout *minutes*

no rif timeout

Syntax Description

minutes	Number of minutes an inactive RIF entry is kept in the cache. The valid range is 1 to 120.

Defaults

15 minutes

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

A RIF entry is refreshed only if a RIF field of an incoming frame is identical to the RIF information of the RIF entry in the cache.

Until a RIF entry is removed from the cache, no new information is accepted for that RIF entry.

Examples

The following example shows changing the timeout to 5 minutes.

```
Switch# configure terminal
Switch(config)# rif timeout 5
```

Related Commands

Command	Description
clear rif-cache	Used to clear the RIF cache.
rif	Enters static source-route information into the routing information field (RIF) cache.
show rif	Displays the current contents of the RIF cache.

rif validate-age

To permit invalidated and aged-out entries to be removed from the RIF cache, use the **rif validate-age** global configuration command. To disable this feature, use the **no** form of this command.

rif validate-age

no rif validate-age

Syntax Description

This command has no keywords or options.

Defaults

Aged entries are removed.

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)	New command

Related Commands

Command	Description
rif	Enters static source-route information into the routing information field (RIF) cache.
rif timeout	Specifies the number of minutes an inactive entry is kept in the RIF cache.
show rif	Displays the current contents of the RIF cache.

rif validate-enable

To enable RIF validation for entries learned on an interface, use the **rif validate-enable** global configuration command. To disable the specification, use the **no** form of this command.

rif validate-enable

no rif validate-enable

Syntax Description This command has no keywords or arguments.

Defaults RIF validation is enabled.

Command Modes Global configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines A RIF validation algorithm is used in the following cases:

- To decrease convergence time to a new source route path when an intermediate bridge goes down.
- To keep a valid RIF entry in a RIF cache even if a RIF entry is not refreshed either because traffic is fast or autonomously switched, or because no traffic exists.

A directed IEEE TEST command is sent to the destination MAC address. If a response is received in the time specified by **rif validate-time**, the entry is refreshed and is considered valid. Otherwise, the entry is removed from the cache. To prevent sending too many TEST commands, any entry that has been refreshed in less than 70 seconds is considered valid.

Validation is triggered when any of the follows occurs:

- A RIF entry is found in the cache.
- A RIF field of an incoming frame and the RIF information of the RIF entry is not identical. If, as the result of validation, the entry is removed from the cache, the RIF field of the next incoming frame with the same MAC address is cached.
- The RIF entry is not refreshed for the time specified in the **rif timeout** command.

Note If the RIF entry has been in the RIF cache for six hours, and has not been refreshed for the time specified in the **rif timeout** command, the entry is removed from the cache.

Note This command has no effect on remote entries learned over RSRB.

Related Commands

Command	Description
rif timeout	Specifies the number of minutes an inactive entry is kept in the RIF cache.

rif xid-explorer

To send IEEE XID explorer packets instead of TEST commands to learn RIF information, use the **rif xid-explorer** global configuration command. To disable this specification, use the **no** form of this command.

rif xid-explorer

no rif xid-explorer

Syntax Description

This command has no keywords or arguments.

Defaults

TEST commands are sent.

Command Modes

Global configuration

Command History

Release	Modification
11.3.(3a)	New command

Related Commands

Command	Description
rif	Enters static source-route information into the routing information field (RIF) cache.
show rif	Displays the current contents of the RIF cache.

rsh

To execute a command remotely on a remote rsh host, use the **rsh** privileged EXEC command.

rsh {*ip-address* | *host*} [**/user** *username*] *line*

Syntax Description

ip-address	IP address of the remote host on which to execute the **rsh** command. Either the IP address or the host name is required.
host	Name of the remote host on which to execute the command. Either the host name or the IP address is required.
username	Remote username.
line	Required parameter to be executed remotely.

Defaults

If you do not specify the **/user** keyword and argument, the switch router sends a default remote username. As the default value of the remote username, the switch software sends the username associated with the current TTY process if that name is valid. For example, if the user is connected to the switch router through Telnet and the user was authenticated through the **username** command, the switch router software sends that username as the remote username. If the TTY username is invalid, the switch router software uses the switch router host name as both the remote and local usernames.

Note TTYs are commonly used in Cisco communications servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

Use the **rsh** command to execute commands remotely. The host on which you remotely execute the command must support the rsh protocol, and the *.rhosts* files on the rsh host must include an entry that permits you to remotely execute commands on that host.

For security reasons, the switch software does not default to a remote login if no command is specified. Instead, the switch router provides Telnet and connect services that you can use rather than **rsh**.

Examples

The following command specifies that user *rusty* attempts to remotely execute the UNIX **ls** command with the **-a** argument on the remote host *mysys.cisco.com*. The command output resulting from the remote execution follows the command example.

```
Switch1# rsh mysys.cisco.com /user rusty ls -a
.
..
.alias
.cshrc
.emacs
.exrc
.history
.login
.mailrc
.newsrc
.oldnewsrc
.rhosts
.twmrc
.xsession
jazz
```

rxspeed (Catalyst 8510 MSR and LightStream 1010)

To set the terminal baud rate receive (from terminal) speed, use the **rxspeed** line configuration command. To set the baud rate to the default, use the **no** form of this command.

rxspeed *bps*

no rxspeed

Syntax Description

bps	Baud rate in bps. Refer to "Usage Guidelines" below for settings.

Defaults

9600 bps

Command Modes

Line configuration

Command History

Release	Modification
11.3(3a)	New command
12.0(3c)W5(9)	Modified: **(Catalyst 8510 MSR and LightStream 1010)** added

Usage Guidelines

This command pertains to the auxiliary port only. Set the speed to match the baud rate of any device you connect to the port. Some baud rates available on devices connected to the port might not be supported on the switch. The switch indicates if the speed you select is not supported.

The following is a list of supported baud rates:

75, 110, 134, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600, 19200, 38400

Examples

The following example sets the auxiliary line receive rate to 2400 bps.

```
Switch# configure terminal
Switch(config)# line aux 0
Switch(config-line)# rxspeed 2400
```

Related Commands

Command	Description
speed	Cisco IOS command removed from this manual.
txspeed	Cisco IOS command removed from this manual.

CHAPTER 17

S Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

scheduler allocate

To guarantee CPU time for processes, use the **scheduler allocate** global configuration command. To restore the default guaranteed CPU time, use the **no** form of this command.

scheduler allocate *interrupt-time process-time*

no scheduler-allocate

Syntax Description

interrupt-time	Integer (in microseconds) that limits the maximum number of microseconds to spend on fast switching within any one network interrupt context. The range is 500 to 6000 microseconds. The default is 4000 microseconds.
process-time	Integer (in microseconds) that guarantees the minimum number of microseconds to spend at the process level when network interrupts are disabled. The range is 500 to 60000 microseconds. The default is 200 microseconds.

Defaults

Approximately five percent of the CPU is available for process tasks.

Command Modes

Global configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

The normal operation of the network server allows the switching operations to use as much of the central processor as required. If the network is running unusually heavy loads that do not allow the processor the time to handle the routing protocols, give priority to the system process scheduler. Use the **scheduler allocate** command to guarantee processor time.

Examples

The following example makes 20 percent of the CPU available for process tasks.

```
Switch(config)# scheduler allocate 2000 500
```

scope

To filter ATM signalling call failures that occur within the switch and on other switches, use the **scope** ATM signalling diagnostics configuration command. To disable this feature, use the **no** form of this command.

scope {**all** | **external** | **internal**}

no scope

Syntax Description

all	Filter call failures that occur within the switch or on other external switches.
external	Filter call failures that occur on other external switches.
internal	Filter call failures that occur within the switch.

Defaults

all

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
11.2(8.0.1)	New command

Examples

In the following example, call failures are filtered by failures that occur within the switch.

```
Switch(cfg-atmsig-diag)# scope internal
```

scope map

To specify the mapping from a range of organizational scope values (used at UNI interfaces) to a PNNI scope value (such as in terms of PNNI routing-level indicators), use the **scope map** PNNI node-level subcommand. To set to default a range of organizational scope values, use the **no** form of this command.

scope map *low-org-scope* [*high-org-scope*] **level** *level-indicator*

no scope map *low-org-scope* [*high-org-scope*]

Syntax Description

low-org-scope	Specifies the low end of the range of organizational scope values. The valid range of organizational scope values is from local (1) to global (15).
high-org-scope	Specifies the high end of the range of organizational scope values. The valid range of organizational scope values is from local (1) to global (15). If no value is specified, then the range includes only one entry (for example, *high-org-scope* equals *low-org-scope*).
level-indicator	Specifies the PNNI scope value to which the range of organizational scope values is mapped. The range is from 0 to 104.

Defaults

Table Table 17-1 shows the default values specified in the ATM Forum PNNI 1.0 Specifications.

Table 17-1 Organizational Scope-to-Default Level Mappings

org-scope Range	ATM Forum Default Level
1-3	96
4-5	80
6-7	72
8-10	64
11-12	48
13-14	32
15 global	0

Command Modes

PNNI node configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

The **scope map** command is used to change the values of specific entries. This command is only accepted when the **scope mode** is set to **manual**.

When the organizational scope of a registered address maps to a PNNI level that is lower in the PNNI hierarchy (larger PNNI routing level) than the level of this node, the registered address is not advertised. Similarly, when the connection scope of a setup attempt maps to a PNNI level that is lower in the PNNI hierarchy than the level of this node, then only destinations directly attached to this switch router are considered acceptable.

Note Modifying the node level without altering the scope map table can result in some advertisements being suppressed.

The ATM switch router provides an option to automatically adjust the level changes. In automatic mode, the default scope map table is tied to the level of the node when it is generated.

Note that the default organizational scope of an individual address is global (15), and the default organizational scope of a group address is local (1).

Examples

The following example shows setting the scope mode to **manual** and setting the scope map entries for organizational scope values 1 through 5 to PNNI level 96, using the **scope map** PNNI node-level subcommand.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)# scope mode manual
Switch(config-pnni-node)# scope map 1 5 level 96
```

Related Commands

Command	Description
scope mode	Specifies the configuration mode of the mapping from organizational scope values (used at UNI interfaces) to PNNI scope (such as PNNI routing-level indicators).
show atm pnni scope	Displays the mapping from organizational scope values—used at UNI interfaces—to PNNI scope (such as PNNI routing level indicators).

scope mode

To specify the configuration mode of the mapping from organizational scope values (used at UNI interfaces) to PNNI scope (such as PNNI routing-level indicators), use the **scope mode** node-level subcommand.

scope mode {**automatic** | **manual**}

Syntax Description

automatic	Generates a default scope mapping table automatically which is tied to the PNNI level of the node. In this mode, no modifications of the scope mapping table entries are allowed.
manual	Allows for manual configuration of the scope mapping table using the **scope map** command.

Defaults

The default scope mappings for **automatic** are shown in Table 17-2.

Table 17-2 Default Scope Mappings for Automatic Mode

Organizational Scope Range	ATM Forum Default Level	Automatic Mode Level
1-3	96	min(l,96)
4-5	80	min(l,80)
6-7	72	min(l,72)
8-10	64	min(l,64)
11-12	48	min(l,48)
13-14	32	min(l,32)
15(global)	0	0

Command Modes

PNNI node configuration

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use this command to modify the way in which the default scope mapping table is computed.

Using the **automatic** mode ensures that all organizational scope values cover an area at least as wide as this node's peer group, even when the node is at a level higher than 96. As a result, all addresses including those of local scope are advertised across this node's peer group.

For each organizational scope value, the corresponding PNNI level is the minimum of the ATM Forum PNNI 1.0 default value and level l of this node.

Note that the scope mapping table is overwritten whenever the scope mode is changed from **manual** to **automatic** (for example, all **scope map** commands for this node are removed).

Examples

The following example shows setting the scope mode to **manual** using the **scope mode** PNNI node-level subcommand.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)# scope mode manual
```

Related Commands

Command	Description
scope map	Specifies the mapping from a range of organizational scope values (used at UNI interfaces) to a PNNI scope value (such as PNNI routing-level indicators).
show atm pnni scope	Displays the mapping from organizational scope values—used at UNI interfaces—to PNNI scope (such as PNNI routing level indicators).

scrambling

To allow scrambling to be enabled or disabled from the current port, use the **scrambling** interface configuration command. To disable scrambling, use the **no** form of this command.

scrambling *scramblingmode*

no scrambling *scramblingmode*

Syntax Description

scramblingmode	Specify either **sts-stream** or **cell-payload.**

Defaults

In SONET interfaces, both modes are enabled. In DS3 interfaces, the mode is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **sts-stream** scrambling is applicable only to SONET interfaces.

Examples

The following example shows how to disable **sts-stream** and **cell-payload** scrambling on the physical device associated with ATM 3/0/0.

```
Switch# configure terminal
Switch(config)# interface atm 3/0/0
Switch(config-if)# no scrambling cell-payload
Switch(config-if)# no scrambling sts-stream
```

segment-target

To specify a target entry in a partially specified PNNI explicit-path, use the **segment-target** PNNI explicit-path configuration command.

segment-target {*name-string* | *node-id* | *node-id-prefix*} [**port** *hex-port-id* | **agg-token** *hex-agg-token-id*]

Syntax Description

name-string	Name of the PNNI node.
node-id	Full 22-byte node ID for a PNNI node.
node-id-prefix	The first 15 or more bytes of a node ID for a PNNI node.
port *hex-port-id*	Optionally specifies an exit port to exclude for a PNNI node. Should be specified as a hexadecimal port ID rather than as a port name. The default is to allow any valid exit port.
agg-token *hex-agg-token-id*	Optionally specifies the exit aggregation token, which is used in place of the port ID for higher-level PNNI LGNs. The default allows any valid exit port.

Defaults

See "Syntax Description."

Command Modes

PNNI explicit-path configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Note See the **atm pnni explicit-path** command for a description of how to edit or delete an existing **segment-target** path entry.

Node IDs can be entered with either the full 22-byte length address, or as a node ID prefix with a length of 15 bytes or more. To specify routes that include higher-level nodes (parent LGNs) for other peer groups, we recommend that you enter exactly 15 bytes so that the address remains valid in the event of a PGL update.

Node IDs appear in the following format:

dec: dec: 13-20 hex digits

Note To display the node IDs that correspond to named nodes in a network, use either the **show atm pnni identifier** command or the **show atm pnni topology** command with the **node** keyword.

Node names can be entered instead of node IDs. If names are used to identify higher-level LGNs, the resulting explicit paths are not guaranteed to remain valid if the PGL changes in the neighboring peer group. To prevent invalid paths, configure all parent LGNs (for all potential PGL nodes) with the same node name.

An exit port can be specified for any entry. The port should be specified as a hexadecimal port ID rather than as a port name. For excluded entries, only this port is excluded from the path.

Note To display the corresponding hexadecimal port IDs for a node, use either the **show atm pnni identifier** command with the **port** keyword, or the **show atm pnni topology** command with the **node** and **hex-port-id** keywords.

Since the port-id could change if the following neighbor peer group changes PGL leaders, the **aggregation token** is used in place of the port ID for nodes with higher-level LGNs. The LGN aggregation token can only identify the port uniquely if the following entry is the **next-node** entry. Aggregation tokens are not allowed for excluded tokens.

Examples

The following example shows how to perform the following PNNI explicit-path configuration tasks:

- Enter PNNI explicit-path configuration mode
- Add one **next-node**
- Add two **segment-target** nodes (these must appear in their desired routing order.)
- Specify an LGN node by its 15-byte node ID prefix
- Exit PNNI explicit-path configuration mode

```
Switch# configure terminal
Switch(config)# atm pnni explicit-path name boston_2.path1
Switch(cfg-pnni-expl-path)# next-node dallas_2
Switch(cfg-pnni-expl-path)# segment-target dallas_4
Switch(cfg-pnni-expl-path)# segment-target 40:72:47.009181000000106000000000
```

Related Commands

Command	Description
atm pnni explicit-path	Used to enter PNNI explicit path configuration mode to create or modify PNNI explicit paths.
exclude-node	Specifies a node to exclude from all segments of a partially specified ATM PNNI explicit path.
next-node	Specifies the next adjacent entry in a fully-specified ATM PNNI explicit path.
show atm pnni explicit-paths	Displays a summary of explicit paths that have been configured.

service-category

To filter ATM signalling call failures by service category, use the **service-category** ATM signalling diagnostics configuration command. To return the service category to the default, use the **no** form of this command.

service-category {**abr** | **all** | **cbr** | **nrt-vbr** | **rt-vbr** | **ubr**}

no service-category

Syntax Description

abr	Sets the service category to ABR.
all	Sets the service category to ABR, CBR, NRT-VBR, RT-VBR, and UBR.
cbr	Sets the service category to CBR.
nrt-vbr	Sets the service category to NRT-VBR.
rt-vbr	Sets the service category to RT-VBR.
ubr	Sets the service category to UBR.

Defaults

all

Command Modes

ATM signalling diagnostics configuration

Command History

Releae	Modification
11.2(8.0.1)	New command

Examples

In the following example, call failures for the ABR and UBR service categories are filtered.

```
Switch# configure terminal
Switch(config)# interface atm 0/0/0
Switch(config-if)# atm signalling diagnostics 1
Switch(cfg-atmsig-diag)# service-category abr ubr
```

sgcp

To enable the operation of the SGCP to interconnect ATM CES interface circuits on a switch router, use the **sgcp** global configuration command. To disable the operation of SGCP on a switch router, use the **no** form of this command.

sgcp

no sgcp

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

When enabled, SGCP listens on all interfaces for UDP packets that contain SGCP requests or responses. For call setup, SGCP allocates connections to endpoints: CES ATM single time slot circuits. For call teardown, SGCP releases connections between endpoints. The **no** form of the command releases all network connections established for SGCP and all endpoints from connections. It also returns resources allocated to SGCP. The **no** form also stops SGCP from listening for UDP packets. No attempt is made to gracefully release resources.

When SGCP receives a CreateConnection packet for the ATM switch router endpoint, the endpoint name is in the following format:

`CBR.`*`x`*`.`*`y`*`.`*`z`*`/`*`c`*

where *x*, *y*, and *z* are standard ATM switch router interface specifiers (*card*/*subcard*/*interface*), and *c* is a CES circuit ID.

For a CreateConnection packet to succeed:

- There must be a CES card in slot *x*, subcard *y*, 0<=*z*<=3:

  T1: 1<=*c*<=24

  E1: 1<=*c*<=31

- There must be a CES circuit defined with circuit ID *c*, with only a single time slot (time slot = *c*) allocated to it.
- There must be no PVC configured for the CES circuit.

- The CES circuit must not be the destination end of a CES soft PVC.
- The parent CES interface line state (shown by the **show ces interface** command) must be normal.
- The SGCP global operational state (shown by the **show sgcp** command) must be active.

Note For SGCP to operate properly, even with the **sgcp** command in effect, you must not enter the **sgcp graceful-shutdown** command.

Examples

The following example enables SGCP.

```
Switch# configure terminal
Switch(config)# sgcp
```

Related Commands

Command	Description
sgcp call-agent	Sends SGCP response packets to a predetermined IP address and UDP port.
sgcp graceful-shutdown	Used to shut down SGCP operations gracefully.
sgcp request retries	Specifies the number of times the ATM switch sends an SGCP request to the call agent without receiving a response, and before ceasing to retry.
sgcp request timeout	Specifies the time the ATM switch waits after sending an SGCP request to the call agent before considering the request lost.
show sgcp	Displays global configuration, operational state, and a summary of connection activity for SGCP.
show sgcp connection	Displays a global list of SGCP connections or a single interface based on a related keyword.
show sgcp endpoint	Displays CES circuit endpoints that might or might not have connections created.
show sgcp statistics	Displays global statistics pertaining to SGCP activity.

sgcp call-agent

To send SGCP response packets to a predetermined IP address and UDP port, use the **sgcp call-agent** global configuration command. To restore the default behavior of responding to SGCP request packets using the source address in the request packet, use the **no** form of this command.

sgcp call-agent *host* [*udp_port*]

no sgcp call-agent

Syntax Description

host	String representing a DNS name or IP address for the SGCP call agent.
udp_port	Decimal UDP port number.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Use this command to determine the IP address and UDP port of the call agent for sending requests and responses if the call-agent address is not configured.

- The gateway sends responses to the source IP address and port specified in the UDP packet containing the SGCP request.
- The gateway sends a DeleteConnection request to the source IP address and port specified in the UDP packet of the CreateConnection request that allocated the current connection.

If the address is specified, but no port is specified, SGCP uses the well-known SGCP port 2427.

Examples

The following example specifies a call-agent address to use. The default UDP port is used.

```
Switch# configure terminal
Switch(config)# sgcp call-agent 172.69.1.129
```

Related Commands

Command	Description
sgcp	Enables the operation of the SGCP to interconnect ATM CES interface circuits on a switch router.
show sgcp	Displays global configuration, operational state, and a summary of connection activity for SGCP.

sgcp graceful-shutdown

To shut down SGCP operation, use the **sgcp graceful-shutdown** global configuration command. To allow SGCP to resume operation, use the **no** form of this command.

sgcp graceful-shutdown

no sgcp graceful-shutdown

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

The graceful shutdown configuration is used while SGCP is active. This command stops SGCP operation after attempting to notify the call agent about the release of any connections in progress.

The **no sgcp** command operates in a similar manner in that any active network connections established by SGCP are torn down.

The gateway also sends DeleteConnection requests to the call agent for all endpoints allocated to connections. After responses (or retransmission limits, or call agent-initiated DeleteConnection) have been received for all connections, the gateway stops listening to UDP. During this activity, SGCP rejects any requests for new connections.

After you enter the **sgcp graceful-shutdown** command with SGCP enabled, the operational state of SGCP that the**show sgcp** command reflects can be Down or Going Down. The Going Down state is entered only if there are active connections. Once all connections are inactive (not allocated and network connection released), the global operational state is Down. While **sgcp** is outstanding, the **no** form of this command resumes SGCP operation.

The **no** form of this command has no effect when issued while SGCP is not operating.

Examples

```
Switch# configure terminal
Switch(config)# sgcp grace-shutdown
```

Related Commands

Command	Description
sgcp	Enables the operation of the SGCP to interconnect ATM CES interface circuits on a switch router.
show sgcp	Displays global configuration, operational state, and a summary of connection activity for SGCP.

sgcp request retries

To specify the number of times the ATM switch router sends an SGCP request to the call agent without receiving a response and before ceasing to retry, use the **sgcp request retries** global configuration command. To restore the default value, use the **no** form of this command.

sgcp request retries *retryval*

no sgcp request retries

Syntax Description

retryval	Decimal number of retries.

Defaults

Three

Command Modes

Global configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Currently, the ATM switch router sends only DeleteConnection requests to the call agent. When UDP is sending packets, there is no assurance that all packets are received. When the number of specified retries has been exceeded, the response to DeleteConnection appears to the ATM switch as positive.

Examples

The following example sets the number of request retries to six.

```
Switch# configure terminal
Switch(config)# sgcp request retries 6
```

Related Commands

Command	Description
sgcp	Enables the operation of the SGCP to interconnect ATM CES interface circuits on a switch router.
sgcp request timeout	Specifies the time the ATM switch waits after sending an SGCP request to the call agent before considering the request lost.
show sgcp	Displays global configuration, operational state, and a summary of connection activity for SGCP.

sgcp request timeout

To specify the time the ATM switch router waits after sending an SGCP request to the call agent before considering the request lost, use the **sgcp request timeout** global configuration command. To restore the default value, use the **no** form of this command.

sgcp request timeout *timeval*

no sgcp request timeout

Syntax Description

timeval	Time value, in milliseconds.

Defaults

500 milliseconds

Command Modes

Global configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Currently, the ATM switch router only sends DeleteConnection requests to the call agent.

Examples

The following example sets the request timeout to one second.

```
Switch# configure terminal
Switch(config)# sgcp request timeout 1000
```

Related Commands

Command	Description
sgcp	Enables the operation of the SGCP to interconnect ATM CES interface circuits on a switch router.
show sgcp	Displays global configuration, operational state, and a summary of connection activity for SGCP.

slip

Use the **slip** EXEC command to attach or detach a SLIP interface.

slip

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

snmp-server enable traps

To enable the router to send SNMP traps, use the **snmp-server enable traps** global configuration command. To disable SNMP and stop sending traps, use the **no** form of this command.

snmp-server enable traps [*trap-type*] [*trap-option*]

no snmp-server enable traps [*trap-type*] [*trap-option*]

Syntax Description

trap-type	Type of trap to enable. If no type is specified, all traps are sent (including envmon and repeater). *trap-type* can have one of the following values: • **atm-accounting**—Enable SNMP ATM accounting traps. • **chassis-change**—Enable SNMP chassis change traps. • **chassis-fail**—Enable SNMP chassis fail traps. • **config**—Enable SNMP configuration traps. • **entity**—Enable SNMP entity traps. • **snmp**—Enable SNMP traps. • **syslog**—Enable SNMP syslog traps.
trap-option	Enables authentication. When the **snmp** keyword is used for *trap-type*, you can specify the **authentication** option to enable SNMP Authentication Failure traps. (The **snmp-sever enable traps snmp authentication** command replaces the **snmp-server trap-authentication** command.) If no option is specified, all SNMP traps are enabled.

Defaults

No traps are enabled.

If you enter this command with no keywords, the default is to enable all trap types.

Command Modes

Global configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

Use the **snmp-server enable** command to specify which SNMP traps the switch router sends, and use the **snmp-server host** command to specify which host or hosts receive SNMP traps.

You must issue a separate **snmp-server enable** command for each trap type, including envmon and repeater.

sonet

To set the mode of operation and control the type of ATM cell used for cell-rate decoupling on the SONET, use the **sonet** interface configuration command. To restore the default operation to OC-3, OC-12, and OC-48c interfaces, use the **no** form of this command.

Catalyst 8540 MSR

sonet {**stm-1** | **sts-3c**} | {**stm-4c** | **sts-12c**} | {**stm-16** | **sts-48c**}

no sonet {**stm-1** | **sts-3c**} | {**stm-4c** | **sts-12c**} | {**stm-16** | **sts-48c**}

Catalyst 8510 MSR and LightStream 1010

sonet {**stm-1** | **sts-3c**} | {**stm-4c** | **sts-12c**}

no sonet {**stm-1** | **sts-3c**} | {**stm-4c** | **sts-12c**}

Syntax Description

stm-1	Synchronous Transport Module level 1. SDH/STM-1 operation (ITU-T specification).[1]
sts-3c	Synchronous Transport Signal level 3, concatenated (3 x 51.84 Mbps). SONET format that specifies the frame structure for the 155.52 Mbps lines used to carry ATM cells.
stm-4c	Synchronous Transport Module level 4. SDH/STM-4 operation (ITU-T specification).
sts-12c	Synchronous Transport Signal level 12, concatenated (12 x 51.84 Mbps). SONET format that specifies the frame structure for the 5184 Mbps lines used to carry ATM cells.
stm-16	Synchronous Transport Module level 16. SDH/STM-16 operation (ITU-T specification). (Catalyst 8540 MSR).
sts-48c	Synchronous Transport Signal level 48, concatenated. (48 x 51.84 Mbps) SONET format that specifies the frame structure for the 2488.32 Mbps lines used to carry ATM cells. (Catalyst 8540 MSR).

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

Defaults

For OC-3: **sts-3c**.

For OC-12: **sts-12c**.

For OC-48c: **sts-48c**.

Command Modes

Interface configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command applies to all ports except the CPU. Use **stm-1**, **stm-4c** and **stm-16** in applications where the ATM switch router requires idle cells for rate adaptation. An idle cell contains 31 zeros followed by a 1.

Use the appropriate default in applications where the ATM switch router requires unassigned cells for rate adaptation. An unassigned cell contains 32 zeros.

Examples

The following example specifies ATM SONET STM-1.

```
Switch(config-if)# sonet stm-1
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.
show running-config	Displays the configuration information currently running on the terminal.
sonet overhead	Used to set SONET/SDH overhead bytes.
sonet report	Enables the reporting of selected alarms.
sonet threshold	Used to set the BER threshold values.

sonet overhead

To set SONET/SDH overhead bytes, use the **sonet overhead** interface configuration command. To restore the default value, use the **no** form of this command.

sonet overhead {**c2** *bytes* | **j0** {*bytes* | **msg** *line*} | **j1**{**16byte** {**exp-msg** *line* | **msg** *line*} | **64byte** {**exp-msg** *line* | **msg** *line*}} | **s1s0** *bits*}

no sonet overhead {**c2** *bytes* | **j0** {*bytes* | **msg** *line*} | **j1**{**16byte** {**exp-msg** *line* | **msg** *line*} | **64byte** {**exp-msg** *line* | **msg** *line*}} | **s1s0** *bits*}

Syntax Description

c2	Sets path signal label indicator.
bytes	Specifies byte value in the range of 0 to 255.
j0	Sets string or repeating value (applicable only in STM mode).
msg	Specifies string to be transmitted.
line	Specifies text consisting of characters.
j1	Sets 64/16-byte format, 0x0 by default.
16byte	Sets 16-byte format message starting with country code or three alphabetic country code.
exp-msg	Specifies expected message.
64byte	Sets 64-byte format message.
s1s0	Specifies bit S1 and S0 of H1.
bits	Specifies bit value in the range of 0 to 3.

Defaults

64-byte message

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

By default, the path trace message is a free format 64-byte string consisting of hostname, interface name, and IP address information. This format is compatible with the default GSR POS j1 message.

Note This command is only supported on a system with an OC-12 or OC-48c interface module.

Examples

The following example sets the **sonet overhead** path signal indicator to 255 bytes on ATM 10/0/0.

```
Switch(config)# int atm 10/0/0
Switch(config-if)# sonet overhead c2 255
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.
sonet	Used to set the mode of operation and control the type of ATM cell used for cell-rate decoupling on the SONET.
sonet report	Enables the reporting of selected alarms.
sonet threshold	Used to set the BER threshold values.

sonet report

To enable the reporting of selected alarms, use the **sonet report** interface configuration command. To revert to the default, or to disable selected alarms, use the **no** form of this command.

sonet report {**slos** | **slof** | **lais** | **lrdi** | **pais** | **prdi** | **plop** | **sd-ber** | **sf-ber** | **b1-tca** | **b2-tca** | **b3-tca**}

no sonet report {**slos** | **slof** | **lais** | **lrdi** | **pais** | **prdi** | **plop** | **sd-ber** | **sf-ber** | **b1-tca** | **b2-tca** | **b3-tca**}

Syntax Description

slos	Enables reporting section loss of signal.
slof	Enables reporting section loss of frame.
lais	Enables reporting line alarm indication signal.
lrdi	Enables line remote defect indication.
pais	Enables path alarm indication signal.
prdi	Enables path remote defect indication.
plop	Enables reporting path loss of pointer.
sd-ber	Enables reporting LBIP BER in excess of SD threshold.
sf-ber	Enables reporting LBIP BER in excess of SF threshold.
b1-tca	Enables B1 (selection error) BER threshold crossing alarm.
b2-tca	Enables B2 (line error) BER threshold crossing alarm.
b3-tca	Enables B3 (BIP-8 error) BER threshold crossing alarm.

Defaults

By default, alarm reporting is enabled for **slos**, **slof**, **plop**, **sf**, **b1-tca**, **b2-tca**, **b3-tca**.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

This command enables the reporting of the selected alarms listed in the "Syntax Description."

Note This command is only supported on a system with an OC-12 or OC-48c interface module.

Examples

The following example enables the section loss of signal reporting:

```
Switch(config-if)# sonet report slos
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.
sonet	Used to set the mode of operation and control the type of ATM cell used for cell-rate decoupling on the SONET.
sonet overhead	Used to set SONET/SDH overhead bytes.
sonet threshold	Used to set the BER threshold values.

sonet threshold

To set the BER threshold values, use the **sonet threshold** interface configuration command. To disable the threshold values, use the **no** form of this command.

sonet threshold {**sd-ber** | **sf-ber** | **b1-tca** | **b2-tca** | **b3-tca**} *ber*

no sonet threshold {**sd-ber** | **sf-ber** | **b1-tca** | **b2-tca** | **b3-tca**}

Syntax Description

sd-ber	Sets signal degrade BER threshold and displays any signal degradation.
sf-ber	Sets signal fail BER threshold and displays any signal failure.
bl-tca	Sets b1 (selection error) BER threshold crossing alarm. This alarm indicates trouble at the section layer of the SONET infrastructure; SONET circuits need to be checked out.
b2-tca	Sets b2 (line error) BER threshold crossing alarm. This alarm indicates trouble at the Line/Multiplexer layer of the SONET infrastructure; SONET network elements in this circuit need to be checked out.
b3-tca	Sets b3 (path BIP error) BER threshold crossing alarm. This alarm indicates trouble at the path layer (end to end) of the SONET infrastructure; SONET network elements in this circut need to be checked out.
ber	Specifies BER in the range of 3 to 9 (10 to minus *n*).

Defaults

For BER thresholds: **sf** = 10e-3, **sd** = 10e-6
For TCA thresholds: **b1** = 10e-6, **b2** = 10e-6, **b3** = 10e-6

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

This command sets or changes the BER and threshold crossing alarms. Any errors in B1 automatically results in B2 (line) and B3 (path) errors.

Note This command is only supported on systems with OC-12 or OC-48c interface modules.

Examples

The following example sets the b3-tca BER threshold crossing alarm to 10.

```
Switch(config-if)# sonet threshold b3-tca 3
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.
sonet	Used to set the mode of operation and control the type of ATM cell used for cell-rate decoupling on the SONET.
sonet overhead	Used to set SONET/SDH overhead bytes.
sonet report	Enables the reporting of selected alarms.

sonet tx-ais on-rx-defect

Use the **sonet tx-ais on-rx-defect** command to enable a SONET interface to send an alarm indication signal (AIS) if it detects the receive port has failed. To disable AIS, use the **no** form of this command.

sonet tx-ais on-rx-defect

no sonet tx-ais on-rx-defect

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

The **sonet tx-ais on-rx-defect** command should not be enabled on both ATM switch router interfaces connected to the same physical line. Even if no alarm exists, both interfaces will see the alarms signals and never come up.

Examples

The following example enables AIS on an ATM interface.

```
Switch# configure terminal
Switch(config)# interface atm 3/0/0
Switch(config-if)# sonet tx-ais on-rx-defect
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.

statistics

To turn on the PNNI statistics feature, use the **statistics** ATM router PNNI configuration command. To disable this feature, use the **no** form of this command.

statistics {**call**}

no statistics {**call**}

Syntax Description

call	Specifies statistics related to route computation for call and party setups.

Defaults

Disabled

Command Modes

ATM router PNNI configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following script shows how to access the **statistics** ATM router PNNI configuration command.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# statistics call
```

Related Commands

Command	Description
show atm pnni statistics call	Used to display PNNI statistics.

status

To configure the status of this filter table entry, use the **status** ATM signalling diagnostics configuration command. To disable this feature, use the **no** form of this command.

status [**active | inactive | delete**]

no status [**active | inactive | delete**]

Syntax Description

active	Sets status to active to begin filtering failed connections.
inactive	Sets status to inactive to stop filtering failed connections.
delete	Sets status to delete if the signalling diagnostics filter table entry needs to be deleted.

Defaults

Inactive

Command Modes

ATM signalling diagnostics configuration

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Examples

The following script shows how to access the **status** command.

```
Switch# configure terminal
Switch(config)# status active
```

summary-address

To configure summary address prefixes on a PNNI node, use the **summary-address** node-level subcommand. To remove configured summary address prefixes, use the **no** form of this command.

summary-address *address-prefix* [**internal | exterior**] [**suppress**]

no summary-address *address-prefix* [**internal | exterior**]

Syntax Description

address-prefix	Specifies the summary address prefix. The maximum length of the address prefix is 19 bytes. Each character in the prefix is 4 bits. The length of the prefix must fall on a nibble boundary. In other words, the length of the prefix must be a multiple of 4 bits.
internal	Specifies local knowledge of reachability, including end-system addresses registered via ILMI address registration.
exterior	Specifies knowledge of reachability through remote networks or derived from other protocol exchanges outside the PNNI routing domain.
suppress	Indicates that neither the summary address nor any addresses for which the summary address is the longest matching prefix are advertised.

Defaults

Default summary addresses are controlled by the **auto-summary** command.

The default summary address type is **internal**.

Command Modes

PNNI node configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Summary addresses can be used to decrease the amount of information advertised by this PNNI node. Summary addresses should only be configured when all end-system addresses matching the summary address are reachable from this switch (for example, not reachable through PNNI interfaces to other switches).

Summary addresses of type internal only summarize internal addresses reachable from this switch (such as ILMI-registered addresses and internal static routes). Summary addresses of type exterior only summarize exterior addresses reachable from this switch (for example, exterior static routes on IISP or public UNI interfaces).

Suppressed summary addresses can be used to prevent other PNNI nodes from learning of switch connectivity to certain addresses (for example, for back doors).

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following script shows how to access the **summary-address** node-level subcommand.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)# summary-address 48.91...
```

Related Commands

Command	Description
atm route	Specifies a static route to a reachable address prefix.
auto-summary	Allows default summary addresses to be generated based on the switch's ATM address.
show atm route	Used to display all local or network-wide reachable address prefixes in this switch's ATM routing table.

sync config (Catalyst 8540 MSR)

To synchronize the configuration between the primary and secondary route processors based on the primary configuration, use the **sync config** main CPU redundancy command. To disable the synchronization, use the **no** form of this command.

sync config {**startup** | **running** | **both**}

no sync config {**startup** | **running** | **both**}

Syntax Description

startup	Synchronizes the startup configuration.
running	Synchronizes the running configuration.
both	Synchronizes the startup and running configurations.

Defaults

both

Command Modes

Main CPU redundancy

Command History

Release	Modification
12.0(3c)W5(9)	New command

Examples

The following example synchronizes the startup configuration of the primary and secondary route processors.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-r)# main-cpu
Switch(config-r-mc)# sync config startup
```

Related Commands

Command	Description
show functional-image-info	Displays information about the in-system programmable device images (FPGA and PLD images) for a given module in the system.

CHAPTER 18

Show Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

show access-lists

To display information about the access list, use the **show access-lists** EXEC command.

show access-lists [*aclnumber* | *aclname*]

Syntax Description

aclnumber	Number from 1 through 1299 that identifies the access list.
aclname	Character string that identifies the access list.

Defaults

The system displays all access lists.

Command Modes

EXEC

Command History

Release	Modification
11.3.(3a)	New command

Examples

The following example is sample output from the **show access-lists** command when access list 101 is specified.

```
Switch# show access-lists 101
Extended IP access list 101
    permit tcp host 198.92.32.130 any established (4304 matches)
    permit udp host 198.92.32.130 any eq domain (129 matches)
    permit icmp host 198.92.32.130 any
    permit tcp host 198.92.32.130 host 171.69.2.141 gt 1023
    permit tcp host 198.92.32.130 host 171.69.2.135 eq smtp (2 matches)
    permit tcp host 198.92.32.130 host 198.92.30.32 eq smtp
    permit tcp host 198.92.32.130 host 171.69.108.33 eq smtp
    permit udp host 198.92.32.130 host 171.68.225.190 eq syslog
    permit udp host 198.92.32.130 host 171.68.225.126 eq syslog
    deny   ip 150.136.0.0 0.0.255.255 224.0.0.0 15.255.255.255
    deny   ip 171.68.0.0 0.1.255.255 224.0.0.0 15.255.255.255 (2 matches)
    deny   ip 172.24.24.0 0.0.1.255 224.0.0.0 15.255.255.255
    deny   ip 192.82.152.0 0.0.0.255 224.0.0.0 15.255.255.255
    deny   ip 192.122.173.0 0.0.0.255 224.0.0.0 15.255.255.255
    deny   ip 192.122.174.0 0.0.0.255 224.0.0.0 15.255.255.255
    deny   ip 192.135.239.0 0.0.0.255 224.0.0.0 15.255.255.255
    deny   ip 192.135.240.0 0.0.7.255 224.0.0.0 15.255.255.255
    deny   ip 192.135.248.0 0.0.3.255 224.0.0.0 15.255.255.255
    deny   ip 192.150.42.0 0.0.0.255 224.0.0.0 15.255.255.255
```

An access list counter counts how many packets are allowed by each line of the access list. This number is displayed as the number of matches.

For information on how to configure access lists, refer to the *ATM Switch Router Software Configuration Guide*.

Related Commands

Command	Description
access-list (extended)	Used to define an extended IP access list. Currently, this command only supports the IP host.
access-list (standard)	Cisco IOS command removed from this manual. See Appendix D.
clear access-list counters	Cisco IOS command removed from this manual. See Appendix D.
clear access-template	Cisco IOS command removed from this manual. See Appendix D.

show accounting

To step through all active sessions and to print all the accounting records for actively accounted functions, use the **show accounting** EXEC command. To disable this function, use the **no** form of the command.

show accounting

no show accounting

Syntax Description

This command has no keywords or arguments.

Defaults

Disabled

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

The **show accounting** command allows you to display the active accountable events on the system. It provides systems administrators with a quick look at what is going on, and can also help collect information in the event of a data loss on the accounting server. The **show accounting** command displays additional data on the internal state of AAA if **debug aaa accounting** is turned on.

Examples

The following example is sample output from the **show accounting** command.

```
Switch# show accounting
Active Accounted actions on tty0, User chard Priv 1
 Task ID 4425, EXEC Accounting record, 0:04:53 Elapsed
 task_id=4425 service=exec port=0
 Task ID 3759, Connection Accounting record, 0:01:06 Elapsed
 task_id=3759 service=exec port=0 protocol=telnet address=171.19.3.78 cmd=grill
Active Accounted actions on tty10, User chard Priv 1
 Task ID 5115, EXEC Accounting record, 0:04:07 Elapsed
 task_id=5115 service=exec port=10
 Task ID 2593, Connection Accounting record, 0:00:56 Elapsed
 task_id=2593 service=exec port=10 protocol=tn3270 address=172.21.14.90
cmd=tn snap
Active Accounted actions on tty11, User mary Priv 1
 Task ID 7390, EXEC Accounting record, 0:00:25 Elapsed
 task_id=7390 service=exec port=11
 Task ID 931, Connection Accounting record, 0:00:20 Elapsed
 task_id=931 service=exec port=11 protocol=telnet address=171.19.6.129 cmd=coal
```

Related Commands

Command	Description
show hosts	Displays the default domain name, the style of the name lookup service, a list of name server hosts, and the cached list of host names and addresses.
show line	Displays terminal line parameters.

show aliases

To display all alias commands or the alias commands in a specified mode, use the **show aliases** EXEC command.

show aliases [*mode*]

Syntax Description

mode	Command mode. You can show the alias commands for the following modes by entering the corresponding **keywords**. • **acctng-file**—ATM accounting file configuration mode • **acctng-sel**—ATM accounting selection configuration mode • **atm-router**—ATM router configuration mode • **atmsig-cug**—Closed user group configuration mode • **atmsig-diag**—Diagnostics configuration mode • **atmsig_e164_table_mode**—ATMSIG E164 table mode • **configure**—Global configuration mode • **exec**—EXEC mode • **interface**—Interface configuration mode • **lane**—ATM LAN Emulation LECS configuration table mode • **line**—Line configuration mode • **map-class**—Map-class configuration mode • **map-list**—Map-list configuration mode • **null-interface**—Null interface configuration mode • **pnni-router-node**—PNNI router node configuration mode • **route-map**—Route map configuration mode • **router**—Router configuration mode • **subinterface**—Subinterface configuration mode

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

All modes except for the null interface mode have their own prompts. For example, the prompt for interface configuration mode is:

```
Switch(config-if)#
```

Examples

The following example is sample output from the **show aliases exec** commands. The default aliases for commands in EXEC mode are displayed.

```
Switch# show aliases exec

Exec mode aliases:
  h                    help
  lo                   logout
  p                    ping
  r                    resume
  s                    show
  w                    where
```

Related Commands

Command	Description
alias	This command or some of its parameters might not function as expected. Refer to Appendix D. Refer also to the *Router Products Command Reference* publication for more information about the **alias** command.

show arp

To display the entries in the ARP table, use the **show arp** EXEC command.

show arp

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example is sample output from the **show arp** command.

```
Switch# show arp
Protocol Address Age (min) Hardware Addr Type nterface
Internet 172.20.42.112 120 0000.a710.4baf ARPAEthernet3
AppleTalk 4028.5 29 0000.0c01.0e56SNAP Ethernet2
Internet 172.20.42.114 105 0000.a710.859b ARPAEthernet3
AppleTalk 4028.9 - 0000.0c02.a03cSNAP Ethernet2
Internet 172.20.42.121 42 0000.a710.68cd ARPAEthernet3
Internet 172.20.36.9 - 0000.3080.6fd4SNAP TokenRing0
AppleTalk 4036.9 - 0000.3080.6fd4SNAP TokenRing0
Internet 172.20.33.9 - c222.2222.2222SMDS Serial0
```

Table 18-1 describes the significant fields shown in the first line of output in the display.

Table 18-1 show arp Field Descriptions

Field	Description
Protocol	Type of network address this entry includes.
Address	Network address that is mapped to the MAC address in this entry.
Age (min)	Interval (in minutes) since this entry was entered in the table, rather than the interval since the entry was last used. (The timeout value is 4 hours.)
Hardware Addr	MAC address mapped to the network address in this entry.
Type	Encapsulation type used for the network address in this entry. Possible values include: • ARPA • SNAP • ETLK (EtherTalk) • SMDS (Interface) Interface associated with this network address.

Related Commands

Command	Description
arp (interface)	Controls the interface-specific handling of IP address resolution into 48-bit Ethernet.

show async bootp

To display the extended BOOTP request parameters that were configured for asynchronous interfaces, use the **show async bootp** EXEC command.

show async bootp

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following is a sample output of the **show async bootp** command.

```
Switch# show async bootp

The following extended data will be sent in BOOTP responses:

bootfile (for address 128.128.1.1) "pcboot"
bootfile (for address 131.108.1.111) "dirtboot"
subnet-mask 255.255.0.0
time-offset -3600
time-server 128.128.1.1
```

If no extended data is defined, you receive the following response.

```
No extended data will be sent in BOOTP responses:
```

Table 18-2 describes the significant fields shown in the display.

Table 18-2 show async bootp Field Descriptions

Field	Description
bootfile... “pcboot”	Boot file for address 128.128.1.1 is named pcboot.
subnet-mask 255.255.0.0	Subnet mask.
time-offset -3600	Local time is one hour (3600 seconds) earlier than UTC time.
time-server 128.128.1.1	Address of the time server for the network.

Related Commands

Command	Description
async-bootp	Cisco IOS command removed from this manual.

show async status (Catalyst 8510 MSR and LightStream 1010)

To list the status of the asynchronous interface 1 associated with the auxiliary port, use the **show async status** user EXEC command.

show async status

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

Shows all SLIP asynchronous sessions.

Examples

The following example is sample output from the **show async status** command.

```
Switch# show async status

Async protocol statistics:
  Rcvd: 5448 packets, 7682760 bytes
        1 format errors, 0 checksum errors, 0 overrun, 0 no buffer
  Sent: 5455 packets, 7682676 bytes, 0 dropped

Int           Local          Remote Qd InPack OutPac Inerr  Drops  MTU Qsz
   1     192.31.7.84         Dynamic  0      0      0     0      0 1500  10
```

Table 18-3 describes the significant fields shown in the display.

Table 18-3 show async status Field Descriptions

Field	Description
Rcvd:	Statistics on packets received.
5548 packets	Packets received.
7682760 bytes	Total number of bytes.
1 format errors	Packets with a bad IP header, even before the checksum is calculated.
0 checksum errors	Count of checksum errors.
0 overrun	Number of giants received.
0 no buffer	Number of packets received when no buffer was available.
Sent:	Statistics on packets sent.
5455 packets	Packets sent.

Table 18-3 show async status Field Descriptions (continued)

Field	Description
7682676 bytes	Total number of bytes.
0 dropped	Number of packets dropped.
Int	Interface number.
*	Line currently in use.
Local	Local IP address on the link.
Remote	Remote IP address on the link. “Dynamic” indicates that a remote address is allowed but has not been specified. “None” indicates that no remote address is assigned or being used.
Qd	Number of packets on hold queue (Qsz is max).
InPack	Number of packets received.
OutPac	Number of packets sent.
Inerr	Number of total input errors; sum of format errors, checksum errors, overruns, and no buffers.
Drops	Number of packets received that would not fit on the hold queue.
MTU	Current maximum transmission unit size.
Qsz	Current output hold queue size.

Related Commands

Command	Description
slip	Used to attach or detach a SLIP interface.

show atm accounting

To show the ATM accounting configuration information, use the **show atm accounting** EXEC command.

show atm accounting

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

Catalyst 8540 MSR

The following example is sample output from the **show atm accounting** EXEC command for a switch router that has remote logging configured.

```
Switch# show atm accounting
ATM Accounting Info:     AdminStatus - UP; OperStatus : UP
Trap Threshold - 90 percent (4500000 bytes)
Interfaces:
     AT1/0/0
     AT2/0/0
File Entry 1 -
     Name: acctng_file1
     Descr: atm accounting data
     Min-age (seconds): 0
     Failed_attempt : soft regular
     Interval (seconds) : 60
     Collect Mode : on-release periodic
     Sizes: Active 68 bytes (#records 0); Ready 74 bytes (#records 0)
     Remote Log and local storage are enabled.
     Primary Log Host: eagle, TCP listen port: 2001, OperStatus: DOWN
     Alternate Log Host: eagle, TCP listen port: 2002, OperStatus: DOWN
Selection Entry 1 -
     Subtree OID : 1.3.6.1.4.1.9.10.18.1.1
     List Bitmap : FF.FE.BF.FC
     Conn Type : svc-in svc-out pvc pvp spvc-originator spvc-target
   Active List Bitmap - FF.FE.BF.FC
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example is sample output from the **show atm accounting** EXEC command.

```
Switch# show atm accounting
ATM Accounting Info:     AdminStatus - DOWN;    OperStatus : DOWN
Trap Threshold - 90 percent (4500000 bytes)
Interfaces:
File Entry 1: Name acctng_file1
    Descr: atm accounting data
    Min-age (seconds): 3600
    Failed_attempt : 0xC0
    Interval (seconds) : 3600
    Collect Mode : 0x80
No file buffers initialized
selection Entry -
    Selection entry 1, subtree OID - 1.3.6.1.4.1.9.10.18.1.1
    Selection entry 1, list bitmap - FF.FE.BF.FC
    Selection entry 1, connType bitmap - F0.00
Active selection -
    Selection entry 1, subtree OID - 1.3.6.1.4.1.9.10.18.1.1
    Selection entry 1, list bitmap - FF.FE.BF.FC
    Selection entry 1, connType bitmap - F0.00
Debug output:
Active Connection/Leg/Party counters
src_legparties (0), dest_legs (0), dest_parties (0)
Sig API: Err - 0
New_Conn: OK - 0; Err - 0
Rel_Conn: OK - 0; Err - 0
New_Leg: OK - 0; Err - 0
Rel_Leg: OK - 0; Err - 0
New_Party: OK - 0; Err - 0
Rel_Party: OK - 0; Err - 0
Switch#
```

Related Commands

Command	Description
atm accounting collection	Controls the collection of ATM accounting data into a specific file.

show atm addresses

To display the active ATM addresses on a switch router, use the **show atm addresses** EXEC command.

show atm addresses

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

The first switch router address is displayed with the word “active” to indicate the current address of the switch router. The output also includes automatically generated soft VC addresses, switch refix(es) used by ILMI, configured interface-specific ILMI prefixes, and the configured LECS addresses.

Examples

The following example is sample output from the **show atm addresses** command.

```
Switch# show atm addresses

Switch Address(es):
  47.00918100000000000CA79E01.00000CA79E01.00 active
  88.888888880000000000000000.000000005151.00

Soft VC Address(es):
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.8000.00 ATM3/0/0
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.8010.00 ATM3/0/1
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.8020.00 ATM3/0/2
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.8030.00 ATM3/0/3
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9000.00 ATM3/1/0
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9010.00 ATM3/1/1
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9020.00 ATM3/1/2
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9030.00 ATM3/1/3

ILMI Switch Prefix(es):
  47.0091.8100.0000.0000.0ca7.9e01
  88.8888.8888.0000.0000.0000.0000

ILMI Configured Interface Prefix(es):

LECS Address(es):
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9030.01
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9030.02
```

Related Commands

Command	Description
atm address	Used to assign a 20-byte ATM address to the switch router.

show atm arp-server

To display the ATM ARP server table, use the **show atm arp-server** command.

show atm arp-server atm *card/subcard/port*[**.***subinterface*]

Syntax Description

card/subcard/port	Specifies the card, subcard, and port numbers for the ATM interface.
subinterface	Specifies the number for the subinterface.

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

The command only applies to the CPU interface. Use this command to see the ARP server configured on the subinterface CPU.

Related Commands

Command	Description
atm aesa gateway	Used to configure an AESA gateway address on an ATM switch router interface that connects to a service provider maintaining a separate ATM addressing plan.

show atm connection-traffic-table

To display a table of connection traffic parameters used by network and connection management, use the **show atm connection-traffic-table** EXEC command.

show atm connection-traffic-table [**row** *row-index* | **from-row** *row-index*]

Syntax Description

row	Displays a single row by the *row-index* number.
from-row	Display the entire connection traffic table starting with the *row-index*.
row-index	Index of the single or starting row, in the range of 1 through 2147483647.

Defaults

Display the entire connection traffic table.

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

An asterisk (*) is appended to row indexes created by SNMP but not made active. Because these rows are not active, they cannot be used by connections.

Examples

The following example is sample output from the **show atm connection-traffic-table** command.

```
Switch# show atm connection-traffic-table
Row      Service-category    pcr        scr/mcr       mbs         cdvt
1            ubr           7113539        none                     none
2            cbr              424                                 none
3            vbr-rt           424          424          50         none
4            vbr-nrt          424          424          50         none
5            abr              424         none                     none
6            ubr              424         none                     none
64000        cbr             1741                                 none
2147483645*  ubr                0         none                     none
2147483646*  ubr                1         none                     none
2147483647*  ubr           7113539        none                     none
```

Table 18-4 describes the fields shown in the display.

Table 18-4 show atm connection-traffic-table Field Descriptions

Field	Description
Row	Index to the connection traffic table.
Service-category	One of the following: **ubr** **cbr** **vbr-rt** **vbr-nrt** **abr**
pcr	The value of the peak cell rate. The peak cell rate is measured in kbps, and is used to transmit whole cells, including the header.
scr/mcr	The value of the sustained cell rate/maximum cell rate. These values are measured in kbps, and are used to transmit whole cells, including the header.
mbs	The value of the MBS.
cdvt	The value of the cell delay variation tolerance.

Related Commands

Command	Description
atm connection-traffic-table -row	Used to create a table entry.

show atm filter-expr

To display a specific ATM filter expression or a summary ATM filter expression, use the **show atm filter-expr** EXEC command.

show atm filter-expr *name* [**detail**]

Syntax Description

name	Name of the ATM filter expression.
detail	Displays more detailed information; must be the last keyword of the command.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following displays assume filter expressions were defined using the commands shown in the example. The names *fred*, *barney*, *wilma*, and *betty* are all filter sets.

```
Switch# atm filter-expr MEN fred or barney
Switch# atm filter-expr WOMEN wilma or betty
Switch# atm filter-expr ADULTS MEN or WOMEN
```

The **show atm filter-expr** command produces the following output.

```
Switch# show atm filter-expr
MEN = fred or barney
WOMEN = wilma or betty
ADULTS = men or women
```

The **show atm filter-expr** detail command produces the following output.

```
Switch# show atm filter-expr detail
MEN = fred or barney
WOMEN = wilma or betty
ADULTS = (fred or barney) or (wilma or betty)
```

Related Commands

Command	Description
atm filter-expr	Configures an ATM address filter that matches patterns.

show atm filter-set

To display a specific ATM filter set or a summary ATM filter set, use the **show atm filter-set** EXEC command.

show atm filter-set *name*

Syntax Description

name	Name of the ATM filter set.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following display assumes the filter sets were defined with the commands shown in the example.

```
Switch# atm filter-set US-OR-NORDUNET 47.0005...
Switch# atm filter-set US-OR-NORDUNET 47.0023...
Switch# atm filter-set LOCAL 49.0003...
```

The following is a sample output from the **show atm filter-set** command.

```
Switch# show atm filter-set
ATM filter set US-OR-NORDUNET
permit 47.0005...
permit 47.0023...
ATM filter set LOCAL
permit 49.0003...
```

Related Commands

Command	Description
atm filter-set	Creates an ATM address filter set.

show atm ilmi-configuration

To display the switch router configuration, use the **show atm ilmi-configuration** EXEC command.

show atm ilmi-configuration

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Displays the information and status about the switch configuration.

Examples

The following example is sample output of the **show atm ilmi-configuration** command.

```
Switch# show atm ilmi-configuration

Switch ATM Address (s):
112233445566778899011223344556677889900 0
LECS Address (s):
11223344556677889900112233445566778899000
```

Table 18-5 describes the fields shown in the display.

Table 18-5 show atm ilmi-configuration Field Descriptions

Field	Description
Switch ATM Address	Displays the current switch router address for the ATM interface.
LECS Address	Displays the current LECS address for the ATM interface.

Related Commands

Command	Description
atm ilmi-enable	Enables the ILMI on a port.

show atm ilmi-status

To display the ILMI-related status information, use the **show atm ilmi-status** EXEC command.

show atm ilmi-status atm *card/subcard/port*

Syntax Description

card/subcard/port	Specifies the card, subcard, and port number for the ATM interface.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output of the **show atm ilmi-status atm** command.

```
Switch# show atm ilmi-status atm 0/1/2

Interface : ATM0/1/2 Interface Type : Private NNI
ILMI VCC : (0, 16) ILMI Keepalive : Disabled
ILMI State:       UpAndNormal
Peer IP Addr:     172.20.41.93    Peer IF Name:     ATM1/0/3
Peer MaxVPIbits:  8               Peer MaxVCIbits:  14
Peer MaxVPCs:     255             Peer MaxVCCs:     16383
Peer MaxSvccVpi:  255
Peer MinSvccVci:  255
Peer MaxSvpcVpi:  33
Configured Prefix(s) :
47.0091.8100.0000.0040.0b0a.2a81
```

Table 18-6 describes the fields shown in the display.

Table 18-6 show atm ilmi-status Field Descriptions

Field	Description
Interface	Displays the card, subcard, and port number of the specified ATM interface.
Interface Type	Displays the type of interface for the specified ATM interface.
ILMI VCC	Displays the number of the current ILMI VCC for the specified ATM interface.
ILMI Keepalive	Displays the status of ILMI keepalive packets.
ILMI State	Displays the status for the ILMI for the specified ATM interface.
Peer IP Addr	Displays the IP address of the peer.
Peer IF Name	Displays the card, subcard, and port of the peer interface.
Peer MaxVPIbits	Displays maximum number of bits allowed for VPIs on the peer interface.
Peer MaxVCIbits	Displays maximum number of bits allowed for VCIs on the peer interface.
Peer MaxVPCs	Displays the maximum number of switched and permanent VPCs supported on the peer IME ATM interface.

Table 18-6 show atm ilmi-status Field Descriptions (continued)

Field	Description
Peer MaxVCCs	Displays the maximum number of switched and permanent VCCs supported on the peer IME ATM interface.
Peer MaxSvpcVpi	Displays the maximum VPI that the signalling stack on the peer IME ATM interface is configured to support for allocation to SVPCs.
Peer MaxSvccVpi	Displays the maximum VPI that the signalling stack on the peer IME ATM interface is configured to support allocation to SVPCs.
Peer MinSvccVci	Displays the minimum VCI value that the signalling stack on the peer IME ATM interface is configured to support for allocation to SVCCs. The same value applies to all SVCC VPI values for which the signalling stack is configured.
Configured Prefix	Displays any prefix for the ATM interface.

Related Commands

Command	Description
atm ilmi-enable	Enables the ILMI on a port.

show atm interface

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

show atm interface {**atm** | **atm-p**}[*card*/*subcard*/*port*[**.***vpt#*] | [*card*/*subcard*/*imagroup*]] [**bitmap** | **status** | **traffic**]

Syntax Description

atm	Specifies an ATM interface.
atm-p	Specifies an ATM-P interface.
card/subcard/port	Specifies the card, subcard, and port number for the ATM or ATM-P interface.
.*vpt#*	Specifies the virtual path tunnel number.
ima*group*	Specifies the IMA interface group number (0 to 3).
bitmap	Displays the ATM interface bitmap.
status	Displays the ATM interface status.
traffic	Displays the ATM interface cell traffic.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

If you do not specify a specific interface, all interfaces on the switch are displayed.

Examples

The following example is sample output from the **show atm interface** command for ATM interface 3/0/0.

```
Switch# show atm interface atm 3/0/0
Interface:      ATM3/0/0        Port-type:      t1suni
IF Status:      UP              Admin Status:   up
Auto-config:    enabled         AutoCfgState:   completed
IF-Side:        Network         IF-type:        NNI
Uni-type:       not applicable  Uni-version:    not applicable
Max-VPI-bits:   8               Max-VCI-bits:   14
Max-VP:         255             Max-VC:         16383
ConfMaxSvpcVpi: 255             CurrMaxSvpcVpi: 255
ConfMaxSvccVpi: 255             CurrMaxSvccVpi: 255
ConfMinSvccVci: 35              CurrMinSvccVci: 35
Svc Upc Intent: pass            Signalling:     Enabled
```

```
ATM Address for Soft VC: 47.0091.8100.0000.0040.0b0a.2a81.4000.0c81.8000.00
Configured virtual links:
  PVCLs SoftVCLs   SVCLs   TVCLs   PVPLs SoftVPLs   SVPLs Total-Cfgd Inst-Conns
      4        0       0       0       0        0       0           4          4
Logical ports(VP-tunnels):     0
Input cells:    14587           Output cells:   14638
5 minute input rate:             0 bits/sec,       0 cells/sec
5 minute output rate:            0 bits/sec,       0 cells/sec
Input AAL5 pkts: 95092, Output AAL5 pkts: 95109, AAL5 crc errors: 0
```

Table 18-7 describes the fields shown in the display.

Table 18-7 show atm interface Field Descriptions

Field	Description
Interface	Displays the card number, subcard number, port number, and VP tunnel number of the interface.
Port-type	Displays the type of port for the specified ATM interface.
IF status	Displays the operational status of the specified ATM interface.
Admin status	Displays the administrative status of the specified ATM interface.
Auto-config	Displays whether ILMI autoconfiguration is enabled or disabled.
AutoCfgState	Displays the state of ILMI autoconfiguration for the specified ATM interface.
IF-side	Displays the interface side for the specified ATM interface.
IF-type	Displays the type of ATM interface (UNI, NNI, or IISP).
Uni-type	Displays whether a UNI interface type is public or private.
Uni-version	Displays the version of a UNI.
Max-VPI-bits	Displays the maximum number of VPI bits.
Max-VCI-bits	Displays the maximum number of VCI bits.
Max-VP	Displays the maximum number of virtual paths on the specified ATM interface.
Max-VC	Displays the maximum number of virtual channels on the specified ATM interface.
ConfMaxSvpcVpi	Displays the maximum VPI that the signalling stack on the ATM interface is configured to support for allocation to SVPCs.
CurrMaxSvpcVpi	Displays the maximum VPI that the signalling stack on the ATM interface currently supports for allocation to SVPCs.
ConfMaxSvccVpi	Displays the maximum VPI that the signalling stack on the ATM interface is configured to support for allocation to SVCCs.
CurrMaxSvccVpi	Displays the maximum VPI that the signalling stack on the ATM interface currently supports for allocation to SVCCs.
ConfMinSvccVci	Displays the minimum VCI value that the signalling stack is configured to support for allocation to SVCCs.
CurrMinSvccVci	Displays the minimum VCI value that the signalling stack currently supports for allocation to SVCCs.
Svc Upc Intent	Displays the intended UPC mode to use for SVCs on the interface.

Table 18-7 show atm interface Field Descriptions (continued)

Field	Description
Signalling	Displays whether ILMI signalling is enabled.
PVCLs	Displays the number of active PVCs for the specified ATM interface.
PVPLs	Displays the number of active PVPs for the specified ATM interface.
SoftVCLs	Displays the number of active soft VCLs for the specified ATM interface.
SVCLs	Displays the number of active switched VCLs for the specified ATM interface.
SoftVPLs	Displays the number of active soft VPLs for the specified ATM interface.
SVPLs	Displays the number of active switched VPLs for the specified ATM interface.
Total-Cfgd	Displays the total number of configured virtual links.
Inst-Conns	Displays the number of installed connections for the specified ATM interface.
Input cells	Displays the number of cells received.
Logical ports (VP-tunnels)	Displays the number of the logical (subinterface) port.
Output cells	Displays the number of cells sent.
5 minute input rate	Displays the total number of cells received in 5 minutes, measured in bits per second and cells per second.
5 minute output rate	Displays the total number of cells sent in 5 minutes, measured in bits per second and cells per second.
Input, output, and CRC errors	Displays the number of AAL5 packets that were input, output, and had CRC errors for the specified ATM interface.

The following is sample output from the **show atm interface** command for the subinterface.

```
Switch# show atm interface atm 0/1/0.2

Interface:ATM0/1/0.2Port-type:vp tunnel
IF Status:UPAdmin Status:up
Auto-config:enabledAutoConfigState:waiting for response from peer
IF-SideNetworkInterface-type:UNI
Uni-type:PrivateUni-version:V3.1
Max-VPI-bits:0Max-VCI-bits:10
Max-VP:0Max-VC:16383
ConfMaxSvpcVpi: 255             CurrMaxSvpcVpi: 255
ConfMaxSvccVpi: 255             CurrMaxSvccVpi: 255
ConfMinSvccVci: 33              CurrMinSvccVci: 33
Signalling:     Enabled
ATM Address for Soft VC: 47.0091.8100.0000.0041.0b0a.1581.4000.0c80.1000.02
Configured virtual links:
  PVCLs   SoftVCLs   SVCLs   Total-Cfgd   Installed-Conns
      4          0       0             4                 4
```

Examples

The following is sample output from the **show atm interface** command for an IMA group.

```
Switch# show atm interface atm 0/0/ima1

Interface:      ATM0/0/ima1     Port-type:      imapam_t1_ima
IF Status:      UP              Admin Status:   up
Auto-config:    enabled         AutoCfgState:   completed
IF-Side:        Network         IF-type:        NNI
Uni-type:       not applicable  Uni-version:    not applicable
Max-VPI-bits:   8               Max-VCI-bits:   14
Max-VP:         255             Max-VC:         16383
ConfMaxSvpcVpi: 255             CurrMaxSvpcVpi: 255
ConfMaxSvccVpi: 255             CurrMaxSvccVpi: 255
ConfMinSvccVci: 35              CurrMinSvccVci: 35
Svc Upc Intent: pass            Signalling:     Enabled
ATM Address for Soft VC: 47.0091.8100.0000.0040.0b0a.2a81.4000.0c80.0090.00
Configured virtual links:
  PVCLs SoftVCLs   SVCLs   TVCLs   PVPLs SoftVPLs   SVPLs Total-Cfgd Inst-Conns
      3        0       0       0       0        0       0          3          3
Logical ports(VP-tunnels):     0
Input cells:    14806           Output cells:   14730
5 minute input rate:             0 bits/sec,       0 cells/sec
5 minute output rate:            0 bits/sec,       0 cells/sec
Input AAL5 pkts: 95217, Output AAL5 pkts: 95193, AAL5 crc errors: 0
```

Related Commands

Command	Description
atm pvp	Used to create a PVP.
show ip access-lists	Displays the contents of all current IP access lists.
show atm status	Displays current information about ATM interfaces and the number of installed connections.
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

show atm interface resource

To display resource management interface configuration status and statistics, use the **show atm interface resource** EXEC command.

show atm interface resource {**atm** | **atm-p**}{*card*/*subcard*/*port* | *card*/*subcard*/**ima***group*}] [**accounting**]

Syntax Description

atm	Specifies an ATM interface.
atm-p	Specifies an ATM-P interface.
card/subcard/port	Specifies the card, subcard, and port number for the ATM or ATM-P interface.
ima*group*	Specifies an IMA group number (0 to 3).
accounting	Displays RM interface CAC statistics.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **show atm interface resource** command displays different information depending on the type of interface:

- external physical interface
- subinterface
- CPU interface

Examples

Catalyst 8540 MSR

The following example shows the resource management information displayed by the **show atm interface resource** command for a physical interface with the switch processor feature card installed.

```
Switch# show atm interface resource atm 0/0/1
Resource Management configuration:
Service Classes:
Service Category map: c1 cbr, c2 vbr-rt, c3 vbr-nrt, c4 abr, c5 ubr
Scheduling: RS c1 WRR c2, WRR c3, WRR c4, WRR c5
WRR Weight: 8 c2, 1 c3, 1 c4, 1 c5
Pacing: disabled   0 Kbps rate configured, 0 Kbps rate installed
overbooking : 300%
Service Categories supported: cbr,vbr-rt,vbr-nrt,abr,ubr
Link Distance: 0 kilometers
Controlled Link sharing:
Max aggregate guaranteed services: 90% Rx,  90% TX
Max bandwidth: none cbr RX, none cbr TX, 35% vbr RX, 35% vbr TX,
none abr RX, none abr TX, none ubr RX, none ubr TX
```

```
Min bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
none abr RX, none abr TX, none ubr RX, none ubr TX
Best effort connection limit: disabled  0 max connections
Max traffic parameters by service (rate in Kbps, tolerance in cell-times):
Peak-cell-rate RX: none cbr, none vbr, none abr, none ubr
Peak-cell-rate TX: none cbr, none vbr, none abr, none ubr
Sustained-cell-rate: none vbr RX, none vbr TX
Minimum-cell-rate RX: none abr, none ubr
Minimum-cell-rate TX: none abr, none ubr
CDVT RX: none cbr, none vbr, none abr, none ubr
CDVT TX: none cbr, none vbr, none abr, none ubr
MBS: none vbr RX, none vbr TX
Resource Management state:
Physical Line Rate (in Kbps) : 155520
Available bit rates (in Kbps):
139967 cbr RX, 139967 cbr TX, 54431 vbr RX, 54431 vbr TX,
139967 abr RX, 139967 abr TX, 139967 ubr RX, 139967 ubr TX
Allocated bit rates:
0 cbr RX, 0 cbr TX, 0 vbr RX, 0 vbr TX,
0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX
Best effort connections: 0 pvcs,  0 svcs
Switch#
```

Examples

Catalyst 8540 MSR

The following example shows the resource management information displayed by the **show atm interface resource** command for OC-48c ports only.

```
Switch# show atm interface resource atm 11/0/0
Resource Management configuration:
    Service Classes:
        Service Category map: c2 cbr, c2 vbr-rt, c3 vbr-nrt, c4 abr,
        Scheduling: RS c1 WRR c2, WRR c3, WRR c4, WRR c5
        WRR Weight: 15 c2, 2 c3, 2 c4, 2 c5
    CAC Configuration to account for Framing Overhead : Disabled
    Pacing: disabled   0 Kbps rate configured, 0 Kbps rate installed
    Service Categories supported: cbr,vbr-rt,vbr-nrt,abr,ubr
    Link Distance: 0 kilometers
    Controlled Link sharing:
        Max aggregate guaranteed services: none RX,  none TX
        Max bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
                       none abr RX, none abr TX, none ubr RX, none ubr TX
        Min bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
                       none abr RX, none abr TX, none ubr RX, none ubr TX
    Best effort connection limit: disabled  0 max connections
    Max traffic parameters by service (rate in Kbps, tolerance in cell-times):
        Peak-cell-rate RX: none cbr, none vbr, none abr, none ubr
        Peak-cell-rate TX: none cbr, none vbr, none abr, none ubr
        Sustained-cell-rate: none vbr RX, none vbr TX
        Minimum-cell-rate RX: none abr, none ubr
        Minimum-cell-rate TX: none abr, none ubr
        CDVT RX: none cbr, none vbr, none abr, none ubr
        CDVT TX: none cbr, none vbr, none abr, none ubr
        MBS: none vbr RX, none vbr TX
Resource Management state:
Scheduler 1:
        Available bit rates (in Kbps):
          590975 cbr TX, 590975 vbr TX, 590975 abr TX, 590975 ubr TX
        Allocated bit rates (in Kbps):
          0 cbr TX, 0 vbr TX, 0 abr TX, 0 ubr TX
Scheduler 2:
        Available bit rates (in Kbps):
```

```
          590975 cbr TX, 590975 vbr TX, 590975 abr TX, 590975 ubr TX
        Allocated bit rates (in Kbps):
          0 cbr TX, 0 vbr TX, 0 abr TX, 0 ubr TX
Scheduler 3:
        Available bit rates (in Kbps):
          590975 cbr TX, 590975 vbr TX, 590975 abr TX, 590975 ubr TX
        Allocated bit rates (in Kbps):
          0 cbr TX, 0 vbr TX, 0 abr TX, 0 ubr TX
Scheduler 4:
        Available bit rates (in Kbps):
          590975 cbr TX, 590975 vbr TX, 590975 abr TX, 590975 ubr TX
        Allocated bit rates (in Kbps):
          0 cbr TX, 0 vbr TX, 0 abr TX, 0 ubr TX
Available bit rates (in Kbps):
        2363903 cbr RX, 2363903 cbr TX, 2363903 vbr RX, 2363903 vbr TX,
        2363903 abr RX, 2363903 abr TX, 2363903 ubr RX, 2363903 ubr TX
    Allocated bit rates:
        0 cbr RX, 0 cbr TX, 0 vbr RX, 0 vbr TX,
        0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX
    Best effort connections: 0 pvcs,  0 svcs
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example shows the resource management information displayed by the **show atm interface resource** command for a physical interface with an FC-PCQ installed.

```
Switch# show atm interface resource atm 1/1/0
Resource Management configuration:
    Service Classes:
        Service Category map: c2 cbr, c2 vbr-rt, c3 vbr-nrt, c4 abr, c5 ubr
        Scheduling: RS c1 WRR c2, WRR c3, WRR c4, WRR c5
        WRR Weight: 15 c2, 2 c3, 2 c4, 2 c5
    CAC Configuration to account for Framing Overhead : Disabled
    Pacing: disabled   0 Kbps rate configured, 0 Kbps rate installed
    Service Categories supported: cbr,vbr-rt,vbr-nrt,abr,ubr
    Link Distance: 0 kilometers
    Controlled Link sharing:
        Max aggregate guaranteed services: none RX,  none TX
        Max bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
                       none abr RX, none abr TX, none ubr RX, none ubr TX
        Min bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
                       none abr RX, none abr TX, none ubr RX, none ubr TX
    Best effort connection limit: disabled  0 max connections
    Max traffic parameters by service (rate in Kbps, tolerance in cell-times):
        Peak-cell-rate RX: none cbr, none vbr, none abr, none ubr
        Peak-cell-rate TX: none cbr, none vbr, none abr, none ubr
        Sustained-cell-rate: none vbr RX, none vbr TX
        Minimum-cell-rate RX: none abr, none ubr
        Minimum-cell-rate TX: none abr, none ubr
        CDVT RX: none cbr, none vbr, none abr, none ubr
        CDVT TX: none cbr, none vbr, none abr, none ubr
        MBS: none vbr RX, none vbr TX
Resource Management state:
    Available bit rates (in Kbps):
        147743 cbr RX, 147743 cbr TX, 147743 vbr RX, 147743 vbr TX,
        147743 abr RX, 147743 abr TX, 147743 ubr RX, 147743 ubr TX
    Allocated bit rates:
        0 cbr RX, 0 cbr TX, 0 vbr RX, 0 vbr TX,
        0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX
    Best effort connections: 1 pvcs,  0 svcs
```

Examples

The following example shows the resource management information displayed by the **show atm interface resource** command with the **accounting** parameter.

```
Switch# show atm interface resource atm 3/1/0 accounting
RCAC result statistics (by request service category):
    cbr:
        0 satisfied, 0 no bandwidth, 0 delay
        0 loss, 0 delay variation, 0 traffic parameter
vbr-rt:
        3 satisfied, 0 unsupported combination, 0 no bandwidth
        0 delay, 0 loss, 0 delay variation
        0 traffic parameter
    vbr-nrt:
        0 satisfied, 0 unsupported combination, 0 no bandwidth
        0 loss, 0 traffic parameter
    abr:
        0 satisfied, 0 traffic parameter, 0 best effort limit
    ubr:
        0 satisfied, 0 traffic parameter, 0 best effort limit
```

The following example shows the resource management information displayed by the **show atm interface resource** command for an IMA interface.

```
Switch# show atm interface resource atm 0/0/ima1
Resource Management configuration:
    Service Classes:
        Service Category map: c2 cbr, c2 vbr-rt, c3 vbr-nrt, c4 abr, c5 ubr
        Scheduling: RS c1 WRR c2, WRR c3, WRR c4, WRR c5
        WRR Weight: 15 c2, 2 c3, 2 c4, 2 c5
    CAC Configuration to account for Framing Overhead : Disabled
    Pacing: disabled   0 Kbps rate configured, 0 Kbps rate installed
    Service Categories supported: cbr,vbr-rt,vbr-nrt,abr,ubr
    Link Distance: 0 kilometers
    Controlled Link sharing:
        Max aggregate guaranteed services: none RX,  none TX
        Max bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
                       none abr RX, none abr TX, none ubr RX, none ubr TX
        Min bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
                       none abr RX, none abr TX, none ubr RX, none ubr TX
    Best effort connection limit: disabled  0 max connections
    Max traffic parameters by service (rate in Kbps, tolerance in cell-times):
        Peak-cell-rate RX: none cbr, none vbr, none abr, none ubr
        Peak-cell-rate TX: none cbr, none vbr, none abr, none ubr
        Sustained-cell-rate: none vbr RX, none vbr TX
        Minimum-cell-rate RX: none abr, none ubr
        Minimum-cell-rate TX: none abr, none ubr
        CDVT RX: none cbr, none vbr, none abr, none ubr
        CDVT TX: none cbr, none vbr, none abr, none ubr
        MBS: none vbr RX, none vbr TX
Resource Management state:
    Available bit rates (in Kbps):
        4340 cbr RX, 4340 cbr TX, 4340 vbr RX, 4340 vbr TX,
        4340 abr RX, 4340 abr TX, 4340 ubr RX, 4340 ubr TX
    Available bit rates for SVCs (in Kbps):
        4340 cbr RX, 4340 cbr TX, 4340 vbr RX, 4340 vbr TX,
        4340 abr RX, 4340 abr TX, 4340 ubr RX, 4340 ubr TX
    Allocated bit rates:
        0 cbr RX, 0 cbr TX, 0 vbr RX, 0 vbr TX,
        0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX
    Best effort connections: 0 pvcs,  0 svcs
```

Table 18-8 describes the field values shown in the previous displays.

Table 18-8 show atm interface resource Management Field Values

Field	Values
Service category map	The service category-to-variable map.
Scheduling	Type of scheduling used by each service category.
WRR Weight	The weighted round-robin weight used by each service category configured for weighted round-robin scheduling.
Pacing	The status of pacing (enabled or disabled) and the rate in kbps.
Link distance	The link distance in kilometers.
Max aggregate guaranteed services	The maximum aggregate guaranteed services bandwidth allocatable to connections, expressed in percent of the bandwidth on the interface in a particular direction.
Max bandwidth	The maximum bandwidth allocatable to connections of a particular service type, expressed in percent of the bandwidth on the interface in a particular direction.
Min bandwidth	The minimum bandwidth allocatable to connections of a particular service type, expressed in percent of the bandwidth on the interface in a particular direction.
Best effort connection limit	The maximum number of best effort connections.
Peak-cell-rate RX	The peak receive cell rate by service category.
Peak-cell-rate TX	The peak transmit cell rate by service category.
Sustained-cell-rate	The sustained cell rate by service category.
Tolerance RX	The receive tolerance (cell delay variation or maximum burst size) by service category.
Tolerance TX	The transmit tolerance (cell delay variation or maximum burst size) by service category.
Available bit rates (in kbps)	The transmit and receive bit rates available by service category in kbps.
Allocated bit rates	The transmit and receive bit rates allocated by service category in kbps.
Best effort connections	The number of PVC and SVC best-effort connections.

Related Commands

Command	Description
atm cac best-effort-limit	Changes or sets the interface limit on the number of best-effort connections.
atm cac framing overhead	Instructs CAC to consider framing overhead.
atm cac link-sharing	Changes the resource management interface controlled link-sharing parameters.
atm cac max-cdvt	Configures the maximum CDVT (per service category and direction) allowed for a connection on an interface by CAC.
atm cac max-mbs	Changes the interface maximum for incoming and outgoing MBS at connection startup.
atm cac max-min-cell-rate	Configures the maximum MCR for ABR and UBR service category traffic flowing into and out of the switch.
atm cac max-peak-cell-rate	Configures the maximum PCR for specific service categories and traffic directions.
atm cac max-sustained-cell-rate	Configures the maximum SCR for traffic flow in either direction.
atm cac overbooking	Configures overbooking on an ATM or IMA interface.
atm cac service-category	Permits or denies a service category on an ATM physical interface, shaped VP tunnel subinterface, or hierarchical VP tunnel subinterface.
atm link-distance	Alters the propagation delay component of the cell-transfer delay offered by an interface.
atm output-queue (Catalyst 8510 MSR and LightStream 1010)	Changes the maximum queue size of the output queue.
atm output-threshold (Catalyst 8510 MSR and LightStream 1010)	Changes the output queue thresholds.
atm pacing	Enables or changes the artificial limitation on interface output rate.

show atm map

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

show atm map

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

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

```
Switch# show atm map
Map list ab: PERMANENT
ip 1.1.1.1 maps to VC 200
```

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

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

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

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

Table 18-9 describes the fields shown in the display.

Table 18-9 show atm map Field Description

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

Related Commands

Command	Description
atm pvc	Used to create a PVC.
map-list	Defines an ATM map statement for either a PVC or SVC.

show atm pnni aesa embedded-number

To show the E.164 AESAs with the E.164 AFI to the left-justified encoding format, use the **show atm pnni aesa embedded-number** privileged EXEC command.

show atm pnni aesa embedded-number

show atm pnni aesa embedded-number *prefix*

Syntax Description

prefix	E.164 AFI portion of the E.164 AESA.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command displays E.164 AESAs with the E.164 AFI to the left-justified encoding format.

Examples

The following example is sample output from the **show atm pnni aesa embedded-number** command, without the prefix specified.

```
Switch# show atm pnni aesa embedded-number
AESA embedded-number is left-justified.
```

The following example is sample output from the **show atm pnni aesa embedded-number** command, with the prefix specified.

```
Switch# show atm pnni aesa embedded-number 45001234
AESA embedded-number is left-justified.
Translating 45.0012.34/32 to
            45.1234/24
```

Related Commands

Command	Description
debug atm pnni	Enables PNNI debugging output.

show atm pnni aggregation link

To show the aggregated PNNI links on the switch, use the **show atm pnni aggregation link** privileged EXEC command.

show atm pnni aggregation link [**local-node** *node-index*] [**aggregation-detail | border-detail**]

Syntax Description

local-node	Specifies the PNNI local node, where higher-level induced links are generated.
node-index	Index number of the PNNI local node, in the range of 1 to 8.
aggregation-detail	Displays the aggregation table with aggregated metrics for the higher-level induced links.
border-detail	Displays the aggregation table with all border uplink metrics.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command displays the aggregation table(s) for PNNI links.

Examples

The following example is sample output from the **show atm pnni aggregation link** command.

```
Switch# show atm pnni aggregation link
PNNI link aggregation for local-node 2 (level=44, name=rhino18.2.44)
  Configured aggregation modes (per service class):
     CBR         VBR-RT       VBR-NRT       ABR           UBR
  ~~~~~~~~~~  ~~~~~~~~~~  ~~~~~~~~~~  ~~~~~~~~~~  ~~~~~~~~~~
  best-link    best-link    best-link    best-link    best-link
  Aggregated outside links from child peer group:
  Upnode Number: 10   Upnode Name: rhino27.2.44
   AggToken  InducPort BorderPort    Border Node(No./Name)
  ~~~~~~~~~~ ~~~~~~~~~ ~~~~~~~~~~~~ ~~~~~~~~~~~~~~~~~~~~
  0          02202000  ATM0/1/2      1 rhino18
  Upnode Number: 11   Upnode Name: Switch.3.32
   AggToken  InducPort BorderPort    Border Node(No./Name)
  ~~~~~~~~~~ ~~~~~~~~~ ~~~~~~~~~~~~ ~~~~~~~~~~~~~~~~~~~~
  0          02CF2000  ATM0/0/2      1 rhino18
  5          02CF2005  ATM0/0/2.4    9 ls1010-1
  8197       02CF22A1  ATM0/0/1      9 ls1010-1
PNNI link aggregation for local-node 3 (level=32, name=rhino18.3.32)
  Configured aggregation modes (per service class):
     CBR         VBR-RT       VBR-NRT       ABR           UBR
  ~~~~~~~~~~  ~~~~~~~~~~  ~~~~~~~~~~  ~~~~~~~~~~  ~~~~~~~~~~
  best-link    best-link    best-link    best-link    best-link
  Aggregated outside links from child peer group:
  Upnode Number: 11   Upnode Name: Switch.3.32
   AggToken  InducPort BorderPort    Border Node(No./Name)
```

```
~~~~~~~~~~ ~~~~~~~~~ ~~~~~~~~~~~~~ ~~~~~~~~~~~~~~~~~~~~~
0          03CF2000  2CF2000       2 rhino18.2.44
5          03CF2005  2CF2005       2 rhino18.2.44
8197       03CF22A1  2CF22A1       2 rhino18.2.44
```

Related Commands

Command	Description
atm pnni aggregation-token	Specifies the aggregation token for a PNNI interface.

show atm pnni aggregation node

To show the PNNI nodal aggregation tables for a complex node, use the **show atm pnni aggregation node** privileged EXEC command.

show atm pnni aggregation node [**local-node** *node-index*] [**border-detail** | **exception-detail** |**port** *hex-port-id* [**port2** *hex-port-id*]]

Syntax Description

local-node	Specifies the complex PNNI local node.
node-index	Index number of the PNNI local node, in the range of 2 to 8.
border-detail	Displays the border path table with path metrics between all pairs of border nodes in the child peer group.
exception-detail	Displays the complex node radius, spokes, and exception bypasses.
port *hex-port id*	Displays the calculated metrics for all spokes and bypasses connected to the specified port. The metrics also display for nonexception spokes or bypasses.
port2 *hex-port id*	Specifies the second port of a port pair and displays the metrics for a single spoke or bypass.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command displays the aggregation table(s) for a complex PNNI local node.

Examples

The following example is sample output from the **show atm pnni aggregation node** command.

```
Switch# show atm pnni aggregation node
PNNI nodal aggregation for local-node 2 (level=56, child PG level=60)
  Complex node representation, exception threshold: 60%

  Configured nodal aggregation modes (per service class):
    CBR          VBR-RT       VBR-NRT      ABR          UBR
  ~~~~~~~~~~~  ~~~~~~~~~~~  ~~~~~~~~~~~  ~~~~~~~~~~~  ~~~~~~~~~~~
  best-link    best-link    best-link    best-link    aggressive

Summary Complex Node Port List:
  Port ID  Rem Inn Agg-Token  Border Cnt In-Spoke  Out-Spoke Agg-Accur
  ~~~~~~~~ ~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~~ ~~~~~~~~~ ~~~~~~~~~ ~~~~~~~~~~
  21FB000  12      0          1          default   default   ok
  2371000  13      0          1          default   default   ok
```

```
Summary Complex Node Bypass Pairs  List (exception bypass pairs only)
  /~~~~~~~~ LOWER PORT ID ~~~~~~~~\ /~~~~~~~~ HIGHER PORT ID ~~~~~~~\
  Port ID  Rem Inn Agg-Token  Inacc Port ID  Rem Inn Agg-Token  Inacc Exceptns
  ~~~~~~~~ ~~~~~~~ ~~~~~~~~~~ ~~~~~ ~~~~~~~~ ~~~~~~~ ~~~~~~~~~~ ~~~~~ ~~~~~~~~
  21FB000  12      0          no    2371000  13      0          no    fwd rev
```

Table 18-10 describes field descriptions for the **show atm pnni aggregation node** command.

Table 18-10 show atm pnni aggregation node Field Descriptions

Field	Description
Port ID = 0	Represents the nucleus.
Agg-Accur	Displays the aggregation accuracy of the aggregated links.
Inacc	Indicates the state of the aggregation accuracy, either yes or no. If the aggregated links are on different border nodes that are distant from one another, it might not be possible to accurately represent their spoke and bypass metrics with a single set of metrics. In this case, they are shown as inaccurate.

Examples

The following example is sample output from the **show atm pnni aggregation node exception-detail** command.

```
Switch# show atm pnni aggregation node exception-detail
PNNI nodal aggregation for local-node 2 (level=56, child PG level=60)
  Complex node representation, exception threshold: 60%

  Metrics for Complex Node Default Radius (input 0x0, output 0x0):
   vp capable
            maxcr    avcr     ctd    cdv   clr0  clr01  aw      crm    vf
   CBR      155519   147743   128    115   10    10     4200    n/a    n/a
   VBR-RT   155519   155519   589    576   8     8      4200    ---    ---
   VBR-NRT  155519   155519   n/a    n/a   8     8      4200    ---    ---
   ABR      155519   0        n/a    n/a   n/a   n/a    4200    n/a    n/a
   UBR      155519   n/a      n/a    n/a   n/a   n/a    3360    n/a    n/a

Detailed Complex Node Bypass Pairs List (exception bypass pairs only)

  /~~~~~~~~ LOWER PORT ID ~~~~~~~~\ /~~~~~~~~ HIGHER PORT ID ~~~~~~~\
  Port ID  Rem Inn Agg-Token  Inacc Port ID  Rem Inn Agg-Token  Inacc Exceptns
  ~~~~~~~~ ~~~~~~~ ~~~~~~~~~~ ~~~~~ ~~~~~~~~ ~~~~~~~ ~~~~~~~~~~ ~~~~~ ~~~~~~~~
  21FB000  12      0          no    2371000  13      0          no    fwd rev

  Remote nodes for this port pair:
  21FB000  2371000   Remote Node (No./Name)
  ~~~~~~~~ ~~~~~~~~  ~~~~~~~~~~~~~~~~~~~~~~~~~~
  remote             12 pnni-09.2.56
           remote    13 pnni-11

  Border nodes for this port pair:
  21FB000  2371000   Border Node (No./Name)
  ~~~~~~~~ ~~~~~~~~  ~~~~~~~~~~~~~~~~~~~~~~~~~~
```

```
  border             1 pnni-14
           border    9 pnni-12

  Metrics for Complex Node Bypass (input 0x21FB000, output 0x2371000):
   vp capable
            maxcr    avcr     ctd    cdv   clr0  clr01  aw      crm    vf
   CBR      155519   147743   154    138   10    10     5040    n/a    n/a
   VBR-RT   155519   155519   707    691   8     8      5040    ---    ---
   VBR-NRT  155519   155519   n/a    n/a   8     8      5040    ---    ---
   ABR      155519   0        n/a    n/a   n/a   n/a    5040    n/a    n/a
   UBR      155519   n/a      n/a    n/a   n/a   n/a    5040    n/a    n/a

  Metrics for Complex Node Bypass (input 0x2371000, output 0x21FB000):
   vp capable
            maxcr    avcr     ctd    cdv   clr0  clr01  aw      crm    vf
   CBR      155519   147743   154    138   10    10     5040    n/a    n/a
   VBR-RT   155519   155519   707    691   8     8      5040    ---    ---
   VBR-NRT  155519   155519   n/a    n/a   8     8      5040    ---    ---
   ABR      155519   0        n/a    n/a   n/a   n/a    5040    n/a    n/a
   UBR      155519   n/a      n/a    n/a   n/a   n/a    5040    n/a    n/a
```

The following example is sample output from the **show atm pnni aggregation node border-detail** command.

```
Switch# show atm pnni aggregation node border-detail
Nodal aggregation is complex for local-node 2 (level=56, name=pnni-14.2.56),
No of border nodes 2,
 Table version 13 active for 07:05:31 [hh:mm:ss]

  Configured nodal aggregation modes (per service class):
      CBR          VBR-RT       VBR-NRT      ABR          UBR
  ~~~~~~~~~~~  ~~~~~~~~~~~  ~~~~~~~~~~~  ~~~~~~~~~~~  ~~~~~~~~~~~
  best-link    best-link    best-link    best-link    aggressive

   Inter Border-Node Metric Table
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

From border 1  ---> border 9   [pnni-14-->pnni-12]
   vp capable, (vp_cap_flags=0x1F)
            maxcr    avcr     ctd    cdv   clr0  clr01  aw      crm    vf
   CBR      155519   147743   154    138   10    10     5040    n/a    n/a
   VBR-RT   155519   155519   707    691   8     8      5040    ---    ---
   VBR-NRT  155519   155519   n/a    n/a   8     8      5040    ---    ---
   ABR      155519   0        n/a    n/a   n/a   n/a    5040    n/a    n/a
   UBR      155519   n/a      n/a    n/a   n/a   n/a    5040    n/a    n/a

From border 9  ---> border 1   [pnni-12-->pnni-14]
   vp capable, (vp_cap_flags=0x1F)
            maxcr    avcr     ctd    cdv   clr0  clr01  aw      crm    vf
   CBR      155519   147743   154    138   10    10     5040    n/a    n/a
   VBR-RT   155519   155519   707    691   8     8      5040    ---    ---
   VBR-NRT  155519   155519   n/a    n/a   8     8      5040    ---    ---
   ABR      155519   0        n/a    n/a   n/a   n/a    5040    n/a    n/a
   UBR      155519   n/a      n/a    n/a   n/a   n/a    5040    n/a    n/a
```

Related Commands

Command	Description
atm pnni aggregation-token	Specifies the aggregation token for a PNNI interface.
nodal-representation	Specifies the type of PNNI LGN representation.

show atm pnni background routes

To show the precalculated background route table to other PNNI nodes, use the **show atm pnni background routes** EXEC command.

show atm pnni background routes [*internal-node-num*] [**abr** | **cbr** | **vbr_rt** | **vbr_nrt** | **ubr**] [**admin-weight** | **cdv** | **ctd**]

Syntax Description

internal-node-num	Shows the background route tables for the node specified by this internal node number.
abr	Shows the background route tables for the available bit rate service category.
cbr	Shows the background route tables for the constant bit rate service category.
vbr_rt	Shows the background route tables for the real-time variable bit rate service category.
vbr_nrt	Shows the background route tables for the non-real-time variable bit rate service category.
ubr	Shows the background route tables for the unspecified bit rate service category.
admin-weight	Shows the background route tables based on administrative weight as the primary metric.
cdv	Shows the background route tables based on cell delay variation as the primary metric.
ctd	Shows the background route tables based on cell transfer delay as the primary metric.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command. Originally **bg routes**.
11.2(5)	Modified: changed to **show atm pnni background routes**.

Usage Guidelines

Use this command to display routes from the background route tables to all known nodes in the PNNI network.

This command filters based on service category or metric information.

Examples

The following example is sample output from the **show atm pnni background routes** command.

```
Switch# show atm pnni background routes cbr admin-weight
Background Routes From CBR/AW Table
-----------------------------------
1 Routes To Node 2
    1. Hops 2. 1:ATM1/1/0 -> 3:ATM0/1/1 -> 2
        ->: aw 10080  cdv 276  ctd 308  acr 147743  clr0 10  clr01 0
        <-: aw 10080  cdv 276  ctd 308  acr 147743  clr0 10  clr01 0

1 Routes To Node 3
    1. Hops 1. 1:ATM1/1/0 -> 3
        ->: aw 5040  cdv 138  ctd 154  acr 147743  clr0 10  clr01 0
        <-: aw 5040  cdv 138  ctd 154  acr 147743  clr0 10  clr01 0

1 Routes To Node 4
    1. Hops 2. 1:ATM1/1/0 -> 3:ATM0/0/2 -> 4
        ->: aw 10080  cdv 276  ctd 308  acr 147743  clr0 10  clr01 0
        <-: aw 10080  cdv 276  ctd 308  acr 147743  clr0 10  clr01 0

3 Routes To Node 5
    1. Hops 3. 1:ATM1/1/0 -> 3:ATM0/0/2 -> 4:ATM1/0/0 -> 5
        ->: aw 15120  cdv 414  ctd 462  acr 147743  clr0 10  clr01 0
        <-: aw 15120  cdv 414  ctd 462  acr 147743  clr0 10  clr01 0
    2. Hops 3. 1:ATM1/1/0 -> 3:ATM0/0/2 -> 4:ATM0/1/0 -> 5
        ->: aw 15120  cdv 414  ctd 462  acr 147743  clr0 10  clr01 0
        <-: aw 15120  cdv 414  ctd 462  acr 147743  clr0 10  clr01 0
    3. Hops 3. 1:ATM1/1/0 -> 3:ATM0/0/2 -> 4:ATM1/0/3 -> 5
        ->: aw 15120  cdv 414  ctd 462  acr 147743  clr0 10  clr01 0
        <-: aw 15120  cdv 414  ctd 462  acr 147743  clr0 10  clr01 0
```

Related Commands

Command	Description
background-routes-enable	Enables background route computation and specifies how often the switch polls for a significant change that activates a new computation of the background routes.

show atm pnni background status

To show the status of background route computation activity, use the **show atm pnni background status** privileged EXEC command.

show atm pnni background status

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command. Originally **bg status**.
11.2(5)	Modified: changed to **show atm pnni background status**.

Usage Guidelines

This command displays the status of the background SPF activity.

Examples

The following example is sample output from the **show atm pnni background status** command.

```
Switch# show atm pnni background status
Background Route Computation is Enabled
Background Interval is set at 10 seconds
Background Insignificant Threshold is set at 32
```

Related Commands

Command	Description
background-routes-enable	Enables background route computation and specifies how often the switch polls for a significant change that activates a new computation of the background routes.

show atm pnni database

To display the contents of the PNNI topology database, use the **show atm pnni database** EXEC command.

show atm pnni database [*internal-node-number* [*ptse-id*] | **local-node** *node-index*] [**detail**]

Syntax Description

internal-node-number	Displays information about a specified node (1 to 255).
ptse-id	Displays information about a specified PTSE (1 to 4294967295) on a node.
node-index	Index number of the PNNI local node to which the command applies, in the range of 1 to 8.
detail	Displays more detailed information and is used as the last keyword of the command.

Command Modes

EXEC

Command History

Release	Modification

Usage Guidelines

The topology database is the collection of PTSEs that the PNNI node gathered from the network.

To display the mapping of *internal-node-number* to PNNI node identifier and node name, use the **show atm pnni identifiers** command.

Use this command without the **detail** keyword to display identifying information about each PTSE.

Use the **detail** keyword to display information about the contents of the PTSEs, including nodal information, internal reachable addresses, exterior reachable addresses, and horizontal links.

- Nodal information includes the node's ATM address, leadership priority, and which node the current node accepts as a peer group leader.
- Internal reachable addresses are attached to the PNNI routing domain.
- Exterior reachable addresses can be accessed outside the scope of the PNNI routing domain, for example, through static routes configured on IISP interfaces.
- Horizontal links are between PNNI nodes that belong to the same peer group.

For information on specific PTSE types and their use, refer to the ATM Forum PNNI 1.0 specification, af-pnni-0055.000.

Examples

The following example is sample output from the **show atm pnni database** command.

```
Switch# show atm pnni database
Node 1 ID 56:160:47.00918100000000603E7B3201.00603E7B3201.00 (name: Switch20)

  PTSE ID  Length  Type  Seq no.   Checksum  Lifetime   Description
  1        92      97    228       3191      2232       Nodal info
  2        52      224   29123     31376     3307       Int. Reachable Address
  3        52      256   181       51057     1845       Ext. Reachable Address
  4        188     288   61        29561     3068       Horizontal Link

Node 2 ID 56:160:47.00918100000000003DDE74601.0003DDE74601.00 (name: Switch22)

  PTSE ID  Length  Type  Seq no.   Checksum  Lifetime   Description
  1        92      97    889       4149      2563       Nodal info
  2        52      224   98986     37349     2504       Int. Reachable Address
  3        72      256   918       49460     3043       Ext. Reachable Address
  4        156     288   63        45295     2668       Horizontal Link
```

The following example is sample output using the **detail** option with this command.

```
Switch# show atm pnni database 1 detail
Node 1 ID 56:160:47.00918100000000603E7B3201.00603E7B3201.00 (name: Switch20)

  PTSE ID  Length  Type  Seq no.   Checksum  Lifetime   Description
  1        92      97    229       3190      1854       Nodal info
    Time to refresh 269, time to originate 0

    Type 97 (Nodal info), Length 48
    ATM address 47.00918100000000603E7B3201.00603E7B3201.00
    priority 0, leader bit NOT SET
    preferred PGL 0:0:00.000000000000000000000000.000000000000.00

  2        52      224   29124     31375     2387       Int. Reachable Address
    Time to refresh 1023, time to originate 0

    Type 224 (Int. Reachable Address), Length 32, Port 0, vp capable
    Scope (level) 0, Address info length (ail) 16, Address info count 1
    Pfx: 47.0091.8100.0000.0060.3E7B.3201..., length 104

  3        52      256   183       51055     2744       Ext. Reachable Address
    Time to refresh 1135, time to originate 0

    Type 256 (Ext. Reachable Address), Length 32, Port 0, vp capable
    Scope (level) 0, Address info length (ail) 16, Address info count 1
    Pfx: 47.0091.8100.0000.0003.dde7.4601..., length 104

  4        188     288   62        29560     2297       Horizontal Link
    Time to refresh 835, time to originate 0

    Type 288 (Horizontal Link), Length 168, vp capable
    Remote Node: 56:160:47.00918100000000003DDE74601.0003DDE74601.00
    Local port 80002000, Remote port 81802000, Aggregation token 0
    Metric:
      Type 128, length 32, Traffic class: 0x8800 ( CBR UBR )
        MCR 155519, ACR 147743, CTD 154, CDV 138, CLR0 10, CLR01 10, AW 5040
      Type 128, length 32, Traffic class: 0x4000 ( VBR-RT )
        MCR 155519, ACR 155519, CTD 707, CDV 691, CLR0 8, CLR01 8, AW 5040
      Type 128, length 32, Traffic class: 0x2000 ( VBR-NRT )
        MCR 155519, ACR 155519, CTD n/a, CDV n/a, CLR0 8, CLR01 8, AW 5040
      Type 128, length 32, Traffic class: 0x1000 ( ABR )
        MCR 155519, ACR 0, CTD n/a, CDV n/a, CLR0 n/a, CLR01 n/a, AW 5040
```

show atm pnni election

To display information relevant to the PNNI peer group leader election process, use the **show atm pnni election** EXEC command.

show atm pnni election [**local-node** *node-index*] [**peers**]

Syntax Description

node-index	Index number of the PNNI local node to which the command applies, in the range of 1 to 8.
peers	Displays the leadership priority and preferred PGL as advertised by all peers in the peer group.

Command Modes

EXEC

Command History

Release	Modification

Usage Guidelines

Using the **show atm pnni election** EXEC command without the **peer** keyword only displays the local information that pertains to the node's PGL election.

Examples

The following example is sample output from the **show atm pnni election** command.

```
Switch# show atm pnni election
PGL Status.............: Not PGL
Preferred PGL..........: Switch20
Preferred PGL Priority.: 64
Active PGL.............: Switch20
Active PGL Priority....: 64
Current FSM State......: PGLE Operating: Not PGL
Last FSM State.........: PGLE Calculating
Last FSM Event.........: Preferred PGL Is Not Self

Configured Priority....: 0
Advertised Priority....: 0
Conf. Parent Node Index: NONE

Hello Startup Factor...: 5
PGL Init Interval......: 15 secs
Search Peer Interval...: 75 secs
Re-election Interval...: 15 secs
Override Delay.........: 30 secs
```

Examples

The following example is sample output from the **show atm pnni election peers** command.

```
Switch# show atm pnni election peers
Node     Leadership   Preferred
  Number   Priority     PGL
  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
  1        0            Switch20
  2        64           Switch20
  3        0            Switch20
  4        0            Switch20
  5        0            Switch20
  6        0            Switch20
  7        0            Switch20
  8        0            Switch20
  9        0            Switch20
```

show atm pnni explicit-paths

To display a summary of explicit paths that have been configured, use the **show atm pnni explicit-paths** command.

show atm pnni explicit-path [**name** *path-name* | **identifier** *path-id*} [**upto** *index*] [**detail**]

Syntax Description

name *path-name*	Specifies the path name for which explicit path information is to be displayed.
identifier *path-id*	Specifies the path ID for which explicit path information is to be displayed.
upto *index*	Specifies the path entry index up to which the routable status is calculated.
detail	Displays full path information with any known errors and warnings for each entry.

Command Modes

EXEC

Command History

Release	Modification

Usage Guidelines

To limit the display to a specific path, use the **name** option. The path information includes the "routable" status, which is based on an actual UBR explicit path calculation to the last included node entry.

Use the **upto** option for troubleshooting explicit paths that are shown as not routable. The routable status is only calculated up to the specified path entry index, which allows you to isolate the first failing path entry.

Use the **detail** option to list the full paths, along with any known errors or warnings associated with each entry.

Examples

The following example shows how to display a summary of explicit paths.

```
Switch# show atm pnni explicit-paths
Summary of configured Explicit Paths:
 PathId Status       UpTo  Routable AdminWt Explicit Path Name
 ~~~~~~ ~~~~~~~~~~~  ~~~~~ ~~~~~~~~ ~~~~~~~ ~~~~~~~~~~~~~~~~~~~~
 1      enabled      3     yes      10040   dallas_4.path1
 2      enabled      6     yes      15120   chicago_2.path1
 3      enabled      2     yes      10080   chicago_2.path2
 4      enabled      2     yes      20595   new_york.path1
```

Examples

The following example shows how to display the detailed configuration, including any known warnings and error messages, for a non-routable explicit path named *new_york.path2*.

```
Switch# show atm pnni explicit-paths name new_york.path2 detail
 PathId Status       UpTo  Routable AdminWt Explicit Path Name
 ~~~~~~ ~~~~~~~~~~~  ~~~~~ ~~~~~~~~ ~~~~~~~ ~~~~~~~~~~~~~~~~~~~~
 1      enabled      4     no       0       new_york.path2
  PNNI routing err_code for UBR call = 6 (PNNI_DEST_UNREACHABLE)

  Entry Type      Node [Port] specifier
  ~~~~~ ~~~~~~~~~ ~~~~~~~~~~~~~~~~~~~~~
  1     next-node dallas_2
  2     next-node dallas_4 port 80000004
                  Warning:Entry index 2 specifies a non-routable port
  3     next-node wash_dc_1
                  Warning:Entry index 3 has no connectivity from prior node
  4     segment   new_york.2.40
```

Related Commands

Command	Description
show atm pnni explicit-paths	Displays a summary of explicit paths that have been configured.

show atm pnni hierarchy

To show the PNNI hierarchy, use the **show atm pnni hierarchy** privileged EXEC command.

show atm pnni hierarchy [**network** [**detail**] | **local-configured**]

Syntax Description

network	Shows the PGLs and higher-level PNNI ancestor LGNs that are active throughout the PNNI routing domain, as visible from this node.
detail	Shows more detailed network hierarchy information.
local-configured	Shows only the locally configured nodes and parent nodes on this system.

Defaults

local-configured

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(3a)	New command

Usage Guidelines

This command displays the configured PNNI hierarchy and its status.

Examples

The following example is sample output from the **show atm pnni hierarchy** command.

```
Switch# show atm pnni hierarchy
Locally configured parent nodes:
  Node          Parent
  Index  Level  Index   Local-node Status     Node Name
  ~~~~~  ~~~~~  ~~~~~~  ~~~~~~~~~~~~~~~~~~~~  ~~~~~~~~~~~~~~~~~~~~~~
  1      60     2       Enabled/ Running      xxxxxx-1
  2      44     3       Enabled/ Not Running  xxxxxx-1.2.44
  3      28     N/A     Enabled/ Not Running  xxxxxx-1.3.28
```

The following example is sample output from the **show atm pnni hierarchy network** command.

```
Switch# show atm pnni hierarchy network
Summary of active parent LGNs in the routing domain:
  Node  Level  Parent  Node Name
  ~~~~  ~~~~~  ~~~~~~  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
  1     60     10      xxxxxx-1
  10    44     12      xxxxx18.2.44
  12    32     0       xxxxx27.3.32
```

Examples

The following example is sample output from the **show atm pnni hierarchy network detail** command.

```
Switch# show atm pnni hierarchy network detail
Detailed hierarchy network display:
  Number Of Network LGN Ancestors: 2

  Lowest Level (60) information:
  Node No.....: 1    Node Name: xxxxxx-1
  Node's ID...:   60:160:47.009181000000060705BD9A5.0060705BD900.00
  Node's Addr.:          47.009181000000060705BD9A5.0060705BD900.01
  Node's PG ID:       60:47.0091.8100.0000.0000.0000.0000
  PGL No......: 9    PGL Name: xxxxx18
  PGL ID......:   60:160:47.0091810000000613E7B2F01.00613E7B2F99.00

  Level 44 ancestor information:
  Parent LGN..: 10   LGN Name: xxxxx18.2.44
  LGN's ID....:    44:60:47.009181000000000000000000.00613E7B2F99.00
  LGN's Addr..:          47.0091810000000613E7B2F01.00613E7B2F99.02
  LGN's PG ID.:       44:47.0091.8100.0000.0000.0000.0000
  LGN PGL No..: 11   LGN PGL Name: xxxxx27.2.44
  LGN's PGL ID:    44:68:47.009181000000004000000000.00400B0A3081.00

  Level 32 ancestor information:
  Parent LGN..: 12   LGN Name: xxxxx27.3.32
  LGN's ID....:    32:44:47.009181000000000000000000.00400B0A3081.00
  LGN's Addr..:          47.009181000000000400B0A3081.00400B0A3081.03
  LGN's PG ID.:       32:47.0091.8100.0000.0000.0000.0000
  LGN PGL No..:      Unelected or unknown
  LGN's PGL ID:      0:0:00.000000000000000000000000.000000000000.00
```

Related Commands

Command	Description
next-node	Specifies the next adjacent entry in a fully-specified ATM PNNI explicit path.
parent	Specifies the PNNI local node index of the parent node.

show atm pnni identifiers

To display the mapping from the local internal node numbers to the global PNNI node identifiers and node names, use the **show atm pnni identifiers** privileged EXEC command.

show atm pnni identifiers [*internal-node-number* | **local-node** *node-index*]

Syntax Description

internal-node-number	Displays the mapping from the specified internal node number to its PNNI node identifier.
node-index	Index number of the PNNI local node to which the command applies, in the range of 1 to 8.

Command Modes

Privileged EXEC

Command History

Release	Modification

Usage Guidelines

Because PNNI node identifiers are long, the PNNI implementation has mapped them into internal node numbers. The internal node numbers are used to display the topology in a compact fashion.

Examples

The following example is sample output from the **show atm pnni identifiers** command.

```
Switch# show atm pnni identifiers
Node  Node Id                                                  Name
  1     56:160:47.00918100000000603E7B3201.00603E7B3201.00  Switch20
  2     56:160:47.00918100000000003DDE74601.0003DDE74601.00  Switch22
```

show atm pnni interface

To display specific information about an interface or to list the interfaces running on a PNNI node, use the **show atm pnni interface** EXEC command.

show atm pnni interface [**local-node** *node-index* | *hex-port-id* | **atm** *card/subcard/port*] [**detail**]

Syntax Description

node-index	Index number of the PNNI local node to which the command applies, in the range of 1 to 8.
hex-port-id	Identifier in hexadecimal notation of the port to show.
card/subcard/port	Card, subcard, and port number of the PNNI interface.
detail	Displays detailed information and is used as the last keyword of the command.

Command Modes

EXEC
Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Use the **show atm pnni interface** command to display information about the status of the PNNI interfaces and the Hello protocol run over the PNNI interfaces.

For a description of the Hello states and timers, refer to the ATM Forum PNNI 1.0 specification, af-pnni-0055.000.

Examples

The following example is sample output using the **detail** option of the **show atm pnni interface** command.

```
Switch# show atm pnni interface atm 0/0/2 detail

Port ATM0/0/2 RCC is up  , Hello state common_out with node SanFran.BldA.T4
Next hello occurs in 1 seconds, Dead timer fires in 63 seconds
  CBR    : AW 5040 MCR 155519 ACR 147743 CTD 154 CDV 138 CLR0 10 CLR01 10
  VBR-RT : AW 5040 MCR 155519 ACR 155519 CTD 707 CDV 691 CLR0 8 CLR01 8
  VBR-NRT: AW 5040 MCR 155519 ACR 155519 CLR0 8 CLR01 8
  ABR    : AW 5040 MCR 155519 ACR 0
  UBR    : AW 5040 MCR 155519
  Aggregation Token: configured 0 , derived 2, remote 2
Tx ULIA seq# 1, Rx ULIA seq# 1, Tx NHL seq# 2, Rx NHL seq# 1
  Remote node ID        72:160:47.009144556677223310111266.00603E7B2001.00
  Remote node address          47.009144556677223310111266.00603E7B2001.01
  Remote port ID         ATM0/0/3 (80003000) (0)
  Common peer group ID      56:47.0091.4455.6677.0000.0000.0000
  Upnode ID             56:72:47.009144556677223300000000.00603E7B2001.00
  Upnode Address               47.009144556677223310111266.00603E7B2001.02
  Upnode number: 10       Upnode Name: SanFran
```

show atm pnni local-node

To display information about a PNNI logical node running on the switch, use the **show atm pnni local-node** privileged EXEC command.

show atm pnni local-node [*node-index*]

Syntax Description

node-index	Displays information about a specific PNNI logical node running on this switch, in the range of 1 to 8.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **show atm pnni local-node** command displays information about the PNNI node and its status.

Examples

The following example is sample output from the **show atm pnni local-node** command.

```
Switch# show atm pnni local-node
PNNI node 1 is enabled and running
  Node name: NewYork.BldB.T3
  System address          47.009144556677114410111255.00603E5BC401.01
  Node ID          72:160:47.009144556677114410111255.00603E5BC401.00
  Peer group ID        72:47.0091.4455.6677.1144.0000.0000
  Level 72, Priority 45 95, No. of interfaces 3, No. of neighbors 1
  Parent Node Index: 2
  Node Allows Transit Calls
  Node Representation: simple
  Hello interval 15 sec, inactivity factor 5,
  Hello hold-down 10 tenths of sec
  Ack-delay 10 tenths of sec, retransmit interval 5 sec,
  Resource poll interval 5 sec
  SVCC integrity times: calling 35 sec, called 50 sec,
  Horizontal Link inactivity time 120 sec,
  PTSE refresh interval 1800 sec, lifetime factor 200 percent,
  Min PTSE interval 10 tenths of sec
  Auto summarization: on, Supported PNNI versions: newest 1, oldest 1
  Default administrative weight mode: uniform
  Max admin weight percentage: -1
  Next resource poll in 3 seconds
  Max PTSEs requested per PTSE request packet: 32
  Redistributing static routes: Yes
```

show atm pnni neighbor

To list PNNI neighboring peers for a switch router, use the **show atm pnni neighbor** EXEC command.

show atm pnni neighbor [**local-node** *node-index*]

Syntax Description

node-index	Index number of the PNNI local node to which the command applies, in the range of 1 to 8.

Command Modes

EXEC
Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **show atm pnni neighbor** command displays information about adjacencies. Multiple links can be connected to the same neighboring peer. The output from this command displays all PNNI interfaces to each neighboring peer, including the local port, the remote port, and the Hello state for each interface. Based on the port identifiers, PNNI derives the port string if the remote switch is an ATM switch router.

The switch may not translate the port identifier into a meaningful string (such as ATM 3/0/0) if the remote switch is not an ATM switch router. For this reason, both the port string and the port identifier are displayed. At any time only one interface to each neighboring peer is used for flooding PTSEs. This interface is identified as `(Flooding Port)` in the command output.

Examples

The following example is sample output from the **show atm pnni neighbor** command.

```
Switch# show atm pnni neighbor local-node 1

Neighbors For Node (Index 1, Level 72)

  Neighbor Name: NewYork.BldB.T1, Node number: 12
  Neighbor Node Id: 72:160:47.009144556677114410111233.00603E7B3A01.00
  Neighboring Peer State: Full
                              ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  Link Selection Set To: minimize blocking of future calls
    Port           Remote Port Id    Hello state
    ATM0/1/3       ATM1/1/3          2way_in    (Flooding Port)
```

show atm pnni precedence

To show the current PNNI prefix priorities for routing, use the **show atm pnni precedence** privileged EXEC configuration command.

show atm pnni precedence

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The following example is sample output from the **show atm pnni precedence** command.

```
Switch# show atm pnni precedence
                                Working   Default
  Prefix Poa Type               Priority  Priority
  ----------------------------  --------  --------
  local-internal                   1         1
  static-local-internal-metrics    2         2
  static-local-exterior            3         3
  static-local-exterior-metrics    2         2
  pnni-remote-internal             2         2
  pnni-remote-internal-metrics     2         2
  pnni-remote-exterior             4         4
  pnni-remote-exterior-metrics     2         2
```

Related Commands

Command	Description
precedence	Configures the precedence of different types of reachable addresses.

show atm pnni resource-info

To display information about routing parameters of all PNNI interfaces received from a resource management module, use the **show atm pnni resource-info** EXEC command.

show atm pnni resource-info [*hex-port-id*] [**atm** *card/subcard/port*] [**local-node** *node-index*]

Syntax Description

hex-port-id	Hexadecimal port ID value.
card/subcard/port	Card, subcard, and port number for the specified ATM interface.
node-index	Index number of the PNNI local node, in the range of 1 to 8.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command. Originally **rm-info**.
11.2(5)	Modified: changed to **show atm pnni resource-info**.

Usage Guidelines

This command is used to display information about the MCR, ACR, CTD, CDV, and CLR for a specific port. Only applicable information is displayed.

- MCR is the maximum cell rate, measured in cells.
- ACR is the available cell rate, measured in cells.
- CTD is the cell transfer delay, measured in microseconds.
- CDV is the cell rate delay variation, in microseconds.
- CLR is the cell loss ratio exponent (for example, 10 means 10exp(-10)).
- [a,b] are the low and high thresholds for the PNNI insignificant change for applicable parameters.

Examples

The following example is sample output from the **show atm pnni resource-info** command.

```
Switch# show atm pnni resource-info
acr pm 50,  acr mt 3, cdv pm 25, ctd pm 50, rm poll interval 5 sec
Interface insignificant change bounds:
ATM0/1/0 , port ID 80100000
  CBR    : MCR 155519 ACR 147743 [73871,155519] CTD 154 [77,231]
           CDV 138 [104,172] CLR0 10 CLR01 10
  VBR-RT : MCR 155519 ACR 155519 [77759,155519] CTD 707 [354,1060]
           CDV 691 [519,863] CLR0 8 CLR01 8
  VBR-NRT: MCR 155519 ACR 155519 [77759,155519] CLR0 8 CLR01 8
  UBR    : MCR 155519
ATM0/1/3 , port ID 80103000
  CBR    : MCR 155519 ACR 147743 [73871,155519] CTD 154 [77,231]
           CDV 138 [104,172] CLR0 10 CLR01 10
  VBR-RT : MCR 155519 ACR 155519 [77759,155519] CTD 707 [354,1060]
           CDV 691 [519,863] CLR0 8 CLR01 8
  VBR-NRT: MCR 155519 ACR 155519 [77759,155519] CLR0 8 CLR01 8
```

```
  UBR    : MCR 155519
ATM1/0/0 , port ID 80800000
  CBR    : MCR 155519 ACR 147743 [73871,155519] CTD 154 [77,231]
           CDV 138 [104,172] CLR0 10 CLR01 10
  VBR-RT : MCR 155519 ACR 155519 [77759,155519] CTD 707 [354,1060]
           CDV 691 [519,863] CLR0 8 CLR01 8
  VBR-NRT: MCR 155519 ACR 155519 [77759,155519] CLR0 8 CLR01 8
  UBR    : MCR 155519
ATM1/0/3 , port ID 80803000
  CBR    : MCR 155519 ACR 147743 [73871,155519] CTD 154 [77,231]
           CDV 138 [104,172] CLR0 10 CLR01 10
  VBR-RT : MCR 155519 ACR 155519 [77759,155519] CTD 707 [354,1060]
           CDV 691 [519,863] CLR0 8 CLR01 8
  VBR-NRT: MCR 155519 ACR 155519 [77759,155519] CLR0 8 CLR01 8
  UBR    : MCR 155519
```

show atm pnni scope

To display the mapping from organizational scope values—used at UNI interfaces—to PNNI scope (in terms of PNNI routing level indicators), use the **show atm pnni scope** privileged EXEC command.

show atm pnni scope

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

This command groups ranges of organization scope values that map to the same PNNI level.
The following example is sample output from the **show atm pnni scope** privileged EXEC command.

```
Switch# show atm pnni scope
UNI scope   PNNI Level
---------   ----------
(1  - 10)      56
(11 - 12)      48
(13 - 14)      32
(15 - 15)      0

Scope mode: automatic
```

Related Commands

Command	Description
scope map	Specifies the mapping from a range of organizational scope values (used at UNI interfaces) to a PNNI scope value (such as PNNI routing-level indicators).
scope mode	Specifies the configuration mode of the mapping from organizational scope values (used at UNI interfaces) to PNNI scope (such as PNNI routing-level indicators).

show atm pnni statistics

To display PNNI statistics, use the **show atm pnni statistics** EXEC command.

show atm pnni statistics call

Syntax Description

call	Displays the PNNI call statistics.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command displays statistics related to path selection, for example, number of crankbacks, number of calls set up, number of calls serviced by the background tree, on-demand calculation, and PTSE exchanges, such as number of incoming PTSEs per minute or number of PTSEs retransmitted.

Examples

The following example is sample output from the **show atm pnni statistics call** command.

```
Switch# show atm pnni statistics call
pnni routing call statistics since 00:04:58

                    total     cbr       rtvbr     nrtvbr    abr       ubr
source route reqs   137       0         0         0         0         137
successful          110       0         0         0         0         110
unsuccessful        27        0         0         0         0         27
crankback reqs      8         0         0         0         0         8
successful          8         0         0         0         0         8
unsuccessful        0         0         0         0         0         0
intraswitch routes  34        0         0         0         0         34
on-demand attempts  0         0         0         0         0         0
successful          0         0         0         0         0         0
unsuccessful        0         0         0         0         0         0
background lookups  76        0         0         0         0         76
successful          76        0         0         0         0         76
unsuccessful        0         0         0         0         0         0
next port requests  81        0         0         0         0         81
successful          66        0         0         0         0         66
unsuccessful        15        0         0         0         0         15

                    total     average
usecs in queue      74890     546
usecs in dijkstra   0         0
usecs in routing    38991     284
```

Related Commands

Command	Description
stopbits	Cisco IOS command removed from this manual. See Appendix D.

show atm pnni summary

To display summary information advertised by PNNI nodes, use the **show atm pnni summary** privileged EXEC command.

show atm pnni summary [**local-node** *node-index*]

Syntax Description

node-index	Index number of the PNNI local node to which the command applies, in the range of 1 to 8. Use this option to restrict the display to a single node.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example is sample output from the **show atm pnni summary** command.

```
Switch# show atm pnni summary

Codes: Node - Node index advertising this summary
       Type - Summary type (INT - internal, EXT - exterior)
       Sup  - Suppressed flag (Y - Yes, N - No)
       Auto - Auto Summary flag (Y - Yes, N - No)
       Adv  - Advertised flag (Y - Yes, N - No)
       C.M  - Creation Mode (A - Auto, C - Configured).

 Node Type Sup Auto Adv  Summary Prefix
 ~~~~ ~~~~ ~~~ ~~~~ ~~~  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
  1   Int   N   Y    Y   47.0091.8100.0000.0060.3e7b.3101/104
  1   Int   N   N    N   aa.bbcc/24
  1   Int   Y   N    N   bb.ccdd/24
  1   Ext   N   N    N   cc.ddee/24
  1   Ext   Y   N    N   dd.eeff/24
  2   Int   N   N    N   11.2233.4455.6677.88/64
  3   Ext   Y   N    N   44.4444.444/36
```

show atm pnni svcc-rcc

To display information about the SVCC RCCs on PNNI local nodes, use the **show atm pnni svcc-rcc** privileged EXEC command.

show atm pnni svcc-rcc [**local-node** *node-index* | **remote-node** *internal-node-num*] [**detail**]

Syntax Description

node-index	Index number of the PNNI local node to which the command applies, in the range of 1 to 8.
internal-node-num	Internal node number of the PNNI remote node.
detail	Displays detailed SVCC RCC information; must be the last keyword.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

This command displays information about the SVCC RCCs on one or more PNNI local nodes.

Examples

The following example is sample output from the **show atm pnni svcc-rcc** command.

```
Switch# show atm pnni svcc-rcc
PNNI VCC-CSS(s) for local-node 2 (level=64):
  Rem-Node RCC Hello St Exit Port       VPI  VCI   HrzLns Rem-Node name
  ~~~~~~~~ ~~~ ~~~~~~~~ ~~~~~~~~~~~~~~~ ~~~~ ~~~~~ ~~~~~~ ~~~~~~~~~~~~~
  12       UP  2way_in  ATM0/1/1        0    33    1      T2.2.64
PNNI VCC-CSS(s) for local-node 3 (level=56):
  Rem-Node RCC Hello St Exit Port       VPI  VCI   HrzLns Rem-Node name
  ~~~~~~~~ ~~~ ~~~~~~~~ ~~~~~~~~~~~~~~~ ~~~~ ~~~~~ ~~~~~~ ~~~~~~~~~~~~~
  11       UP  2way_in  ATM0/0/3        0    33    1      T5.3.56
```

Related Commands

Command	Description
debug atm pnni	Enables PNNI debugging output.
show atm pnni interface	Displays specific information about an interface or lists the interfaces running on a PNNI node.

show atm pnni topology

To display the topology connectivity information from the internal topology database, use the **show atm pnni topology** EXEC command.

show atm pnni topology [**node** *node-name*] [**detail**]

Syntax Description

node	Displays the topology information about a specific node identified by the *node-name*.
node-name	Identifies the node by a specific name.
detail	Displays more detailed information and is used as the last keyword of the command.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The topology as seen from the PNNI database can be displayed using the **show atm pnni topology** command. This command shows all accessible PNNI nodes in the network (through PTSEs) and any links to neighboring nodes.

PNNI nodes are represented internally by an 8-bit number. This command shows the mapping between the internal node number and the full 22-byte node ID.

A link status of "up" indicates the link is advertised by the node on both ends of a link. A link status of "2down" indicates the remote node (neighbor) did not advertise the link. Links that are down are not used for path selection by the current node.

Examples

The following example is partial output from the **show atm pnni topology** command.

```
Switch# show atm pnni topology
Node 1 (name: xxxxxx-1, type: xxxxxx, ios-version: xx.x)
Node ID..: 60:160:47.009181000000060705BD9A5.0060705BD900.00
Node AESA:        47.009181000000060705BD9A5.0060705BD900.01
Link Service Classes Advertised: CBR VBR-RT VBR-NRT ABR UBR
Leadership Priority: 60, Claims PGL: Yes, Transit Calls: Allowed
Ancestor: No, Nodal Representation: Simple

   status  link-type  local port     remote port    neighbor
   ~~~~~~  ~~~~~~~~~  ~~~~~~~~~~~~~  ~~~~~~~~~~~~~  ~~~~~~~~
   up      hrz        ATM0/0/2       ATM0/0/2       Switch
   up      hrz        ATM0/0/2.4     ATM0/0/2.4     Switch
   up      hrz        ATM0/0/0       ATM0/0/0       xxxxx18
   up      hrz        ATM0/1/3       ATM0/0/1       xxxxx18
   up      hrz        ATM0/0/1       ATM0/0/1       Switch
```

```
Node 2 (name: xxxxxx-1.2.36, type: xxxxxx, ios-version: 11.3)
Node ID..:  36:60:47.009181000000000000000000.0060705BD900.00
Node AESA:        47.009181000000060705BD9A5.0060705BD900.02
Link Service Classes Advertised: CBR VBR-RT VBR-NRT ABR UBR
Leadership Priority: 0, Claims PGL: No, Transit Calls: Allowed
Ancestor: Yes, Nodal Representation: Simple

   status  link-type  local port     remote port    neighbor
   ~~~~~~  ~~~~~~~~~  ~~~~~~~~~~~~~  ~~~~~~~~~~~~~  ~~~~~~~~
   up      hrz        2D24009        2B70009        xxxxx27.2.36
   up      hrz        2D24000        2B70000        xxxxx27.2.36
```

show atm pnni traffic

To display information about traffic received on PNNI interfaces, use the **show atm pnni traffic** privileged EXEC command.

show atm pnni traffic

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example is sample output from the **show atm pnni traffic** command.

```
Traffic statistics for local-node 1 (Level 60)

  Interface ID    PNNI bytes rcvd   bits/sec   Since     Rem Node(No./Name)
  ~~~~~~~~~~~~~   ~~~~~~~~~~~~~~~  ~~~~~~~~   ~~~~~~~~  ~~~~~~~~~~~~~~~~~~
  ATM0/0/0        7368              398        00:02:28  11 xxxxx18
  ATM0/0/1        7228              390        00:02:28  9 Switch
  ATM0/0/2        1300              70         00:02:28  9 Switch
  ATM0/0/2.4      1300              70         00:02:28  9 Switch
  ATM0/1/0        0                 0          00:02:33
  ATM0/1/3        1300              70         00:02:28  11 xxxxx18

Traffic statistics for local-node 2 (Level 36)

  Interface ID    PNNI bytes rcvd   bits/sec   Since     Rem Node(No./Name)
  ~~~~~~~~~~~~~   ~~~~~~~~~~~~~~~  ~~~~~~~~   ~~~~~~~~  ~~~~~~~~~~~~~~~~~~
  FFFFFFFF        4460              275        00:02:09  10 xxxxx27.2.36
```

show atm qos-defaults

To provide default values for QoS and display the table used, use the **show atm qos-defaults** EXEC command.

show atm qos-defaults

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command. Originally **show atm qos**.
11.2(5)	Modified: changed to **show atm qos-defaults**.

Examples

The following sample output from the **show atm qos-defaults** command displays the default QoS table.

```
Switch# show atm qos-defaults
Default QoS objective table:
Max cell transfer delay (in microseconds): any cbr, any vbr-rt
Peak-to-peak cell delay variation (in microseconds): any cbr, any vbr-rt
Max cell loss ratio for CLP0 cells: any cbr, any vbr-rt, any vbr-nrt
Max cell loss ratio for CLP0+1 cells: any cbr, any vbr-rt, any vbr-nrt
```

Table 18-11 describes the fields shown in the display.

Table 18-11 show atm qos-defaults Field Descriptions

Field	Description
Max cell transfer delay	Is displayed in microseconds and applies to one of the following (**any** indicates the objective parameter is undefined): • **cbr** • **vbr-rt**
Peak-to-peak cell delay variation	Is displayed in microseconds and applies to one of the following (**any** indicates the objective parameter is undefined): • **cbr** • **vbr-rt**
Max cell loss ratio	Is displayed as a negative power of ten and applies to one of the following (**any** indicates the objective parameter is undefined): • **cbr** • **vbr-rt** • **vbr-nrt**

Related Commands

Command	Description
atm qos default	Changes individual QoS objectives assigned to SVC setup messages entering the switch through UNI interfaces.

show atm resource

To display global resource manager configuration and status, use the **show atm resource** EXEC command.

Catalyst 8540 MSR

show atm resource [**module_id** *number*]

Catalyst 8510 MSR and LightStream 1010

show atm resource

Syntax Description

module_id *number*	Identification number of the module for which you want to display configuration data and status. (Catalyst 8540 MSR only).

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The output from this command normalizes the maximum cell and queue limit values to match what is installed in the hardware. Any values specified explicitly via configuration are preserved and can be displayed by viewing the configuration.

Examples

Catalyst 8540 MSR

The following example shows the results of using the **show atm resource** command with the switch processor feature card installed.

```
Switch# show atm resource
        Resource configuration:
            Over-subscription-factor 8  Sustained-cell-rate-margin-factor 1%
            Abr-mode:   EFCI
            Service Category to Threshold Group mapping:
             cbr 1 vbr-rt 2 vbr-nrt 3 abr 4 ubr 5
           Threshold Groups:
            Module Group Max     Max Q  Min Q  Q thresholds  Cell  Name
              ID         cells   limit  limit  Mark Discard  count
                         instal  instal instal
            ------------------------------------------------------------
            1      1     131071  63     63     25 %  87 %      0     cbr-default-tg
                   2     131071  127    127    25 %  87 %      0     vbrrt-default-tg
                   3     131071  511    31     25 %  87 %      0     vbrnrt-default-tg
                   4     131071  511    31     25 %  87 %      0     abr-default-tg
                   5     131071  511    31     25 %  87 %      0     ubr-default-tg
                   6     131071  1023   1023   25 %  87 %      0     well-known-vc-tg
           ============================================================
           2       1     131071  63     63     25 %  87 %      0     cbr-default-tg
```

```
         2     131071  127    127    25 %  87 %       0     vbrrt-default-tg
         3     131071  511    31     25 %  87 %       0     vbrnrt-default-tg
         4     131071  511    31     25 %  87 %       0     abr-default-tg
         5     131071  511    31     25 %  87 %       0     ubr-default-tg
         6     131071  1023   1023   25 %  87 %       0     well-known-vc-tg
=============================================================
3        1     131071  63     63     25 %  87 %       0     cbr-default-tg
         2     131071  127    127    25 %  87 %       0     vbrrt-default-tg
         3     131071  511    31     25 %  87 %       0     vbrnrt-default-tg
         4     131071  511    31     25 %  87 %       0     abr-default-tg
         5     131071  511    31     25 %  87 %       0     ubr-default-tg
         6     131071  1023   1023   25 %  87 %       0     well-known-vc-tg
=============================================================
4        1     131071  63     63     25 %  87 %       0     cbr-default-tg
         2     131071  127    127    25 %  87 %       0     vbrrt-default-tg
         3     131071  511    31     25 %  87 %       0     vbrnrt-default-tg
         4     131071  511    31     25 %  87 %       0     abr-default-tg
         5     131071  511    31     25 %  87 %       0     ubr-default-tg
         6     131071  1023   1023   25 %  87 %       0     well-known-vc-tg
=============================================================
5        1     131071  63     63     25 %  87 %       0     cbr-default-tg
         2     131071  127    127    25 %  87 %       0     vbrrt-default-tg
         3     131071  511    31     25 %  87 %       0     vbrnrt-default-tg
         4     131071  511    31     25 %  87 %       0     abr-default-tg
         5     131071  511    31     25 %  87 %       0     ubr-default-tg
         6     131071  1023   1023   25 %  87 %       0     well-known-vc-tg
=============================================================
6        1     131071  63     63     25 %  87 %       0     cbr-default-tg
         2     131071  127    127    25 %  87 %       0     vbrrt-default-tg
         3     131071  511    31     25 %  87 %       0     vbrnrt-default-tg
         4     131071  511    31     25 %  87 %       0     abr-default-tg
         5     131071  511    31     25 %  87 %       0     ubr-default-tg
         6     131071  1023   1023   25 %  87 %       0     well-known-vc-tg
=============================================================
7        1     131071  63     63     25 %  87 %       0     cbr-default-tg
         2     131071  127    127    25 %  87 %       0     vbrrt-default-tg
         3     131071  511    31     25 %  87 %       0     vbrnrt-default-tg
         4     131071  511    31     25 %  87 %       0     abr-default-tg
         5     131071  511    31     25 %  87 %       0     ubr-default-tg
         6     131071  1023   1023   25 %  87 %       0     well-known-vc-tg
=============================================================
8        1     131071  63     63     25 %  87 %       0     cbr-default-tg
         2     131071  127    127    25 %  87 %       0     vbrrt-default-tg
         3     131071  511    31     25 %  87 %       0     vbrnrt-default-tg
         4     131071  511    31     25 %  87 %       0     abr-default-tg
         5     131071  511    31     25 %  87 %       0     ubr-default-tg
         6     131071  1023   1023   25 %  87 %       0     well-known-vc-tg
=============================================================
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example shows the results of using the **show atm resource** command with an FC-PCQ installed.

```
Switch# show atm resource
Resource configuration:
    Over-subscription-factor 8  Sustained-cell-rate-margin-factor 1%
    Abr-mode:   relative-rate
    Atm service-category-limit (in cells):
         64512 cbr 64512 vbr-rt 64512 vbr-nrt 64512 abr-ubr
Resource state:
    Cells per service-category:
         0 cbr 0 vbr-rt 0 vbr-nrt 0 abr-ubr
```

Related Commands

Command	Description
atm abr-mode (Catalyst 8510 MSR and LightStream 1010)	Used to select **efci** marking, **relative-rate** marking, or both.
atm pacing	Enables or changes the artificial limitation on interface output rate.
atm service-category-limit (Catalyst 8510 MSR and LightStream 1010)	Sets the limits on the number of cells simultaneously allowed in the switch memory by type of output queue.
atm sustained-cell-rate-margin-factor	Changes the Sustained SCRMF, which dictates the weight given to PCR in computing the bandwidth used by VBR connections.

show atm rmon

To show the status of the ATM RMON MIB, use the **show atm rmon** EXEC command.

show atm rmon {**host** *number* | **matrix** *number* | **stats** *number* | **status**}

Syntax Description

host	Displays the ATM RMON host table port select group number information.
matrix	Displays the ATM RMON matrix table information.
stats	Displays the ATM RMON status table information.
status	Displays the ATM RMON resource status information.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example shows ATM host table information for the specified port select group using the **show atm rmon host** EXEC command.

```
atmrmon-switch# show atm rmon host 1
PortSelGrp: 1   Collection: Enabled     Drops: 0
47.007900000000000000000000.00A03E000001.00
  CBR/VBR in: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
         out: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
  ABR/UBR in: calls: 0/123852  cells: 0 connTime: 0 days 00:00:00
         out: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
47.00918100000000615C71A501.00000C39C23F.00
  CBR/VBR in: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
         out: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
  ABR/UBR in: calls: 1/14  cells: 0 connTime: 3 days 21:18:29
         out: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
47.00918100000000615C71A501.00603E329221.00
  CBR/VBR in: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
         out: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
  ABR/UBR in: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
         out: calls: 0/123852  cells: 0 connTime: 0 days 00:00:00
47.00918100000000615C71A501.00603E329221.01
  CBR/VBR in: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
         out: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
  ABR/UBR in: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
         out: calls: 1/14  cells: 0 connTime: 3 days 21:18:30
```

Table 18-12 describes some of the fields in the output from the **show atm rmon** command.

Table 18-12 show atm rmon Field Descriptions

Field	Description
47.00790000000000000000000 000.00A03E000001.00	Address of the host.
CBR/VBR in: calls: 0/0	Total successful CBR/VBR calls, including calls currently connected.
cells: 0	Total active cells (in: A to everybody; out: everybody to A).
connTime: 0	Total connection time aggregated for multiple connections.

The following example shows ATM matrix table information for the specified port select group using the **show atm rmon matrix** EXEC command.

```
atmrmon-switch# show atm rmon matrix 1
PortSelGrp: 1   Collection: Enabled     Drops: 0
47.00790000000000000000000.00A03E000001.00
47.00918100000000615C71A501.00603E329221.00
  CBR/VBR   calls: 0/0  cells: 0 connTime: 0 days 00:00:00
  ABR/UBR   calls: 0/0  cells: 0 connTime: 0 days 00:00:00
47.00918100000000615C71A501.00000C39C23F.00
47.00918100000000615C71A501.00603E329221.01
  CBR/VBR   calls: 0/0  cells: 0 connTime: 0 days 00:00:00
  ABR/UBR   calls: 0/0  cells: 0 connTime: 0 days 00:00:00
47.00918100000000615C71A501.00603E329221.00
47.00790000000000000000000.00A03E000001.00
  CBR/VBR   calls: 0/0  cells: 0 connTime: 0 days 00:00:00
  ABR/UBR   calls: 0/123856  cells: 0 connTime: 0 days 00:00:00
47.00918100000000615C71A501.00603E329221.01
47.00918100000000615C71A501.00000C39C23F.00
  CBR/VBR   calls: 0/0  cells: 0 connTime: 0 days 00:00:00
  ABR/UBR   calls: 1/14  cells: 0 connTime: 3 days 21:18:40
```

The **show atm rmon stats** command summarizes the statistics for the entire port select group, including non-monitored traffic. The following example shows ATM stats table information for the specified port select group using the **show atm rmon stats** EXEC command.

```
atmrmon-switch# show atm rmon stats 1
PortSelGrp: 1   Collection: Enabled     Drops: 0
  CBR/VBR: calls: 0/0  cells: 0 connTime: 0 days 00:00:00
  ABR/UBR: calls: 1/123862  cells: 0 connTime: 3 days 21:18:19
```

The following example shows ATM status table information for the specified port select group, and identifies which ATM interfaces were configured using the **atm rmon collect** or the **snmp enable** command.

```
atmrmon-switch# show atm rmon status
PortSelGrp: 1 Status: Enabled  Hosts:  4/no-max  Matrix:  4/no-max
        ATM0/0/0        ATM0/0/2
PortSelGrp: 2 Status: Enabled  Hosts:  0/no-max  Matrix:  0/no-max
        ATM0/0/3
PortSelGrp: 4 Status: Enabled  Hosts:  0/1  Matrix:  0/5
        ATM0/0/1
PortSelGrp: 5 Status: Enabled  Hosts:  0/no-max  Matrix:  0/no-max
        ATM0/1/2
PortSelGrp: 6 Status: Enabled  Hosts:  0/no-max  Matrix:  0/no-max
        ATM0/1/3
```

```
PortSelGrp: 7 Status: Enabled  Hosts:  0/no-max  Matrix:  0/no-max
        ATM0
```

As the following example shows, when using the **status** option, the configuration is maintained even when data collection is disabled.

```
atmrmon-switch# show atm rmon status
PortSelGrp: 1 Status: Disabled  Hosts: 0/10000    Matrix:  0/20000
        ATM0/0/0        ATM0/0/2
PortSelGrp: 2 Status: Disabled  Hosts: 0/10000    Matrix: 0/20000
        ATM0/0/3
```

Related Commands

Command	Description
atm rmon collect	Adds a port to an ATM-RMON MIB port select group.
atm rmon enable	Enables ATM-RMON MIB data collection.
atm rmon portselgrp	Configures statics, host, and matrix collection parameters for ATM-RMON MIB.

show atm route

To display all local or network-wide reachable address prefixes in the switch router's ATM routing table, use the **show atm route** EXEC command.

show atm route [*address-prefix* [**longer_prefix**] | **local**]

Syntax Description

address-prefix	Displays all routing table entries for the specified prefix.
longer_prefix	Displays all routing tables entries for longer prefixes that match the specified address prefix.
local	Displays information about reachable addresses attached to this switch router only. This includes static routes configured on this switch router and routes learned using ILMI address registration.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command displays the ATM address prefixes in the ATM routing table. Prefixes are tagged with either **E** or **I**. The **E** represents external prefixes that were configured using the **atm route** command. The **I** represents internal prefixes registered through ILMI or generated internally by the system for other purposes (for example; soft-PVP support). The prefix is displayed in the format *prefix/length*, where *length* indicates the length, in bits:

```
1234.24/16
```

The node represents the switch router that generated the route. Node 1 represents this switch router, while other numbers represent switch routers learned from the network. The port number, the protocol that generated the advertisement, the time stamp, and the port status (or summary information) are also displayed.

The link is down in the following cases:

- For local prefixes, the status is displayed as DN if either the associated interface is down or the associated interface type is NNI. Note that static routes to address prefixes cannot be used on NNI interfaces.
- For remote prefixes, such as those advertised by a remote node, the status is displayed as DN if connectivity from the local switch to the remote switch is lost.

Examples

The following example is sample output from the **show atm route** command.

```
Switch# show atm route

Codes: P - installing Protocol (S - Static, P - PNNI, R - Routing control),
       T - Type (I - Internal prefix, E - Exterior prefix, SE -
                 Summary Exterior prefix, SI - Summary Internal prefix)
                    ZE - Suppress Summary Exterior, ZI - Suppress Summary Internal)

P   T Node/Port        St Lev Prefix
~ ~~~ ~~~~~~~~~~~~~~~~ ~~ ~~~ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
P   E 2   0            UP 0   default/0
R  SI 1   0            UP 0   47.0091.8100.0000.0060.3E7B.3201/104
R   I 1   ATM0/0/0     UP 0   47.0091.8100.0000.0060.3E7B.3201.0000.0c40.81d2/152
R   I 1   ATM0/0/0     UP 0   47.0091.8100.0000.0060.3E7B.3201.0000.0c40.81d3/152
R   I 1   ATM0/0/0     UP 0   47.0091.8100.0000.0060.3E7B.3201.0000.0c40.81d4/152
R   I 1   ATM0/0/0     UP 0   47.0091.8100.0000.0060.3E7B.3201.0000.0c40.81d5/152
R   I 1   ATM0         UP 0   47.0091.8100.0000.0060.3E7B.3201.0060.3e7b.3201/152
R   I 1   ATM0         UP 0   47.0091.8100.0000.0060.3E7B.3201.0060.3e7b.3202/152
R   I 1   ATM0         UP 0   47.0091.8100.0000.0060.3E7B.3201.0060.3e7b.3203/152
R   I 1   ATM0         UP 0   47.0091.8100.0000.0060.3E7B.3201.0060.3e7b.3204/152
R   I 1   ATM0         UP 0   47.0091.8100.0000.0060.3E7B.3201.4000.0c/128
S   E 1   ATM0/0/1     UP 0   47.0091.8100.0000.0003.dde7.4601/104
P   I 2   0            UP 0   47.0091.8100.0000.0003.dde7.4601/104
P   I 3   0            UP 0   47.0091.8100.0000.0060.3e7b.3801/104
```

show atm routing-mode

To display the routing mode in which the switch is running, use the **show atm routing-mode** privileged EXEC command.

show atm routing-mode

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

The routing mode of the switch is dynamic (PNNI) or static (IISP).

Examples

This following example is sample output from the **show atm routing-mode** command.

```
Switch# show atm routing-mode
Routing Mode: Dynamic (PNNI)
```

Related Commands

Command	Description
atm routing-mode	Restricts the mode of ATM routing on an ATM switch router.

show atm signalling cug

To display all configured CUGs, use the **show atm signalling cug** EXEC command.

show atm signalling cug [**interface atm** *card/subcard/port*] [**access** | **alias** *alias-name* | **interlock-code** *ic*]

Syntax Description

card/subcard/port	The card, subcard, and port number of the ATM interface.
alias-name	The name of the CUG alias for the 24-byte interlock code.
ic	The interlock code number.

Command Modes

EXEC

Command History

Release	Modification
11.2(8.0.1)	New command

Examples

The following example is sample output from the **show atm signalling cug** command.

```
Switch# show atm signalling cug
Interface:          ATM3/0/0
Cug Alias Name:
Cug Interlock Code: 00.000000000000000000000000.000000000000.00.01001111
Non preferential Cug
Permit Network to User Calls
Permit User to Network Calls
```

Related Commands

Command	Description
atm signalling cug access	Restricts access to and from a closed user group.
atm signalling cug alias	Creates a CUG alias.
atm signalling cug assign	Assigns a CUG to an interface.

show atm signalling diagnostics

To display the configured filter entries and the collection call records for the ATM signalling diagnostics feature, use the **show atm signalling diagnostics** EXEC command.

show atm signalling diagnostics {**filter** | **record** | **status** *filter-index*}

Syntax Description

filter	Displays the information in the filter table.
record	Displays the call failure records.
status	Displays global diagnostics status.
filter-index	Displays all of the records filtered for each entry in the filter index specified. The *filter-index* can range from 1 to 50.

Command Modes

EXEC

Command History

Release	Modification
11.2(8.0.1)	New command

Examples

The following example is sample output from the **show atm signalling diagnostics filter** command.

```
Switch# show atm signalling diagnostics filter
F I L T E R   I N D E X    1
-------------------------------
Scope: internal, Cast Type: p2mp
Connection Kind: soft-vc
Service Category:  CBR (Constant Bit Rate)  UBR (Unspecified Bit Rate)
Clear Cause: 0, Initial TimerValue: 600
Max Records: 20,   NumMatches: 0,   Timer expiry: 600
Incoming Port: ATM0/0/1, Outgoing Port: ATM0/1/1
Calling Nsap Address:47.111122223333444455556666.777788889999.00
Calling Address Mask:FF.FFFFFF000000000000000000.000000000000.00
Called Nsap Address :47.111122223333444455556666.777788889999.01
Called Address Mask :FF.FFFFFF000000000000000000.000000000000.00
Status : active
```

Examples

The following example is sample output from the **show atm signalling diagnostics record 1** command.

```
Switch# show atm signalling diagnostics record 1
D I S P L A Y I N D E X    1
-------------------------------
Scope: internal,  Cast Type: p2p, Conn Indicator: Setup Failure
Connection Kind:   switched-vc
Service Category:  UBR (Unspecified Bit Rate)
Clear Cause: 0x29,  Diagnostics: NULL
Incoming Port: ATM1/0/3,  Outgoing Port:ATM0/1/3
Calling-Address: 47.009181000000006011000000.470803040506.00
Calling-SubAddr: NULL
Called-Address : 47.00918100000006083C42C01.750203040506.00
```

```
Called-SubAddr : NULL
Crankback Type : No Crankback
DTL's :
NodeId:56:160:47.009181000000006011000000.006083AB9001.00 Port: 0/1/3:2
NodeId:56:160:47.00918100000000603E7B4101.00603E7B4101.00 Port: 0/0/0:2
NodeId:56:160:47.00918100000000006083C42C01.006083C42C01.00 Port: 0
```

show atm signalling statistics

To show the ATM signalling statistics, use the **show atm signalling statistics** EXEC command.

show atm signalling statistics [**interface atm** *card/subcard/port*] [**ie**]

Syntax Description

card/subcard/port	Specifies the card, subcard, and port number of the ATM interface.
ie	Displays the information element statistics.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

If no interface is specified, statistics for all interfaces are displayed.

Examples

The following example is sample output from the **show atm signalling statistics** EXEC command with no interface specified.

```
Switch# show atm signalling statistics
Global Statistics:
Calls Throttled: 0
Max Crankback: 3
Max Connections Pending: 255
Max Connections Pending Hi Water Mark: 0

ATM 0:0   UP Time 00:00:32  # of int resets: 0
----------------------------------------------------------------
Terminating connections: 0       Soft VCs: 0
Active Transit PTP SVC: 0        Active Transit MTP SVC: 0
Port requests:  0                Source route requests: 0
Conn-Pending: 0                  Conn-Pending High Water Mark: 0
Calls Throttled: 0               Max-Conn-Pending:  40

          Messages:   Incoming  Outgoing
          ---------   --------  --------
PTP Setup Messages:         0         0
MTP Setup Messages:         0         0
  Release Messages:         0         0
  Restart Messages:         0         0

           Message:   Received Transmitted Tx-Reject Rx-Reject
Add Party Messages:           0           0         0         0

     Failure Cause:   Routing     CAC   Access-list    Addr-Reg  Misc-Failure
    Location Local:         0       0             0           0             0
   Location Remote:         0       0             0           0             0
```

Examples

The following example is sample output from the **show atm signalling statistics** EXEC command for interface ATM 0/0/0.

```
Switch# show atm signalling statistics interface atm 0/0/0
ATM 0/0/0:0   UP Time 00:01:32  # of int resets: 0
----------------------------------------------------------------
Terminating connections: 0       Soft VCs: 0
Active Transit PTP SVC: 0        Active Transit MTP SVC: 0
Port requests:  0                Source route requests: 0
Conn-Pending: 0                  Conn-Pending High Water Mark: 0
Calls Throttled: 0               Max-Conn-Pending:  40

          Messages:   Incoming  Outgoing
          ---------   --------  --------
PTP Setup Messages:         0         0
MTP Setup Messages:         0         0
  Release Messages:         0         0
  Restart Messages:         0         0

           Message:   Received Transmitted Tx-Reject Rx-Reject
Add Party Messages:           0           0         0         0

     Failure Cause:   Routing     CAC   Access-list    Addr-Reg  Misc-Failure
    Location Local:         0       0             0           0             0
   Location Remote:         0       0             0           0             0
```

Related Commands

Command	Description
clear atm signalling statistics	Clears existing ATM signalling statistics.

show atm snoop

To display the current port snooping configuration and actual register values for the highest ATM interface, use the **show atm snoop** EXEC command.

show atm snoop

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command displays the snoop test port name, snoop option (enabled or disabled), monitored port name (if enabled), and snoop direction (receive or transmit if enabled).

This command applies only to card 4, subcard 1, and the highest port allowed for the card. See the **atm signalling vpci** command for port information.

Examples

The following example displays the snoop configuration and actual register values for the highest interface.

```
Switch# show atm snoop
Snoop Test Port Name:  ATM3/1/3 (interface status=SNOOPING)
Snoop option:          (configured=enabled) (actual=enabled)
Monitored Port Name:   (configured=ATM3/0/0) (actual=ATM3/0/0)
Snoop direction:       (configured=receive) (actual=receive)
```

The following example shows that there is no card in the snoop test port card 4, subcard 1 position.

```
Switch# show atm snoop

Snoop Test Port Name:  ATM3/1/3 (port is bad or missing)
Snoop option:          (configured=disabled)
```

The following example shows that the snoop test port has been inserted and configured but is shut down.

```
Switch# show atm snoop

Snoop Test Port Name:  ATM3/1/3 (interface status=DOWN)(shutdown)
Snoop option:          (configured=enabled)
Monitored Port Name:   (configured=ATM3/1/0)
Snoop direction:       (configured=receive)
```

Related Commands

Command	Description
atm signalling vpci	Specifies the value of VPCI to be carried in the signalling messages within a VP tunnel.

show atm snoop-vc

To display the current port snooping configuration and actual register values per-VC, use the **show atm snoop-vc** EXEC command.

show atm snoop-vc [**interface atm** *card*/*subcard*/*port*]

Syntax Description

card/*subcard*/*port*	Specifies the card, subcard, and port number of the ATM interface.

Command Modes

EXEC

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

This command displays the snoop test port name, snoop option (enabled or disabled), monitored port name (if enabled), and snoop direction (receive or transmit if enabled).

Examples

The following example displays all VC snoop connections on the switch.

```
Switch# show atm snoop-vc
       Snooping                                Snooped
Interface    VPI   VCI   Type    X-Interface  X-VPI X-VCI Dir    Status
ATM0/0/2     0     5     PVC     ATM0/1/1     0     5     Rx     DOWN
ATM0/0/2     0     16    PVC     ATM0/1/1     0     16    Rx     DOWN
ATM0/1/2     0     5     PVC     ATM0/0/1     0     5     Tx     DOWN
ATM0/1/2     0     16    PVC     ATM0/0/1     0     16    Tx     DOWN
ATM0/1/2     0     18    PVC     ATM0/0/1     0     18    Tx     UP
ATM0/1/2     0     100   PVC     ATM0/0/1     0     100   Tx     DOWN
ATM0/1/2     0     201   PVC     ATM0/0/1     0     201   Tx     DOWN
ATM0/1/2     0     202   PVC     ATM0/0/1     0     202   Tx     DOWN
ATM0/1/2     0     300   PVC     ATM0/0/1     0     300   Tx     DOWN
ATM0/1/2     0     301   PVC     ATM0/0/1     0     301   Tx     DOWN
```

The following example displays all VC snoop connections on ATM interface 0/1/2.

```
Switch# show atm snoop-vc interface atm 0/1/2
      Snooping                                Snooped
Interface    VPI   VCI   Type    X-Interface  X-VPI X-VCI Dir    Status
ATM0/1/2     0     5     PVC     ATM0/0/1     0     5     Tx     DOWN
ATM0/1/2     0     16    PVC     ATM0/0/1     0     16    Tx     DOWN
ATM0/1/2     0     18    PVC     ATM0/0/1     0     18    Tx     UP
ATM0/1/2     0     100   PVC     ATM0/0/1     0     100   Tx     DOWN
ATM0/1/2     0     201   PVC     ATM0/0/1     0     201   Tx     DOWN
ATM0/1/2     0     202   PVC     ATM0/0/1     0     202   Tx     DOWN
ATM0/1/2     0     300   PVC     ATM0/0/1     0     300   Tx     DOWN
ATM0/1/2     0     301   PVC     ATM0/0/1     0     301   Tx     DOWN
```

Examples

The following example displays VC snoop connection VPI 0, VCI 543 on ATM interface 0/0/0.

```
Switch# show atm snoop-vc interface atm 0/0/0 0 543

Interface: ATM0/0/0, Type: oc3suni
VPI = 0  VCI = 543
Status: UP
Time-since-last-status-change: 00:00:19
Connection-type: PVC
Cast-type: snooping-leaf
Packet-discard-option: enabled
Usage-Parameter-Control (UPC): pass
Wrr weight: 32
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states:  Not-applicable
Cross-connect-interface: ATM0, Type: ATM Swi/Proc
Cross-connect-VPI = 0
Cross-connect-VCI = 42
Cross-connect-UPC: pass
Cross-connect OAM-configuration: disabled
Cross-connect OAM-state:  Not-applicable
Threshold Group: 6, Cells queued: 0
Rx cells: 0, Tx cells: 4
Rx connection-traffic-table-index: 3
Rx service-category: VBR-RT (Realtime Variable Bit Rate)
Rx pcr-clp01: 424
Rx scr-clp01: 424
Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx       mbs: 50
Tx connection-traffic-table-index: 3
Tx service-category: VBR-RT (Realtime Variable Bit Rate)
Tx pcr-clp01: 424
Tx scr-clp01: 424
Tx mcr-clp01: none
Tx      cdvt: none
Tx       mbs: 50
```

Related Commands

Command	Description
atm snoop-vc	Sets the current port snooping configuration and actual register values per-VC.

show atm snoop-vp

To display the current port snooping configuration and actual register values per-VP, use the **show atm snoop-vp** EXEC command.

show atm snoop-vp [**interface atm** *card/subcard/port*]

Syntax Description

card/subcard/port	Specifies the card, subcard, and port number of the ATM interface.

Command Modes

EXEC

Command History

Release	Modification
11.2(8.0.1)	New command

Usage Guidelines

This command displays the snoop test port name, snoop option (enabled or disabled), monitored port name (if enabled), and snoop direction (receive or transmit if enabled).

Examples

The following example displays all VP snoop connections on the switch.

```
Switch# show atm snoop-vp
       Snooping                              Snooped
Interface     VPI  Type     X-Interface  X-VPI Dir    Status
ATM0/0/2      0    PVC      ATM0/1/1     0     Rx     DOWN
ATM0/0/2      0    PVC      ATM0/1/1     0     Rx     DOWN
ATM0/1/2      0    PVC      ATM0/0/1     0     Tx     DOWN
ATM0/1/2      0    PVC      ATM0/0/1     0     Tx     DOWN
ATM0/1/2      0    PVC      ATM0/0/1     0     Tx     UP
ATM0/1/2      0    PVC      ATM0/0/1     0     Tx     DOWN
ATM0/1/2      0    PVC      ATM0/0/1     0     Tx     DOWN
ATM0/1/2      0    PVC      ATM0/0/1     0     Tx     DOWN
ATM0/1/2      0    PVC      ATM0/0/1     0     Tx     DOWN
ATM0/1/2      0    PVC      ATM0/0/1     0     Tx     DOWN
```

Related Commands

Command	Description
atm snoop-vp	Sets the current port snooping configuration and actual register values per-VP.

show atm status

To display current information about ATM interfaces and the number of installed connections, use the **show atm status** EXEC command.

show atm status

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following is sample output from the **show atm status** command.

```
Switch# show atm status
NUMBER OF INSTALLED CONNECTIONS: (P2P=Point to Point, P2MP=Point to MultiPoint)

Type        PVCs  SoftPVCs      SVCs      PVPs  SoftPVPs      SVPs      Total
P2P           11         0         0         1         0         0         12
P2MP           0         0         0         0         0         0          0
                                    TOTAL INSTALLED CONNECTIONS =         12

PER-INTERFACE STATUS SUMMARY AT 14:56:19 UTC Mon Mar 25 1997:
   Interface      IF         Admin  Auto-Cfg    ILMI Addr     SSCOP    Hello
     Name       Status      Status    Status    Reg State     State    State
------------- -------- ------------ -------- ------------ --------- --------
ATM0               UP           up      n/a   Restarting      Idle      n/a
ATM3/0/0           UP           up     done  UpAndNormal    Active  2way_in
ATM3/0/0.25      DOWN     shutdown  waiting          n/a      Idle      n/a
ATM3/0/0.26        UP           up  waiting  WaitDevType      Idle      n/a
ATM3/0/1         DOWN         down  waiting          n/a      Idle      n/a
ATM3/0/2           UP           up     done  UpAndNormal    Active  2way_in
ATM3/0/3         DOWN         down  waiting          n/a      Idle      n/a
```

show atm traffic

To display the ATM layer traffic information for all of the ATM interfaces, use the **show atm traffic** EXEC command.

show atm traffic

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command displays input and output cell counts and a 5-minute transfer rate for all ATM interfaces.

Examples

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

```
Switch# show atm traffic
Interface ATM0
Rx cells: 0
Tx cells: 0
5 minute input rate: 0 bits/sec, 0 cells/sec
5 minute output rate: 0 bits/sec, 0 cells/sec

Interface ATM3/0/0
Rx cells: 0
Tx cells: 0
5 minute input rate: 0 bits/sec, 0 cells/sec
5 minute output rate: 0 bits/sec, 0 cells/sec
```

Related Commands

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

show atm vc

To display the ATM layer connection information about the virtual connection, use the **show atm vc** EXEC command.

show atm vc
show atm vc interface {**atm** | **atm-p**} *card*/*subcard*/*port*[**.***vpt#*] [*vpi vci*] [**detail**]
show atm vc [**cast-type** *cast-type*] [**conn-type** *conn-type*] [**interface** {**atm** | **atm-p**} *card*/*subcard*/*port*[**.***vpt#*]]
show atm vc traffic [**interface** {**atm** | **atm-p**} *card*/*subcard*/*port*[**.***vpt#*] [*vpi vci*]]

Syntax Description

card/*subcard*/*port*	Card, subcard, and port number for the interface.
.*vpt#*	Virtual path tunnel identifier to display.
vpi vci	Virtual path identifier and virtual channel identifier to display.
detail	Displays the Rx cell drops and queued-cells for all VCs on a given interface.
cast-type	Specifies the cast type as multipoint-to-point (**mp2p**), point-to-multipoint (**p2mp**), or point-to-point (**p2p**).
conn-type	Specifies the connection type as **pvc**, **soft-vc**, **svc**, or **tvc**.
traffic	Displays the virtual channel cell traffic.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example shows a display for the **vc** interface.

```
Switch# show atm vc
Interface     VPI   VCI   Type    X-Interface  X-VPI X-VCI  Encap Status
ATM0/1/0      0     5       PVC     ATM0         0     52    QSAAL  UP
ATM0/1/0      0     16      PVC     ATM0         0     32    ILMI   UP
ATM0/1/0      0     18      PVC     ATM0         0     73    PNNI   UP
ATM0/1/1      0     5       PVC     ATM0         0     53    QSAAL  DOWN
ATM0/1/1      0     16      PVC     ATM0         0     33    ILMI   DOWN
ATM0/1/2      0     5       PVC     ATM0         0     54    QSAAL  DOWN
ATM0/1/2      0     16      PVC     ATM0         0     34    ILMI   DOWN
ATM0/1/3      0     5       PVC     ATM0         0     55    QSAAL  UP
ATM0/1/3      0     16      PVC     ATM0         0     35    ILMI   UP
ATM1/0/0      0     5       PVC     ATM0         0     56    QSAAL  UP
ATM1/0/0      0     16      PVC     ATM0         0     36    ILMI   UP
ATM1/0/1      0     5       PVC     ATM0         0     57    QSAAL  DOWN
ATM1/0/1      0     16      PVC     ATM0         0     37    ILMI   DOWN
ATM1/0/2      0     5       PVC     ATM0         0     58    QSAAL  DOWN
ATM1/0/2      0     16      PVC     ATM0         0     38    ILMI   DOWN
ATM1/0/3      0     5       PVC     ATM0         0     59    QSAAL  UP
ATM1/0/3      0     16      PVC     ATM0         0     39    ILMI   UP
ATM1/0/3      0     18      PVC     ATM0         0     72    PNNI   UP
```

```
ATM1/1/0      0      5       PVC      ATM0          0      60     QSAAL   DOWN
ATM1/1/0      0      16      PVC      ATM0          0      40     ILMI    DOWN
ATM1/1/1      0      5       PVC      ATM0          0      61     QSAAL   DOWN
ATM1/1/1      0      16      PVC      ATM0          0      41     ILMI    DOWN
```

Table 18-13 describes the fields shown in the display.

Table 18-13 show atm vc Field Descriptions

Field	Description
Interface	Displays the card, subcard, and port number of the specified ATM interface.
VPI	Displays the number of the virtual path identifier.
VCI	Displays the number of the virtual channel identifier.
Type	Displays the type of interface for the specified ATM interface.
X-Interface	Displays the card, subcard, and port number of the cross-connected value for the ATM interface.
X-VPI	Displays the number of the cross-connected value of the virtual path identifier.
X-VCI	Displays the number of the cross-connected value of the virtual channel identifier.
Encap	Displays the type of connection on the interface.
Status	Displays the current state of the specified ATM interface.

Examples

The following example displays the output for interface ATM 1/0/0 with and without the **detail** keyword which shows the Rx-cel-drops and the Rx-queued-cells:

```
Swtich# show atm vc traffic interface atm 1/0/0
Interface         VPI  VCI   Type      rx-cell-cnts     tx-cell-cnts
ATM-P1/0/0        0    32    PVC               1                0
ATM-P1/0/0        0    33    PVC               0                0
ATM-P1/0/0        0    34    PVC               0                0
ATM-P1/0/0        0    35    PVC               0                0
ATM-P1/0/0        0    37    PVC               0                0
ATM-P1/0/0        0    39    PVC               0                0
ATM-P1/0/0        0    48    PVC               0                0
Switch# show atm vc traffic interface atm 1/0/0 detail
Interface         VPI  VCI   Type      rx-cell    tx-cell rx-cell-drop rx-cell-qued
ATM-P1/0/0        0    32    PVC             1          0           0          0
ATM-P1/0/0        0    33    PVC             0          0           0          0
ATM-P1/0/0        0    34    PVC             0          0           0          0
ATM-P1/0/0        0    35    PVC             0          0           0          0
ATM-P1/0/0        0    37    PVC             0          0           0          0
ATM-P1/0/0        0    39    PVC             0          0           0          0
ATM-P1/0/0        0    48    PVC             0          0           0          0
```

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The following example shows the interface information for ATM 1/0/0, with VPI 0, VCI 5, and packet discard enabled, using an FC-PCQ.

```
Switch# show atm vc interface atm 1/0/0 1 100

Interface: ATM1/0/0, Type: oc3suni
VPI = 0  VCI = 5
Status: UP
Time-since-last-status-change: 1d18h
Connection-type: PVC
```

```
Cast-type: point-to-point
Packet-discard-option: enabled
Usage-Parameter-Control (UPC): pass
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states:  Not-applicable
Cross-connect-interface: ATM0, Type: ATM Swi/Proc
Cross-connect-VPI = 0
Cross-connect-VCI = 58
Cross-connect-UPC: pass
Cross-connect OAM-configuration: disabled
Cross-connect OAM-state:  Not-applicable
Encapsulation: AALQSAAL
Rx cells: 32520, Tx cells: 32520
Rx connection-traffic-table-index: 3
Rx service-category: VBR-RT (Realtime Variable Bit Rate)
Rx pcr-clp01: 424
Rx scr-clp01: 424
Rx mcr-clp01: none
Rx      cdvt: none
Rx       mbs: 50
Tx connection-traffic-table-index: 3
Tx service-category: VBR-RT (Realtime Variable Bit Rate)
Tx pcr-clp01: 424
Tx scr-clp01: 424
Tx mcr-clp01: none
Tx      cdvt: none
Tx       mbs: 50
Crc Errors:0, Sar Timeouts:0, OverSizedSDUs:0
BufSzOvfl:  Small:0, Medium:0, Big:0, VeryBig:0, Large:0
```

Examples

The following example shows the interface information for ATM 1/0/0, with VPI 1, VCI 100 and packet discard disabled, using the switch processor feature card.

```
Switch# show atm vc interface atm 1/0/0 1 100

Interface: ATM1/0/0, Type: oc12suni
VPI = 1 VCI = 100
Status: UP
Time-since-last-status-change: 02:55:48
Connection-type: PVC
Cast-type: point-to-point
Packet-discard-option: disabled
Usage-Parameter-Control (UPC): pass
Wrr weight: 32
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states:  Not-applicable
```

```
Cross-connect-interface: ATM0/1/1, Type: oc3suni
Cross-connect-VPI = 1
Cross-connect-VCI = 100
Cross-connect-UPC: pass
Cross-connect OAM-configuration: disabled
Cross-connect OAM-state:  Not-applicable
Threshold Group: 5, Cells queued: 0
Rx cells: 0, Tx cells: 0
Tx Clp0:0,  Tx Clp1: 0
Rx Clp0:0,  Rx Clp1: 0
Rx Upc Violations:0, Rx cell drops:0
Rx Clp0 q full drops:0, Rx Clp1 qthresh drops:0
Rx connection-traffic-table-index: 1
Rx service-category: UBR (Unspecified Bit Rate)
Rx pcr-clp01: 7113539
Rx scr-clp01: none
Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx       mbs: none
Tx connection-traffic-table-index: 1
Tx service-category: UBR (Unspecified Bit Rate)
Tx pcr-clp01: 7113539
Tx scr-clp01: none
Tx mcr-clp01: none
Tx      cdvt: none
Tx       mbs: none
```

Examples

The following example shows the interface information for ATM 1/0/0, with VPI 0, VCI 5, and packet discard enabled, using the FC-PFQ.

```
Switch# show atm vc interface atm 1/0/0 0 5

Interface: ATM1/0/0, Type: oc12suni
VPI = 0  VCI = 5
Status: UP
Time-since-last-status-change: 03:02:32
Connection-type: PVC
Cast-type: point-to-point
Packet-discard-option: enabled
Usage-Parameter-Control (UPC): pass
Wrr weight: 32
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states:  Not-applicable
Cross-connect-interface: ATM0, Type: ATM Swi/Proc
Cross-connect-VPI = 0
Cross-connect-VCI = 45
Cross-connect-UPC: pass
Cross-connect OAM-configuration: disabled
Cross-connect OAM-state:  Not-applicable
Encapsulation: AALQSAAL
Threshold Group: 6, Cells queued: 0
Rx cells: 2302, Tx cells: 2301
Tx Clp0:2301,  Tx Clp1: 0
Rx Clp0:2302,  Rx Clp1: 0
Rx Upc Violations:0, Rx cell drops:0
Rx pkts:0, Rx pkt drops:0
Rx connection-traffic-table-index: 3
```

```
Rx service-category: VBR-RT (Realtime Variable Bit Rate)
Rx pcr-clp01: 424
Rx scr-clp01: 424
Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx       mbs: 50
Tx connection-traffic-table-index: 3
Tx service-category: VBR-RT (Realtime Variable Bit Rate)
Tx pcr-clp01: 424
Tx scr-clp01: 424
Tx mcr-clp01: none
Tx      cdvt: none
Tx       mbs: 50
Crc Errors:0, Sar Timeouts:0, OverSizedSDUs:0
BufSzOvfl:  Small:0, Medium:0, Big:0, VeryBig:0, Large:0
```

Examples

The following example shows the last explicit path status for a soft VC. Note that the first listed explicit path, *new_york.path2*, shows an unreachable result, but the second explicit path, *new_york.path1*, has succeeded.

```
Switch# show atm vc interface atm0/1/3 0 40
VPI = 0 VCI = 40
Status:UP
Time-since-last-status-change:00:00:03
Connection-type:SoftVC
Cast-type:point-to-point
 Soft vc location:Source
 Remote ATM address:47.0091.8100.0000.0060.705b.d900.4000.0c81.9000.00
 Remote VPI:0
 Remote VCI:40
 Soft vc call state:Active
 Number of soft vc re-try attempts:0
 First-retry-interval:5000 milliseconds
 Maximum-retry-interval:60000 milliseconds
 Aggregate admin weight:15120
 TIME STAMPS:
 Current Slot:4
  Outgoing Release   February 26 17:02:45.940
  Incoming Rel comp  February 26 17:02:45.944
  Outgoing Setup     February 26 17:02:45.948
  Incoming Connect   February 26 17:02:46.000
  Outgoing Setup     February 23 11:54:17.587
  Incoming Release   February 23 11:54:17.591
  Outgoing Setup     February 23 11:54:37.591
  Incoming Release   February 23 11:54:37.611
  Outgoing Setup     February 23 11:55:17.611
  Incoming Connect   February 23 11:55:17.655

 Explicit-path 1:result=6 PNNI_DEST_UNREACHABLE  (new_york.path2)
 Explicit-path 2:result=1 PNNI_SUCCESS  (new_york.path1)
 Only-explicit
Packet-discard-option:disabled
Usage-Parameter-Control (UPC):pass
Number of OAM-configured connections:0
OAM-configuration:disabled
OAM-states: Not-applicable
```

```
Cross-connect-interface:ATM0/0/3.4, Type:oc3suni
Cross-connect-VPI = 4
Cross-connect-VCI = 35
Cross-connect-UPC:pass
Cross-connect OAM-configuration:disabled
Cross-connect OAM-state: Not-applicable
Rx cells:0, Tx cells:0
Rx connection-traffic-table-index:1
Rx service-category:UBR (Unspecified Bit Rate)
Rx pcr-clp01:7113539
Rx scr-clp01:none
Rx mcr-clp01:none
Rx      cdvt:1024 (from default for interface)
Rx       mbs:none
Tx connection-traffic-table-index:1
Tx service-category:UBR (Unspecified Bit Rate)
Tx pcr-clp01:7113539
Tx scr-clp01:none
Tx mcr-clp01:none
Tx      cdvt:none
Tx       mbs:none
```

Table 18-14 describes the fields shown in the displays.

Table 18-14 show atm vc interface ATM Field Descriptions

Field	Description
Interface	Displays the card, subcard, and port number of the ATM interface.
VPI/VCI	Displays the number of the virtual path identifier and the virtual channel identifier.
Status	Displays the type of interface for the specified ATM interface.
Time-since-last-status-change	Displays the time elapsed since the last status change.
Connection-type	Displays the type of connection for the specified ATM interface.
Cast-type	Displays the type of cast for the specified ATM interface.
Packet-discard-option	Displays the state of the packet-discard option; enabled or disabled.
Usage-Parameter-Control (UPC)	Displays the state of the UPC.
Wrr weight	Weighted round-robin weight.
Number of OAM-configured connections	Displays the number of connections configured by OAM.
OAM-configuration	Displays the state of the OAM configuration; enabled or disabled.
OAM-states	Displays the status of the OAM state; applicable or not applicable.
Cross-connect-interface	Displays the card, subcard, and port number of the cross-connected ATM.
Cross-connect-VPI	Displays the number of the cross-connected virtual path identifier.
Cross-connect-VCI	Displays the number of the cross-connected virtual channel identifier.
Cross-connect-UPC	Displays the state of the cross-connected UPC; pass or not pass.
Cross-connect OAM-configuration	Displays the state of the cross-connected OAM configuration; enabled or disabled.

Table 18-14 show atm vc interface ATM Field Descriptions (continued)

Field	Description
Cross-connect OAM-state	Displays the status of the cross-connected OAM state; applicable or not applicable.
Encapsulation	Encapsulation type.
Threshold Group/Cells queued	Displays the threshold group number and number of cells queued.
Rx cells/Tx cells	Displays the number of cells transmitted and received.
Tx Clp0/Tx Clp1	Displays the number of CLP=0 and CLP=1 cells transmitted.
Rx Clp0/Rx Clp1	Displays the number of CLP=0 and CLP=1 cells received.
Rx Upc Violations	Displays the number of UPC violations detected in the receive cell stream.
Rx cell drops	Displays the number of cells received and then dropped.
Rx pkts	Displays the number of packets received.
Rx pkt drops	Displays the number of packets dropped.
RxClp0q full drops	Displays the number of CLP=0 cells received and then dropped for exceeding the input queue size.
Rx Clp1 qthresh drops	Displays the number of CLP=1 cells received and then dropped for exceeding the discard threshold of the input queue.
Rx connection-traffic-table-index	Displays the receive connection-traffic-table-index.
Rx service-category	Displays the receive service category.
Rx pcr-clp01	Displays the receive peak cell rate for clp01 cells (kbps).
Rx scr-clp01	Displays the receive sustained cell rate for clp01 cells (kbps).
Rx mcr-clp01	Displays the receive minimum cell rate for clp01 cells (kbps).
Rx cdvt	Displays the receive cell delay variation tolerance.
Rx mbs	Displays the receive minimum burst size.
Tx connection-traffic-table-index	Displays the transmit connection-traffic-table-index.
Tx service-category	Displays the transmit service category.
Tx pcr-clp01	Displays the transmit peak cell rate for clp01 cells (kbps).
Tx scr-clp01	Displays the transmit sustained cell rate for clp01 cells (kbps).
Tx mcr-clp01	Displays the transmit minimum cell rate for clp01 cells (kbps).
Tx cdvt	Displays the transmit cell delay variation tolerance.
Tx mbs	Displays the transmit minimum burst size.
Crc error	Displays the number of cyclic redundancy check errors.
Sar Timeouts	Displays the number of segmentation and reassembly timeouts.
OverSizedSDUs	Displays the number of oversized service data units.
BufSzOvfl	Displays the number of buffer size overflows.

Examples

The following example shows how to enter the command for a display of the cast type, point-to-multipoint, and connection type soft-vc on ATM interface 0/0/0.

```
Switch# show atm vc cast-type p2mp conn-type soft-vc interface ATM 0/0/0
```

The following example shows how to enter the command for a display of the connection type SVC and cast-type point-to-point on ATM interface 0/0/0.

```
Switch# show atm vc conn-type svc cast-type p2p interface ATM 0/0/0
```

The following example shows the transmit and receive cell count on ATM interface 1/0/0, with VPI 1 and VPI 100.

```
Switch# show atm vc traffic interface atm 1/0/0 1 100
Interface    VPI     VCI      Type      rx-cell-cnts     tx-cell-cnts
ATM1/0/0     1       100       PVC                0                0
```

Related Commands

Command	Description
atm pvc	Used to create a PVC.
show atm interface	Displays ATM-specific information about an ATM interface.
show atm status	Displays current information about ATM interfaces and the number of installed connections.
show atm vc signalling	Displays the ATM VC signalling activity.

show atm vc signalling

To show the ATM VC signalling activity, use the **show atm vc signalling** EXEC command.

show atm vc signalling [**interface atm** *card/subcard/port*] [**cast-type p2p | p2mp**] [**detail**]

Syntax Description

card/subcard/port	Card, subcard, and port number for the ATM interface.
cast-type	Displays the payload type protocol and the message type protocol information for a point-to-point (**p2p**) or point-to-multipoint (**p2mp**) connection.
detail	Displays detailed information about a connection, including type of connection, calling party, current and previous state, and how the call was initiated.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show atm vc signalling** EXEC command.

```
Switch# show atm vc signalling

Interface  VPI   VCI   CallRef  X-Interface VPI    VCI     CallRef  Type
*ATM0/0/0  0     32       1       ATM1/0/0   0     32       1       MTP
*ATM0/0/0  0     33       2       ATM1/0/0   0     33       2       MTP
*ATM0/0/0  0     34       3       ATM1/0/0   0     34       3       MTP
*ATM0/0/0  0     35       4       ATM1/0/0   0     35       4       MTP
*ATM0/0/0  0     36       5       ATM1/0/0   0     36       5       MTP
*ATM0/0/0  0     37       6       ATM1/0/0   0     37       6       MTP
*ATM0/0/0  0     38       7       ATM1/0/0   0     38       7       MTP
*ATM0/0/0  0     39       8       ATM1/0/0   0     39       8       MTP
*ATM0/0/0  0     40       9       ATM1/0/0   0     40       9       MTP
*ATM0/0/0  0     41       10      ATM1/0/0   0     41       10      PTP
*ATM0/0/0  0     42       11      ATM1/0/0   0     42       11      PTP
*ATM0/0/0  0     43       12      ATM1/0/0   0     43       12      PTP
*ATM0/0/0  0     44       13      ATM1/0/0   0     44       13      PTP
*ATM0/0/0  0     45       14      ATM1/0/0   0     45       14      PTP
*ATM0/0/0  0     46       15      ATM1/0/0   0     46       15      PTP
*ATM0/0/0  0     47       16      ATM1/0/0   0     47       16      PTP
*ATM0/0/0  0     48       17      ATM1/0/0   0     48       17      PTP
*ATM0/0/0  0     49       18      ATM1/0/0   0     49       18      PTP
*ATM0/0/0  0     50       19      ATM1/0/0   0     50       19      PTP
```

The following example is sample output from the **show atm vc signalling** EXEC command using the **p2p** option.

```
Switch# show atm vc signalling cast-type p2p
Interface  VPI   VCI   CallRef  X-Interface VPI    VCI     CallRef  Type
 ATM0      0     67       5        ATM0/1/1  0     32       1       PTP
*ATM0/0/0  0     32       1        ATM1/0/0  0     32       1       PTP
*ATM0/0/0  0     33       2        ATM1/0/0  0     33       2       PTP
*ATM0/0/0  0     34       3        ATM1/0/0  0     34       3       PTP
*ATM0/0/0  0     35       4        ATM1/0/0  0     35       4       PTP
*ATM0/0/0  0     36       5        ATM1/0/0  0     36       5       PTP
*ATM0/0/0  0     37       6        ATM1/0/0  0     37       6       PTP
*ATM0/0/0  0     38       7        ATM1/0/0  0     38       7       PTP
*ATM0/0/0  0     39       8        ATM1/0/0  0     39       8       PTP
*ATM0/0/0  0     40       9        ATM1/0/0  0     40       9       PTP
*ATM0/0/0  0     41       10       ATM1/0/0  0     41       10      PTP
*ATM0/0/0  0     42       11       ATM1/0/0  0     42       11      PTP
*ATM0/0/0  0     43       12       ATM1/0/0  0     43       12      PTP
*ATM0/0/0  0     44       13       ATM1/0/0  0     44       13      PTP
*ATM0/0/0  0     45       14       ATM1/0/0  0     45       14      PTP
*ATM0/0/0  0     46       15       ATM1/0/0  0     46       15      PTP
*ATM0/0/0  0     47       16       ATM1/0/0  0     47       16      PTP
```

The following sample shows the output using the **detail** and **cast-type** options with the **show atm vc signalling** command.

```
Switch# show atm vc signalling detail cast-type p2mp
(0/0/0:0  0,36 - 0005) p2p
    From: 47.22220000000000000000
    remote, Rcvd Connect Ack -> Active(N10),

(1/0/0:0  0,36 - 0005) p2p
      To: 47.11110000000000000000
      local , Req Connect Ack -> Active(N10),
```

Table 18-15 describes the fields from the **show atm vc signalling detail** command.

Table 18-15 show atm vc signalling detail Field Descriptions

Field	Description
0/0/0	The interface number.
0,36	The VCI/VCI number.
0005	The call reference number.
p2p	The type of connection.
From	The origin of the calling party.
remote/local	The call was initiated either remotely or locally.
Rcvd Connect Ack	The previous state of the call.
Active	The current state of the call.

show atm vp

To display the ATM layer connection information about the virtual path, use the **show atm vp** EXEC command.

show atm vp

show atm vp interface {**atm** | **atm-p**} *card*/*subcard*/*port*[**.***vpt#*] [*vpi vci*]

show atm vp cast-type *cast-type* [**conn-type** *conn-type*] [**interface** {**atm** | **atm-p**} *card*/*subcard*/*port*[**.***vpt#*]]

show atm vp traffic [**interface** {**atm** | **atm-p**} *card*/*subcard*/*port*[**.***vpt#*] [*vpi vci*]]

Syntax Description

card/*subcard*/*port*	Card, subcard, and port number for the interface.
.*vpt#*	Virtual path tunnel identifier.
vpi vci	Virtual path identifier and virtual channel identifier to display.
cast-type	Specifies the cast type as point-to-multipoint (**p2mp**) or point-to-point (**p2p**).
conn-type	Specifies the connection type as **pvc**, **soft-vc**, or **svc**.
traffic	Displays the virtual channel cell traffic.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show atm vp** command.

```
Switch# show atm vp
Interface     VPI    Type  X-Interface     X-VPI     Status
ATM3/1/1      1       SVP     ATM3/1/2     200       UP
ATM3/1/1      2       SVP     ATM3/1/2     201       UP
ATM3/1/1      3       SVP     ATM3/1/2     202       UP
ATM3/1/2      200     SoftVP  ATM3/1/1     1         UP
ATM3/1/2      201     SoftVP  ATM3/1/1     2         UP
ATM3/1/2      202     SoftVP  ATM3/1/1     3         UP
ATM3/1/2      255     SoftVP  NOT CONNECTED
```

The following is sample output from the **show atm vp** command for ATM 3/1/1.

```
Switch# show atm vp interface atm 3/1/1
Interface     VPI    Type  X-Interface     X-VPI     Status
ATM3/1/1      1       SVP     ATM3/1/2     200       UP
ATM3/1/1      2       SVP     ATM3/1/2     201       UP
ATM3/1/1      3       SVP     ATM3/1/2     202       UP
```

Examples

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The following example is sample output from the **show atm vp** command for ATM 0/1/0 and VP 18 with an FC-PCQ installed.

```
Switch# show atm vp interface atm 0/1/0 18

Interface: ATM0/1/0, Type: oc3suni
VPI = 18
Status: UP
Time-since-last-status-change: 16:13:58
Connection-type: PVP
Cast-type: point-to-point
Usage-Parameter-Control (UPC): pass
Number of OAM-configured connections: 52
OAM-configuration: Seg-loopback-on Ais-on
OAM-states:  OAM-Up
OAM-Loopback-Tx-Interval: 5
Cross-connect-interface: ATM0/1/2, Type: oc3suni
Cross-connect-VPI = 18
Cross-connect-UPC: pass
Cross-connect OAM-configuration: Seg-loopback-on Ais-on
Cross-connect OAM-state:  OAM-Up
OAM-Loopback-Tx-Interval: 5
Rx cells: 197554, Tx cells: 151430
Rx connection-traffic-table-index: 1
Rx service-category: UBR (Unspecified Bit Rate)
Rx pcr-clp01: 7113539
Rx scr-clp01: none
Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx       mbs: none
Tx connection-traffic-table-index: 1
Tx service-category: UBR (Unspecified Bit Rate)
Tx pcr-clp01: 7113539
Tx scr-clp01: none
Tx mcr-clp01: none
Tx      cdvt: none
Tx       mbs: none
```

Examples

The following example is sample output from the **show atm vp** command for ATM 0/0/1 and VP 51 with the switch processor feature card installed.

```
Switch# show atm vp interface atm 0/0/1 51

Interface: ATM0/0/1, Type: oc3suni
VPI = 51
Status: TUNNEL
Time-since-last-status-change: 3d02h
Connection-type: PVP
Cast-type: point-to-point
Usage-Parameter-Control (UPC): pass
Wrr weight: 32
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states:  Not-applicable
Threshold Group: 5, Cells queued: 0
Rx cells: 0, Tx cells: 0
Tx Clp0:0,  Tx Clp1: 0
Rx Clp0:0,  Rx Clp1: 0
Rx Upc Violations:0, Rx cell drops:0
```

```
Rx Clp0 q full drops:0, Rx Clp1 qthresh drops:0
Rx connection-traffic-table-index: 1
Rx service-category: UBR (Unspecified Bit Rate)
Rx pcr-clp01: 7113539
Rx scr-clp01: none
Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx       mbs: none
Tx connection-traffic-table-index: 1
Tx service-category: UBR (Unspecified Bit Rate)
Tx pcr-clp01: 7113539
Tx scr-clp01: none
Tx mcr-clp01: none
Tx      cdvt: none
Tx       mbs: none
```

Table 18-16 describes the fields shown in the display.

Table 18-16 show atm vp interface atm Field Descriptions

Field	Description
Interface	Displays the card, subcard, and port number of the ATM interface.
VPI/VCI	Displays the number of the virtual path identifier and the virtual channel identifier.
Status	Displays the type of interface for the specified ATM interface.
Time-since-last-status-change	Displays the time elapsed since the last status change.
Connection-type	Displays the type of connection for the specified ATM interface.
Cast-type	Displays the type of cast for the specified ATM interface.
Usage-Parameter-Control (UPC)	Displays the state of the UPC.
Number of OAM-configured connections	Displays the amount of connections configured by OAM.
OAM-configuration	Displays the state of the OAM configuration; enabled or disabled.
OAM-states	Displays the status of the OAM state; applicable or not applicable.
OAM Loopback-Tx-Interval	Displays the OAM loopback transmit interval.
Cross-connect-interface	Displays the cross-connect interface number.
Cross-connect-VPI	Displays the cross-connect VPI number.
Cross-connect-UPC	Displays the cross-connect UPC status.
Cross-connect OAM-configuration	Displays the configuration of the OAM in the cross-connect half-leg.
Cross-connect OAM-state	Displays the state of the OAM cross-connect half-leg.
OAM-Loopback-Tx-Interval	Displays the OAM loopback transmit interval.
Rx cells/Tx cells	Displays the number of cells transmitted and received.
Rx connection-traffic-table-index	Displays the receive connection-traffic-table-index.
Rx service-category	Displays the receive service category.
Rx pcr-clp01	Displays the receive peak cell rate for clp01 cells (kbps).

Table 18-16 show atm vp interface atm Field Descriptions (continued)

Field	Description
Rx scr-clp01	Displays the receive sustained cell rate for clp01 cells (kbps).
Rx mcr-clp01	Displays the receive minimum cell rate for clp01 cells (kbps).
Rx cdvt	Displays the receive cell delay variation tolerance.
Rx mbs	Displays the receive maximum burst size.
Tx connection-traffic-table-index	Displays the transmit connection-traffic-table-index.
Tx service-category	Displays the transmit service category.
Tx pcr-clp01	Displays the transmit peak cell rate for clp01 cells (kbps).
Tx scr-clp01	Displays the transmit sustained cell rate for clp01 cells (kbps).
Tx mcr-clp01	Displays the transmit minimum cell rate for clp01 cells (kbps)
Tx cdvt	Displays the transmit cell delay variation tolerance.
Tx mbs	Displays the transmit maximum burst size.

The following example shows how to display the cast type, point-to-multipoint, and connection type soft-VC information on ATM interface 0/0/0.

```
Switch# show atm vp cast-type p2mp conn-type soft-vc interface atm 0/0/0
```

The following example shows how display the connection type SVC and cast-type point-to-point information on ATM interface 0/0/0.

```
Switch# show atm vp conn-type svc cast-type p2p interface atm 0/0/0
```

Related Commands

Command	Description
show atm interface	Displays ATM-specific information about an ATM interface.
show atm status	Displays current information about ATM interfaces and the number of installed connections.

show bootflash:

To display information about the bootflash: file system, use the **show bootflash:** EXEC command.

show bootflash: [**all** | **chips** | **filesys**]

Syntax Description

all	Displays all flash information.
chips	Displays flash chip information.
file*sys*	Displays file system status information.

Defaults

Displays information about files in the file system.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command. Originally **show boot**.
12.0(3c)W5(9)	Modified: Changed to **show bootflash:**

Examples

The following example is sample output from the **show boot** command displaying chip information.

```
Switch# show bootflash: chips
******** RSP Internal Flash Bank -- Intel Chips ********
Flash SIMM Reg: 3424
  Flash SIMM PRESENT
  2 Banks
  Bank Size = 4M
  HW Rev = 4

Flash Status Registers: Bank 0
  Intelligent ID Code  : 89898989 A2A2A2A2
  Status Reg: 80808080

Flash Status Registers: Bank 1
  Intelligent ID Code  : 89898989 A2A2A2A2
  Status Reg: 80808080
```

Related Commands

Command	Description
boot	Cisco IOS command removed from this manual. Refer to Appendix D.
bert (Catalyst 8510 MSR and LightStream 1010)	Checks the bit errors on a line for a particular interval.
boot system	Specifies the system image that the switch loads at startup.
show version	Displays the system hardware configuration, software version, and names and sources of configuration files and boot images.

show buffers

Use the **show buffers** EXEC command to display statistics for the buffer pools on the network server.

show buffers [**address** *hex-addr* | **all** | **assigned** | **free** | **input-interface** *interface-type card/subcard/port* | **old** | **pool** *pool-name* [**dump** | **header** | **packet**]] | [**failures**]

Syntax Description

hex-addr	Address, in hexadecimal notation, of the buffer to display.
all	Displays all buffers.
assigned	Displays the buffers in use.
free	Displays the buffers available for use.
interface-type	Specifies an input interface as **atm**, **atm-p**, **cbr**, **ethernet**, or **null**.
card/subcard/port	Specifies the card, subcard, and port number for the interface.
old	Displays buffers older than one minute.
pool-name	Specifies the name of a buffer pool to use.
dump	Shows the buffer header and all data in the display.
header	Shows the buffer header only in the display.
packet	Shows the buffer header and packet data in the display.
failures	Displays buffer allocation failures.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show buffers** command with no arguments, showing all buffer pool information.

```
Switch# show buffers
Buffer elements:
     500 in free list (500 max allowed)
     19874 hits, 0 misses, 0 created

Public buffer pools:
Small buffers, 104 bytes (total 120, permanent 120):
     120 in free list (20 min, 250 max allowed)
     18937 hits, 0 misses, 0 trims, 0 created
     0 failures (0 no memory)
Middle buffers, 600 bytes (total 100, permanent 100):
     100 in free list (10 min, 200 max allowed)
     58957 hits, 0 misses, 0 trims, 0 created
     0 failures (0 no memory)
Big buffers, 1524 bytes (total 20, permanent 20):
     20 in free list (5 min, 200 max allowed)
     1123 hits, 0 misses, 0 trims, 0 created
     0 failures (0 no memory)
VeryBig buffers, 4520 bytes (total 10, permanent 10):
```

```
     10 in free list (0 min, 300 max allowed)
     0 hits, 0 misses, 0 trims, 0 created
     0 failures (0 no memory)
Large buffers, 5024 bytes (total 0, permanent 0):
     0 in free list (0 min, 20 max allowed)
0 hits, 0 misses, 0 trims, 0 created
     0 failures (0 no memory)
Huge buffers, 18024 bytes (total 0, permanent 0):
     0 in free list (0 min, 13 max allowed)
     0 hits, 0 misses, 0 trims, 0 created
     0 failures (0 no memory)

Interface buffer pools:
AAL5_Small buffers, 512 bytes (total 512, permanent 512):
     0 in free list (0 min, 512 max allowed)
     512 hits, 0 misses
     512 max cache size, 512 in cache
AAL5_Medium buffers, 4096 bytes (total 128, permanent 128):
     0 in free list (0 min, 128 max allowed)
     128 hits, 0 misses
     128 max cache size, 128 in cache
AAL5_Large buffers, 9216 bytes (total 64, permanent 64):
     0 in free list (0 min, 64 max allowed)
     64 hits, 0 misses
     64 max cache size, 64 in cache
```

Table 18-17 describes the significant fields shown in the display.

Table 18-17 show buffers Field Descriptions

Field	Description
Buffer elements	Buffer elements are small structures used as placeholders for buffers in internal operating system queues. Buffer elements are used when a buffer might need to be on more than one queue.
Free list	Total number of the currently unallocated buffer elements.
Max allowed	Maximum number of buffers that are available for allocation.
Hits	Count of successful attempts to allocate a buffer when needed.
Misses	Count of buffer allocation attempts that resulted in growing the buffer pool to allocate a buffer.
Created	Count of new buffers created to satisfy buffer allocation attempts when the available buffers in the pool have already been allocated.
Small buffers	Buffers that are 104 bytes long.
Middle buffers	Buffers that are 600 bytes long.
Big buffers	Buffers that are 1524 bytes long.
VeryBig buffers	Buffers that are 4520 bytes long.
Large buffers	Buffers that are 5024 bytes long.
Huge buffers	Buffers that are 18024 bytes long.
Total	Total number of this type of buffer.
Permanent	Number of these buffers that are permanent.
Free list	Number of available or unallocated buffers in that pool.

Table 18-17 show buffers Field Descriptions (continued)

Field	Description
Min	Minimum number of free or unallocated buffers in the buffer pool.
Max allowed	Maximum number of free or unallocated buffers in the buffer pool.
Hits	Count of successful attempts to allocate a buffer when needed.
Misses	Count of buffer allocation attempts that resulted in growing the buffer pool in order to allocate a buffer.
Trims	Count of buffers released to the system because they were not being used. This field is displayed only for dynamic buffer pools, not interface buffer pools, which are static.
Created	Count of new buffers created in response to misses. This field is displayed only for dynamic buffer pools, not interface buffer pools, which are static.
Total	Total number of this type of buffer.
Permanent	Number of these buffers that are permanent.
Free list	Number of available or unallocated buffers in that pool.
Min	Minimum number of free or unallocated buffers in the buffer pool.
Max allowed	Maximum number of free or unallocated buffers in the buffer pool.
Hits	Count of successful attempts to allocate a buffer when needed.
Fall backs	Count of buffer allocation attempts that resulted in falling back to the smallest public buffer pool that is at least as big as the interface buffer pool.
Max Cache Size	Maximum number of buffers from interface pool that can be in the buffer pool's cache. Each interface buffer pool has its own cache. These are not additional permanent buffers; they come from the interface's buffer pools. Some interfaces place all buffers from the interface pool into the cache. In this case, it is normal for the *free list* to display 0.
Failures	Total number of allocation requests that failed because no buffer was available for allocation; the datagram was lost. Such failures normally occur at interrupt level.
No memory	Number of failures that occurred because no memory was available to create a new buffer.

show calendar

To display the calendar hardware setting, use the **show calendar** EXEC command.

show calendar

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
1.1(4)	New command

Usage Guidelines

You can compare the time and date shown with this command with the time and date listed using the **show clock** command to verify that the calendar and system clock are synchronized. The time displayed is relative to the configured time zone.

Examples

In the following example, the hardware calendar indicates the time stamp of 12:13:44 p.m. on Friday, April 4, 1997.

```
Switch# show calendar
12:13:44 PST Fri April 4 1997
```

Related Commands

Command	Description
show clock	Displays the system clock.

show capability (Catalyst 8540 MSR)

To display the capabilities of the primary or secondary route processor and the software version that is running, use the **show capability** EXEC command.

show capability {**primary** | **secondary**}

Syntax Description

primary	Displays the capabilities of the primary route processor.
secondary	Displays the capabilities of the secondary route processor.

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

The **show capability** display includes hardware and functional versions of the various components.

Examples

The following example shows capabilities of the primary route processor for the ATM switch router.

```
Switch# show capability primary
  Dram Size is :64 MB
  Pmem Size is :4 MB
  Nvram Size is :512 KB
  BootFlash Size is :8 MB
  ACPM hw version 3.1
  ACPM functional version 3.8
  Netclk Module present flag :1
  NCLK hw version 1.0
  NCLK func version 1.2
  Printing the parameters for Switch card: 0
  SWC0 HW version 2.2
  SWC0 Functional version 0.40
  SWC0 Table memory size: 8 MB
  SWC0 Feat Card Present Flag: 1
  SWC0 Feat Card HW version 1.0
  SWC0 Feat Card Functional version 2.0
  Printing the parameters for Switch card: 1
  SWC1 HW version 0.0
  SWC1 Functional version 0.0
  SWC1 Table memory size: 0 MB
  SWC1 Feat Card Present Flag: 0
  SWC1 Feat Card HW version 0.0
  SWC1 Feat Card Functional version 0.0
  Printing the parameters for Switch card: 2
  SWC2 HW version 2.2
  SWC2 Functional version 0.40
  SWC2 Table memory size: 8 MB
```

```
  SWC2 Feat Card Present Flag: 1
  SWC2 Feat Card HW version 1.0
  SWC2 Feat Card Functional version 2.0
Number of Drivers in IOS: 3
  Driver 0 type: 2560
  Driver 0 Functional Version 0.27
  Driver 1 type: 2562
  Driver 1 Functional Version 0.1
  Driver 2 type: 2564
  Driver 2 Functional Version 0.1
```

show cdp

To display global CDP information, including timer and hold-time information, use the **show cdp** EXEC command.

show cdp

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show cdp** command. Global CDP timer and hold-time parameters are set to the defaults of 60 and 180 seconds, respectively.

```
Switch# show cdp
Global CDP information:
        Sending CDP packets every 60 seconds
        Sending a holdtime value of 180 seconds
```

Related Commands

Command	Description
cdp holdtime	Cisco IOS command removed from this manual. Refer to Appendix D.
cdp timer	Cisco IOS command removed from this manual. Refer to Appendix D.
show cdp entry	Displays information about a neighbor device listed in the CDP table.
show cdp neighbors	Displays information about neighbors.

show cdp entry

To display information about a neighbor device listed in the CDP table, use the **show cdp entry** EXEC command.

show cdp entry *entry-name* [**protocol** | **version**]

Syntax Description

entry-name	Name of the neighbor about which you want information.
protocol	Limits the display to information about the protocols enabled on a device.
version	Limits the display to information about the version of software running on the device.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show cdp entry protocol** command. Only information about the protocols enabled on *device.cisco.com* is displayed.

```
Switch# show cdp entry device.cisco.com protocol
Protocol information for device.cisco.com:
  IP address: 198.92.68.18
  CLNS address: 490001.1111.1111.1111.00
  DECnet address: 10.1
```

The following example is sample output from the **show cdp entry version** command. Only information about the version of software running on *device.cisco.com* is displayed.

```
Switch# show cdp entry device.cisco.com version
Version information for device.cisco.com:
  GS Software (GS3), IOS Version xx.x(10302) [jhunt 161]
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Mon 07-Nov-97 14:34
```

Related Commands

Command	Description
show cdp neighbors	Displays information about neighbors.

show cdp interface

To display information about the interfaces on which CDP is enabled, use the **show cdp interface** EXEC command.

show cdp interface [*interface-type card/subcard/port*]

Syntax Description

interface-type	Type of interface, specified as **atm**, **atm-p**, **cbr**, **ethernet**, or **null**.
card/subcard/port	Card, subcard, and port number for the interface.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

Catalyst 8540 MSR

The following example is sample output from the **show cdp interface** command. Status information and information about CDP timer and hold-time settings is displayed for all interfaces on which CDP is enabled.

```
Switch# show cdp interface
Ethernet 0 is up, line protocol is up, encapsulation is ARPA
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
```

The following example is sample output from the **show cdp interface** command with an interface specified. Status information and information about CDP timer and hold-time settings is displayed for the Ethernet 0 interface only.

```
Switch# show cdp interface ethernet 0
Ethernet 0 is up, line protocol is up, encapsulation is ARPA
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example is sample output from the **show cdp interface** command. Status information and information about CDP timer and hold-time settings is displayed for all interfaces on which CDP is enabled.

```
Switch# show cdp interface
Aux0 is up, line protocol is up, encapsulation is SMDS
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
Ethernet 0 is up, line protocol is up, encapsulation is ARPA
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
```

show cdp neighbors

To display information about neighbors, use the **show cdp neighbors** EXEC command.

show cdp neighbors [*interface-type card/subcard/port*] [**detail**]

Syntax Description

interface-type	Specifies the type of the interface connected to the neighbors in question.
card/subcard/port	Identifies the card, subcard, and port number of the interface connected to the neighbors in question.
detail	Displays detailed information about a neighbor (or neighbors), including network address, enabled protocols, hold time, and software version.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following is sample output from the **show cdp neighbors** command. Device ID, interface type and number, hold-time settings, capabilities, platform, and port ID information about the switch router's neighbors are displayed.

```
Switch# show cdp neighbors
Capability Codes: R - Switch, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP

Device ID        Local Intrfce     Holdtme    Capability  Platform  Port ID
device.cisco.com      Eth 0          151         R T        AGS       Eth 0
device.cisco.com      Ser 0          165         R T        AGS       Ser 3
```

The following is sample output from the **show cdp neighbors detail** command, with information about the ATM neighbors, including network address, enabled protocols, and software version.

```
Switch# show cdp neighbors detail
Device ID: device.cisco.com
Entry address(es):
  IP address: 198.92.68.18
  CLNS address: 490001.1111.1111.1111.00
  DECnet address: 10.1
Platform: AGS, Capabilities: Switch Trans-Bridge
Interface: Ethernet 0, Port ID (outgoing port): Ethernet 0
Holdtime: 143 sec
Version:
GS Software (GS3), Experimental Version xx.x(10302) [asmith 161]
Copyright (c) 1986-1998 by Cisco Systems, Inc.
Compiled Mon 07-Nov-97 14:34
```

Related Commands

Command	Description
show cdp entry	Displays information about a neighbor device listed in the CDP table.

show cdp traffic

To display traffic information from the CDP table, use the **show cdp traffic** EXEC command.

show cdp traffic

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show cdp traffic** command.

```
Switch# show cdp traffic
CDP counters:
        Packets output: 94, Input: 75
        Hdr syntax: 0, Chksum error: 0, Encaps failed: 0
        No memory: 0, Invalid packet: 0, Fragmented: 0
```

In this example, traffic information is displayed, including the numbers of packets sent, the number of packets received, header syntax, checksum errors, failed encapsulations, memory problems, and invalid and fragmented packets. Header syntax indicates the number of packets CDP receives that have an invalid header format.

show ces address

To show all the configured CES-IWF ATM addresses, use the **show ces address** EXEC command.

show ces address

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show ces address** command.

```
Switch# show ces address
CES-IWF ATM Address(es):
47.0091.8100.0000.0061.705a.cd01.4000.0c80.0030.10  CBR0/0/0:0  vpi 0 vci 16
47.0091.8100.0000.0061.705a.cd01.4000.0c80.0034.10  CBR0/0/1:1  vpi 0 vci 1040
47.0091.8100.0000.0061.705a.cd01.4000.0c80.0034.20  CBR0/0/1:2  vpi 0 vci 1056
47.0091.8100.0000.0061.705a.cd01.4000.0c80.0038.10  CBR0/0/2:0  vpi 0 vci 2064
```

show ces circuit

To show detailed circuit information, use the **show ces circuit** EXEC command.

show ces circuit [**interface cbr** *card/subcard/port* [*circuits*]]

Syntax Description

card/subcard/port	Card, subcard, and port number of the CBR interface.
circuits	Number of circuits to display, from 0 to 31.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output about CBR interface 1/0/0 from the **show ces circuit** command.

```
Switch# show ces circuit interface cbr 1/0/0
Interface  Circuit  Circuit-Type     X-interface   X-vpi   X-vci Status
 CBR0/0/1    1       Active SoftVC     ATM1/0/1      0        33  UP
 CBR0/0/1    2       Active SoftVC     ATM1/0/1      0        34  UP
```

The following example is sample output about CBR interface 0/0/1 on circuit 1 using the **show ces circuit** command.

```
Switch# show ces circuit interface cbr 0/0/1 1
Circuit:Name CBR0/0/1:1, Circuit-state ADMIN_UP / Interface CBR0/0/1,
Circuit_id 1, Port-Type T1, Port-State UP
Port Clocking network-derived, aal1 Clocking Method CESIWF_AAL1_CLOCK_SYNC
Channel in use on this port: 1-24
Channels used by this circuit: 1-12
Cell-Rate: 2043, Bit-Rate 768000
cas OFF, cell_header 0x4100 (vci = 1040)
Configured CDV 2000 usecs, Measured CDV unavailable
De-jitter: UnderFlow unavailable, OverFlow unavaliable
ErrTolerance 8, idleCircuitdetect OFF, onHookIdleCode 0x0
state: VcActive, maxQueueDepth       42, startDequeueDepth       25
Partial Fill:       47, Structured Data Transfer 288
Active SoftVC
Src:atm addr 47.0091.8100.0000.0061.705a.cd01.4000.0c80.0034.10 vpi 0, vci 1040
Dst:atm addr 47.0091.8100.0000.0060.5c71.2001.4000.0c80.1034.10
```

show ces interface cbr

To show detailed CES port information, use the **show ces interface cbr** privileged EXEC command.

show ces interface cbr *card/subcard/port*

Syntax Description

card/subcard/port	Card, subcard, and port number of the CBR interface.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show ces interface cbr** command.

```
Switch# show ces interface cbr0/0/0
Interface:      CBR0/0/0        Port-type:T1-DCU
IF Status:      UP              Admin Status: UP
Channels in use on this port: 1-24
LineType: ESF        LineCoding: B8ZS  LoopConfig: NoLoop
SignalMode: NoSignalling   XmtClockSrc: network-derived
DataFormat: UnStructured   AAL1 Clocking Mode: Adaptive     LineLength: 0_110

LineState:  LossOfSignal
Errors in the Current Interval:
  PCVs        0 LCVs        0   ESs         0   SESs        0   SEFSs        0
  UASs        0 CSSs        0   LESs        0   BESs        0   DMs          0
Errors in the last 24Hrs:
  PCVs     1028 LCVs   190733   ESs         0   SESs        2   SEFSs        0
  UASs        0 CSSs        0   LESs        0   BESs        0   DMs          6
Input  Counters: 12160995 cells, 571566765 bytes
Output Counters: 83926483 cells, 3944544701 bytes
```

show ces status

To display the status of the ports on the CES interface, use the **show ces status** EXEC command.

show ces status

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show ces status** command.

```
Switch# show ces status
Interface      IF      Admin        Port  Channels in
     Name       Status   Status        Type      use
------------- -------- --------- ----------- -----------
     CBR0/0/0       UP        UP           T1        1-24
     CBR0/0/1       UP        UP           T1        1-24
     CBR0/0/2       UP        UP           T1        1-24
     CBR0/0/3       UP        UP           T1
```

show clock

To display the system clock, use the **show clock** EXEC command.

show clock [**detail**]

Syntax Description

detail	Indicates the clock source (NTP, VINES, and so on) and the current summertime setting (if any).

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The system clock keeps an authoritative flag that indicates whether or not the time is believed to be accurate. If system clock has been set by a timing source, the flag is set. If the time is not authoritative, it is used only for display purposes. Until the clock is authoritative and the authoritative flag is set, the flag prevents the switch from causing peers to synchronize to itself when the switch time is invalid.

The symbol that precedes the **show clock** display indicates the following:

- An asterisk (*) indicates not authoritative.
- A blank space indicates authoritative.
- A period (.) indicates authoritative, but NTP is not synchronized.

Examples

The following sample output shows that the current clock is authoritative and that the time source is NTP.

```
Switch# show clock detail
15:29:03.158 PST Fri Ap 4 1997
Time source is NTP
```

Related Commands

Command	Description
clock set	Cisco IOS command removed from this manual. Refer to Appendix D.
show calendar	Displays the calendar hardware setting.

show compress

To display compression statistics, use the **show compress** EXEC command.

show compress

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show compress** command.

```
Switch# show compress
Serial0
uncompressed bytes xmt/rcv 10710562/11376835
1  min avg ratio xmt/rcv 2.773/2.474
5  min avg ratio xmt/rcv 4.084/3.793
10 min avg ratio xmt/rcv 4.125/3.873
no bufs xmt 0 no bufs rcv 0
resets 0
```

Table 18-18 describes the fields shown in the display.

Table 18-18 show compress Field Descriptions

Field	Description
Serial0	Name and number of the interface.
uncompressed bytes xmt/rcv	Total number of uncompressed bytes sent and received.
1 min avg ratio xmt/rcv 5 min avg ratio xmt/rcv 10 min avg ratio xmt/rcv	Static compression ratio for bytes sent and received, averaged over a period of 1 minute, 5 minutes, and 10 minutes.
no bufs xmt	Number of times buffers were not available to compress data being sent.
no bufs rcv	Number of times buffers were not available to uncompress data being received.
resets	Number of resets.

show controllers

To display information about a physical port device, use the **show controllers** EXEC command.

show controllers [**atm0** | **ethernet0** | {**atm** | **ethernet**} *card/subcard/port* |
{**atm** *card/subcard/imagroup*} | **e1** *card/subcard/port* [**brief** | **tabular**] |
t3 *card/subcard/port*[**:***t1-line*] [**brief** | **tabular**]]

Syntax Description

atm0	Specifies an ATM interface on the route processor.
ethernet0	Specifies an Ethernet interface on the route processor.
atm	Specifies an ATM interface.
ethernet	Specifies an Ethernet interface.
e1	Specifies a channelized E1 interface.
t3	Specifies a channelized DS3 (CDS3) interface.
card/subcard/port	Specifies the card, subcard, and port number for the interface.
:t1-line	Identifies the T1 line number, which is a number between 1 and 24. If you do not specify this option, all configured T1 lines display.
card/subcard/**ima***group*	Specifies the card, subcard, and IMA group number (0 to 3) for the IMA interface.
brief	Displays a subset of information.
tabular	Displays statistical information in a tabular format.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The output from this command shows what transmit clock is configured for an interface.

The **show controllers t3** command also displays the port adapter and LSIPC states. If the LSIPC is in a down state, this command shows the number of keepalive attempts that have been made. This command also displays the firmware and hardware version for the Frame Relay port adapter.

Examples

The following example shows output used for debugging for OC-3 counters from the **show controllers atm** command on ATM 0/1/0.

```
Switch# show controllers atm 0/1/0
IF Name: ATM0/1/0    Chip Base Address: A8908000
Port type: OC3    Port rate: 155 Mbps    Port medium: SM Fiber
Port status:SECTION LOS    Loopback:None    Flags:8300
TX Led: Traffic Pattern    RX Led: Traffic Pattern  TX clock source:  free-running
Framing mode:  sts-3c
Cell payload scrambling on
Sts-stream scrambling on
```

```
OC3 counters:

  Key: txcell - # cells transmitted
       rxcell - # cells received
       b1     - # section BIP-8 errors
       b2     - # line BIP-8 errors
       b3     - # path BIP-8 errors
       ocd    - # out-of-cell delineation errors - not implemented
       g1     - # path FEBE errors
       z2     - # line FEBE errors
       chcs   - # correctable HEC errors
uhcs   - # uncorrectable HEC errors

txcell:3745, rxcell:98171428
b1:0, b2:0, b3:0, ocd:0
g1:0, z2:0, chcs:0, uhcs:0

OC3 errored secs:
b1:0, b2:0, b3:0, ocd:0
g1:0, z2:0, chcs:0, uhcs:0

OC3 error-free secs:
b1:1249, b2:1249, b3:1249, ocd:0
g1:1249, z2:1249, chcs:1249, uhcs:1249

Clock reg:80

  mr 0x30, mcfgr 0x70, misr 0xE0, mcmr 0xEF,
  mctlr 0x48, cscsr 0x50, crcsr 0x48, rsop_cier 0x00,
  rsop_sisr 0x47, rsop_bip80r 0x00, rsop_bip81r 0x00, tsop_ctlr 0x80,
  tsop_diagr 0x80, rlop_csr 0x02, rlop_ieisr 0x0E, rlop_bip8_240r 0x00,
  rlop_bip8_241r 0x00, rlop_bip8_242r 0x00, rlop_febe0r 0x00, rlop_febe1r 0x00,
  rlop_febe2r 0x00, tlop_ctlr 0x80, tlop_diagr 0x80, rpop_scr 0x1C,
  rpop_isr 0x9F, rpop_ier 0xFD, rpop_pslr 0xFF, rpop_pbip80r 0x00,
  rpop_pbip81r 0x00, rpop_pfebe0r 0x00, rpop_pfebe1r 0x00, tpop_cdr 0x00,
  tpop_pcr 0x00, tpop_ap0r 0x00, tpop_ap1r 0x90, tpop_pslr 0x13,
  tpop_psr 0x00, racp_csr 0x84, racp_iesr 0x15, racp_mhpr 0x00,
  racp_mhmr 0x00, racp_checr 0x00, racp_uhecr 0x00, racp_rcc0r 0x00,
  racp_rcc1r 0x00, racp_rcc2r 0x00, racp_cfgr 0xFC, tacp_csr 0x04,
  tacp_iuchpr 0x00, tacp_iucpopr 0x6A, tacp_fctlr 0x00, tacp_tcc0r 0x00,
  tacp_tcc1r 0x00, tacp_tcc2r 0x00, tacp_cfgr 0x08,
```

Table 18-19 describes some key fields in the output.

Table 18-19 show controllers Field Descriptions

Field	Description
B1	Selection errors. Calculated over all bits of previous frame after scrambling. Always even parity.
B2	Line errors. Calculated over SPE and line overhead bytes of the previous frame before scrambling.
B3	Path BIP-8 errors. Calculated over SPE of the STE-3c of the previous frame before scrambling.
G1,Z2	Number of FEBE detected by the receive path. Error numbers are inserted into the appropriate bit positions of the outgoing G1,Z2 bytes.

Examples

The following example is sample output from the **show controllers atm0** command.

```
Switch# show controllers atm0
printing the copy stats here...
TxCopiedPkts :0
TxNonCopiedPkts :0
RxCopiedPkts :0
RxNonCopiedPkts :0
Island0: 60ABA4E4 first Ctl address : 607C7890
first blk address A8051000(288)- A80FFE00(7FF)  :total 577(1399)
```

The following example is sample output used for debugging for the T1 interface from the **show controllers atm** command on ATM 0/1/0.

```
Switch# show controllers atm 0/1/0
IF Name: ATM0/1/0, framer Base Address: A8909000
Port type: T1    Port rate: 1.5 Mbps    Port medium: UTP
Port status:Good Signal    Loopback:None    Flags:8008
TX Led: Traffic Pattern    RX Led: Traffic Pattern   CD Led: Green
TX clock source:  free-running
T1 Framing Mode:  ESF PLCP format
FERF on AIS is on
FERF on RED is on
FERF on OOF is on
FERF on LOS is on
LBO: between 0-110

Counters:

  Key: txcell   - # cells transmitted
       rxcell   - # cells received
       lcv      - # line code violations
       ferr     - # framing bit error event counter
       bee     - # bit error event, CRC-6 in ESF, Framing bit error in SF
       b1       - # PLCP BIP errors
       fe       - # PLCP framing pattern octet errors
       plcp_febe- # PLCP FEBE errors
       hcs      - # uncorrectable HEC errors
       uicell   - # unassigned/idle cells dropped

txcell:21460, rxcell:20736
lcv:0, ferr:0, bee:0
febe:0, b1:0, fe:0, plcp_febe:7, hcs:0, uicell:338177354

PDH errored secs:
lcv:0, ferr:0, bee:0
febe:0, b1:0, fe:0, plcp_febe:1, hcs:0

PDH error-free secs:
lcv:101438, ferr:101438, bee:101438
febe:0, b1:101438, fe:101438, plcp_febe:101437, hcs:101438

 Misc reg: 10

  cfgr 0x08, ier 0x00, isr 0x00, ctlr 0x00,
  imrr 0x21, dlcr 0x78, rboc_cier 0x38, rboc_isr 0x3F,
  t3frmr_cfgr 0x80, t3frmr_ier 0x00, t3frmr_isr 0x00, t3frmr_statr 0x02,
  rfdl_cfgr 0x84, rfdl_esr 0x80, rfdl_statr 0x87, rfdl_datar 0x87,
  pmon_pmr 0x38, pmon_iesr 0x38, pmon_lcvec0r 0xFF, pmon_lcvec1r 0xFF,
  pmon_fbeec0r 0xFF, pmon_fbeec1r 0xFF, pmon_sezdc0r 0x9A, pmon_sezdc1r 0xF5,
  pmon_peec0r 0x00, pmon_peec1r 0x00, pmon_ppeec0r 0x00, pmon_ppeec1r 0x00,
  pmon_febeec0r 0x00, pmon_febeec1r 0x00, t3tran_cfgr 0x00, t3tran_diagr 0x00,
  xfdl_cfgr 0x00, xfdl_isr 0x02, xfdl_txdatar 0x00, xboc_coder 0x7F,
```

```
  splr_cfgr 0x84, splr_ier 0x80, splr_isr 0x80, splr_statr 0x00,
  splt_cfgr 0x84, splt_ctlr 0x80, splt_diagr 0x00, splt_f1r 0x00,
  cppm_locmr 0x0C, cppm_copmr 0x70, cppm_b1ec0r 0x00, cppm_b1ec1r 0x00,
  cppm_feec0r 0x00, cppm_feec1r 0x00, cppm_febec0r 0x00, cppm_febec1r 0x00,
  cppm_hcsec0r 0x00, cppm_hcsec1r 0x00, cppm_iucc0r 0x04, cppm_iucc1r 0x0D,
  cppm_rcc0r 0x01, cppm_rcc1r 0x00, cppm_tcc0r 0x01, cppm_tcc1r 0x00,
  rxcp_ctlr 0x28, rxcp_frcr 0x00, rxcp_iesr 0x00, rxcp_iucph1r 0x00,
  rxcp_iucph2r 0x00, rxcp_iucph3r 0x00, rxcp_iucph4r 0x01, rxcp_iucmh1r 0xFF,
  rxcp_iucmh2r 0xFF, rxcp_iucmh3r 0xFF, rxcp_iucmh4r 0xFF, rxcp_upcph1r 0x00,
  rxcp_upcph2r 0x00, rxcp_upcph3r 0x00, rxcp_upcph4r 0x00, rxcp_upcmh1r 0xFF,
  rxcp_upcmh2r 0xFF, rxcp_upcmh3r 0xFF, rxcp_upcmh4r 0xFF, rxcp_hcscsr 0xFC,
  rxcp_lctctr 0xB4, txcp_ctlr 0xA0, txcp_iesr 0x08, txcp_iucph1r 0x00,
  txcp_iucph2r 0x00, txcp_iucph3r 0x00, txcp_iucph4r 0x01, txcp_iucph5r 0x52,
  txcp_iucpr 0x00, e3frmr_foptr 0x00, e3frmr_moptr 0x00, e3frmr_fier 0x00,
  e3frmr_fiisr 0x01, e3frmr_meier 0x00, e3frmr_meiir 0x00, e3frmr_mesr 0x00,
  e3tran_foptr 0x00, e3tran_sdoptr 0x01, e3tran_bip8emr 0x00, e3tran_maoptr 0x00,
ttb_ctlr 0x04, ttb_ttisr 0x00, ttb_iar 0x00, ttb_idr 0x00,
  ttb_eptlr 0x00, ttb_ptlcsr 0x00, sffpcsr 0x20, pcr 0x20,

IF Name: ATM0/1/0, framer Base Address: A8909000

 Dump of framer registers 16 per line
00-0F : 30 00 00 00  00 00 00 0C  00 00 00 00  02 02 00 00
10-1F : 22 02 22 22  50 50 50 50  20 2F 2F 23  7C 78 FF FF
20-2F : 11 00 01 01  01 01 01 01  01 01 38 3F  50 40 40 40
30-3F : FC FF FF FF  00 02 00 00  84 80 87 87  40 00 08 44
40-4F : D0 D4 D0 D0  30 30 00 00  00 03 00 00  00 00 00 00
50-5F : 00 00 FF 00  C4 C0 7F 7F  1C 1C C0 C0  18 18 18 18
60-6F : 18 18 18 18  18 18 18 00  00 00 00 00  00 00 00 00
70-7F : 00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
```

Examples

The following example is sample output used for debugging for the IMA interface from the **show controllers** command on ATM interface 0/0/ima1.

```
Switch# show controllers atm 0/0/ima1
ATM0/0/ima1 is up
        PAM State is UP
        Firmware Version: 1.6
        FPGA Version : 1.2
        Boot version : 1.2
        mmcport      = 0        hwgrp number = 0
 rxgsr        - Receive Group status register
 txgsr        - Transmit Group status register
 lsbdcbcell   - # of cells in the delay comp buffer LSB
 msbdcbcell   - Number of cells in the delay comp buffer MSB
 txlnks       - Links in the Group in TX direction
 rxlnks       - Links in the Group in RX direction
 scci_reg     - SCCI register
 imaid_reg    - IMA ID register
 gsc_reg      - GSC register
 txtiming_reg - tx timing ref register
 txtest_reg   - tx test link register1
 txtestp_reg  - tx test pattern register
 rxtestp_reg  - rx test pattern register
rxgsr =0x3, txsgr =0x5, dcbcelllsb =0x33, dcbcellmsb =0x5,
txlnks =0x7, rxlnks =0x0, scci_reg =0x7, imaid_reg =0x1,
gsc_reg=0xA2, txtiming_reg=0x20, txtst_reg=0x20, txtstp_reg=0x0,rxtstp_reg=0x40,

linkinfo_reg=0xFClinkinfo_reg=0xFClinkinfo_reg=0xFClinkinfo_reg=0x0
linkinfo_reg=0x0linkinfo_reg=0x0linkinfo_reg=0x0linkinfo_reg=0x0
```

Related Commands

Command	Description
show switch fabric (Catalyst 8540 MSR)	Shows the details of the switch fabric for an ATM switch router.
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

show debugging

To display information about the types of CDP debugging that are enabled for your switch router, use the **show debugging** EXEC command.

show debugging

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show debugging** command, which shows all three types of CDP debugging enabled.

```
Switch# show debugging
CDP:
  CDP packet info debugging is on
  CDP events debugging is on
  CDP neighbor info debugging is on

CDP-PA: Packet received from neon.cisco.com on interface Ethernet0
CDP-EV: Encapsulation on interface Serial0 failed
CDP-AD: Aging entry for neon.cisco.com, on interface Ethernet0
```

show diag

Catalyst 8540 MSR

To display power-on diagnostics status for the Catalyst 8540 MSR, use the **show diag** EXEC command.

show diag [**power-on**]

Catalyst 8510 MSR and LightStream 1010

To display environmental statistics and power-on diagnostics status for the Catalyst 8510 MSR and the LightStream 1010, use the **show diag** EXEC command.

show diag [**environment** | **power-on** | **all**]

Syntax Description

environment	Displays environmental status.
power-on	Displays the status of power-on diagnostics.
all	Displays the status of all command options.

Defaults

Catalyst 8540 MSR: None

Catalyst 8510 MSR and LightStream 1010: None

Command Modes

EXEC for all models

Usage Guidelines

Catalyst 8540 MSR

The power-on diagnostic test results for the Catalyst 8540 MSR are displayed using the **show diag** command.

Catalyst 8510 MSR and LightStream 1010

The power-on or hardware reset diagnostics provide full sets of test suites for the Catalyst 8510 MSR and the LightStream 1010. The test results are stored in the switch memory and an interface is provided using the **show diag** command. If an error is detected during the test, the status LED turns red.

Examples

Catalyst 8540 MSR

The following example is sample output from the **show diag power-on** EXEC command on a switch router primary route processor.

```
Switch# show diag power-on

Cat8540 Power-on Diagnostics Status (.=Pass,F=Fail,U=Unknown,N=Not Applicable)
--------------------------------------------------------------------------------
   Last Power-on Date: 97/09/15   Time: 18:17:50

   BOOTFLASH:  .   PCMCIA-Slot0: N   PCMCIA-Slot1: N
   CPU-IDPROM: .   NVRAM-Config: .
   ETHSRAM:    .   DRAM:         .   SARSRAM:       .
```

```
   PS0:         .   PS2:          N   PS (12V):     .
   FAN:         .   Temperature:  .   Bkp-IDPROM:   .


   Ethernet-port Access:   .         Ethernet-port CAM-Access: .
   Ethernet-port Loopback: .         Ethernet-port Loadgen:    .

Power-on Diagnostics Passed.
```

Catalyst 8510 MSR and LightStream 1010

The following example is sample output from the **show diag environment** EXEC command.

```
Switch# show diag environment
Temperature:                          OK
Fan:                                  OK
Voltage:                              OK
Power Supply#0 type: Power One,  status:    Failure
Power Supply#1 type: Astec,  status:    OK
```

The following example is sample output from the **show diag power-on** EXEC command on a switch router with an FC-PCQ installed.

```
Switch# show diag power-on
XXXXXX Power-on Diagnostics Status (.=Pass,F=Fail,U=Unknown,N=Not Applicable)
--------------------------------------------------------------------------------
   Last Power-on Date: 97/04/14   Time: 16:03:22
   BOOTFLASH:  .   PCMCIA-Slot0: .   PCMCIA-Slot1: N
   CPU-IDPROM: .   FCard-IDPROM: .   NVRAM-Config: .
   SRAM:       .   DRAM:         .
   PS1:        .   PS2:          N   PS (12V):     .
   FAN:        .   Temperature:  .   Bkp-IDPROM:    .

   MMC-Switch Access: .              Accordian Access: .
   LUT: .   ITT: .   OPT: .   OTT: .   STK: .   LNK: .   ATTR: .   Queue: .
   Cell-Memory:  .

   Feature-Card Access: .
   ICC: .   OCC: .   OQP: .   OQE: .   CC:  .   RT:  .
   TM0: .   TM1: .   TMC: .   IT:  .   LT:  .   RR:  .   ABR: .

Access/Interrupt/Loopback/CPU-MCast/Port-MCast/FC-MCast/FC-TMCC Test Status:
Ports                      0         1         2         3
--------------------------------------------------------------------------------
PAM 0/0 (T1CE)          .......   .......   .......   .......
PAM 0/1 (155MM)         .......   .......   .......   .......
PAM 1/0 (155MM)         .......   .......   .......   .......
PAM 1/1 (155MM)         .......   .......   .......   .......
PAM 3/0 (155UTP)        .......   .......   .......   .......
PAM 3/1 (DS3Q)        .......   .......   .......   .......Ethernet-port Access:   .
Ethernet-port CAM-Access: .
   Ethernet-port Loopback: .         Ethernet-port Loadgen:    .
```

Examples

The following example is sample output from the **show diag power-on** EXEC command on a switch router with the switch processor feature card installed.

```
Switch# show diag power-on
XXXXXX Power-on Diagnostics Status (.=Pass,F=Fail,U=Unknown,N=Not Applicable)
--------------------------------------------------------------------------------
   Last Power-on Diags  Date: 97/11/05   Time: 11:03:41   By: V 3.2

   BOOTFLASH:  .   PCMCIA-Slot0: N   PCMCIA-Slot1: N
   CPU-IDPROM: .   FCard-IDPROM: .   NVRAM-Config: .
   SRAM:       .   DRAM:         .

   PS1:        N   PS2:          N   PS (12V):     .
   FAN:        .   Temperature:  .   Bkp-IDPROM:   .

   MMC-Switch Access: .              Accordian Access: .
   LUT: .   ITT: .   OPT: .   OTT: .   STK: .   LNK: .   ATTR: .   Queue: .
   Cell-Memory:  .

switch processor feature card
    Access: .
     RST: .    REG: .    IVC: .    IFILL: .    OVC: .    OFILL: .

    TEST:
     CELL: .   SNAKE: .   RATE: .   MCAST: .   SCHED: .
     TGRP: .   UPC  : .   ABR : .   RSTQ : .

Access/Interrupt/Loopback/CPU-MCast/Port-MCast/FC-MCast/FC-TMCC Test Status:
Ports                       0         1         2         3
--------------------------------------------------------------------------------
PAM 0/0 (155UTP)        .....NN   .....NN   .....NN   .....NN
PAM 1/0 (155MM)         .....NN   .....NN   .....NN   .....NN
PAM 1/1 (622)           .....NN      N         N         N
PAM 3/0 (622MM)         .....NN      N         N         N
PAM 3/1 (DS3Q)          .....NN   .....NN   .....NN   .....NN

   Ethernet-port Access:   .         Ethernet-port CAM-Access: .
   Ethernet-port Loopback: .         Ethernet-port Loadgen:    .

Power-on Diagnostics Passed.
```

The following example is sample output from the **show diag all** EXEC command on an ATM switch router.

```
Switch# show diag all
XXXXXX Power-on Diagnostics Status (.=Pass,F=Fail,U=Unknown,N=Not Applicable)
--------------------------------------------------------------------------------

environment
-----------
Temperature:                        OK
Fan:                                OK
Voltage:                            OK
Power Supply#0 type: Power One,  status:    Failure
Power Supply#1 type: Astec,  status:    OK
```

Related Commands

Command	Description
show hardware	Displays the revision number of the hardware.

show diag online (Catalyst 8540 MSR)

To display test results for system diagnostic online tests, use the **show diag online** command.

show diag online [**detail** | **status**] [**access** | **oir** | **snake**]

Syntax Description

detail	Displays test detail for the specified test.
status	Displays test status for the specified test.
access	The access tests ensure connectivity at a configurable interval between the primary route processor and the following: • Active switch processors • Standby switch processor, if it is present • Feature cards • Port adapters • Interface modules Whenever the access test detects a hardware failure, the system issues an error message to the console. If the access test detects a hardware problem with an active switch processor, the standby switch processor, if present, automatically takes over and becomes an active switch processor. The system generates an SNMP trap when the switchover occurs.
oir	Online insertion and removal (OIR) tests check the functioning of the switch fabric and interfaces on a per-port basis. The switch router performs these tests when the system boots up and when you insert a port adapter or interface module into a slot. The OIR test sends a packet to the interface loopback and expects to receive it back within a certain time period. If the packet does not reach the port within the expected time period, or the route processor receives a corrupted packet, the system issues an error message to the console, generates an SNMP trap, and brings the port to an administrative down state.
snake	The snake test establishes a connection across all the active ports in the switch router, originating and terminating at the primary route processor. The route processor establishes a connection by sending a packet to each port in turn, which then terminates at the route processor. If the packet does not reach the route processor within the expected time period, or the received packet is corrupted, further testing is performed to isolate and disable the port causing the problem.The size of the packet and frequency of the test are configurable to minimize the impact on system performance. The snake test supports all ATM interface modules and enhanced Gigabit Ethernet interface modules. It does not support ATM port adapters, Fast Ethernet interface modules, or Gigabit Ethernet interface modules.

Defaults

No default.

Command Modes

Privileged EXEC, EXEC

Command History

Release	Modification
12.0(13)W5(19)	New command

Usage Guidelines

The access and snake online diagnostic tests run at user specified intervals and results are stored. The OIR diagnostic test has a variable packet size that can be configured. The **show diag online** command displays test results.

Diagnostic tests must be enabled by using the **diag online** command before the **show diag online** command display current diagnostic test results.

Examples

The following example is sample output from the **show diag online access** command.

```
Switch# show diag online access
========  Access Test Status and Details ========
======== Online Access Test Status ========

Current Test Status : Test is Enabled
Current Frequency of Access Test : 100 seconds

Slot  Card-Type       Test Status
----  ----------      ------------
 0/*  Super Cam       Pass
 0/0  8T1 IMA PAM     Pass
 0/1  8E1 IMA PAM     Pass
 2/*  ARM PAM         Pass
 3/*  ETHERNET PAM    Pass
 5/*  Switch Card     Pass
 5/0  Feature Card    Pass
 7/*  Switch Card     Pass
 7/0  Feature Card    Pass
 9/*  OC48c PAM       Pass
10/*  OCM Board       Pass
10/0  QUAD 622 Gen    Pass
11/*  OC48c PAM       Pass
12/*  OCM Board       Pass
12/0  QUAD 622 Gen    Pass

======== Online Access Test Status End ========
======== Online Access Test Details ========

Current Test Status : Test is Enabled
Current Frequency of Access Test : 100 seconds

Slot Card-Type       Iteration    Success    Failure    Last Failure
---- ----------      ----------   -------    -------    ------------
 0/* Super Cam       3247         3247       0          ----
 0/0 8T1 IMA PAM     3247         3247       0          ----
 0/1 8E1 IMA PAM     3247         3247       0          ----
 2/* ARM PAM         3247         3247       0          ----
 3/* ETHERNET PAM    3247         3247       0          ----
 5/* Switch Card     3247         3247       0          ----
 5/0 Feature Card    3247         3247       0          ----
 7/* Switch Card     3247         3247       0          ----
 7/0 Feature Card    3247         3247       0          ----
 9/* OC48c PAM       3247         3247       0          ----
10/* OCM Board       3247         3247       0          ----
```

```
10/0 QUAD 622 Generi 3247         3247       0          ----
11/* OC48c PAM       3247         3247       0          ----
12/* OCM Board       3247         3247       0          ----
12/0 QUAD 622 Generi 3247         3247       0          ----

======== Online Access Test Details End ========
Switch#
```

The following example is sample output from the **show diag online detail oir** command.

```
Switch# show diag online detail oir
======== Online OIR Test Details ========
Current Test Status : Test is Enabled
-------- Previous failure details ----------
Port    Card Type   Pkt Size  Err Type                  Test Time LOOP
_______ ___________ _________ ____________________  _____________ ____
00/1/01 8E1 IMA PAM       300 OIR_TIMER_ERR             00:00:43  PIF
00/1/03 8E1 IMA PAM       300 OIR_TIMER_ERR             00:00:43  PIF

02/0/00                   300 OIR_TEST_ABORT            18:00:38  PHY
02/0/01                   300 OIR_TEST_ABORT            18:00:38  PHY


-------- Complete details --------
Port    Tx Pkt    Rx Pkt    Success   Failure   Total Tests
_______ _________ _________ _________ _________ ___________
00/0/00         1         1         1         0           1
00/0/01         1         1         1         0           1
00/0/02         1         1         1         0           1
00/0/03         1         1         1         0           1
00/1/00         1         1         1         0           1
00/1/01         2         1         1         1           2
00/1/02         1         1         1         0           1
00/1/03         2         1         1         1           2

02/0/00         0         0         0         1           0
02/0/01         0         0         0         1           0

03/0/00         1         1         1         0           1
03/0/01         1         1         1         0           1
03/0/02         1         1         1         0           1
03/0/03         1         1         1         0           1
03/0/04         1         1         1         0           1
03/0/05         1         1         1         0           1
03/0/06         1         1         1         0           1
03/0/07         1         1         1         0           1
03/0/08         1         1         1         0           1
03/0/09         1         1         1         0           1
03/0/10         1         1         1         0           1
03/0/11         1         1         1         0           1
03/0/12         1         1         1         0           1
03/0/13         1         1         1         0           1
03/0/14         1         1         1         0           1
03/0/15         1         1         1         0           1

09/0/00         2         2         2         0           2

10/0/00         2         2         2         0           2
10/0/01         2         2         2         0           2
10/0/02         2         2         2         0           2
10/0/03         2         2         2         0           2

11/0/00         2         2         2         0           2

12/0/00         2         2         2         0           2
12/0/01         2         2         2         0           2
12/0/02         2         2         2         0           2
12/0/03         2         2         2         0           2
```

```
Switch#
```

For additional information about the **show diag online** command, or about how to display results, refer to the *ATM Switch Router Software Configuration Guide*.

Related Commands

Command	Description
debug diag online (Catalyst 8540 MSR)	Enables or disables system debugging.
diag online (Catalyst 8540 MSR)	Enables, disables and configures system diagnostic tests.

show environment

To display temperature and voltage information on the console, use the **show environment** EXEC command.

show environment

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show environment** command.

```
Switch# show environment
Temperature:OK
Fan:OK
Voltage: OK
Power Supply #0 type: 0 Status:OK
```

show facility-alarm status (Catalyst 8540 MSR)

To display the current major and minor alarm status, if any, and to display the configuration of the alarm thresholds, use the **show facility-alarm status** EXEC command.

show facility-alarm status

Defaults

Displays all alarms and configuration settings.

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Examples

The following example displays the facility alarm status and configuration while no alarm condition exists.

```
Switch# show facility-alarm status
Thresholds:
 Core minor 38 major 50
Switch#
```

The following example displays the facility alarm status and configuration while an alarm condition exists.

```
Switch# show facility-alarm status
Thresholds:
 Core minor 45 major 53
SOURCE:Chassis TYPE:Power entry module 0 failure SEVERITY:Minor ACO:Normal
```

Related Commands

Command	Description
clear facility-alarm (Catalyst 8540 MSR)	Clears alarm conditions and resets the alarm contacts.
facility-alarm (Catalyst 8540 MSR)	Configures the temperatures so that the ATM switch router declares a major or minor alarm condition.

show file

To display the configuration stored in a specified file, use the **show file** EXEC command.

show file descriptors | information [[*device***:**]*filename*] **| systems**

Syntax Description

descriptors	Displays open file descriptors information.
information	Displays file information.
device:	Device containing the configuration file. The colon (**:**) is required. Valid devices are as follows: • **bootflash:** is the internal Flash memory. • **sec-bootflash:** is the secondary internal Flash memory on the redundant route processor. (Catalyst 8540 MSR) • **nvram:** is the NVRAM on the route processor card. • **sec-nvram:** is the NVRAM on the redundant route processor card. (Catalyst 8540 MSR) • **slot0:** is the first PC slot on the route processor card and is the initial default device. • **sec-slot0:** is the first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** is the second PC slot on the route processor card. • **sec-slot1:** is the second PC slot on the redundant route processor card. (Catalyst 8540 MSR) If you omit the *device***:** argument, the system uses the default device specified by the **cd** command.
filename	Name of the file. The file can be of any type. The maximum filename length is 63 characters.
systems	Displays file systems information.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

When showing the configuration, the switch informs you whether the displayed configuration is a complete configuration or a distilled version. A distilled configuration is one that does not contain access lists.

Examples

The following example is sample output from the **show file** command.

```
Switch# show file slot0:switch-config
Using 534 out of 129016 bytes
!
version xx.x
!
hostname Cyclops
!
enable-password xxxx
service pad
!
boot system dross-system 131.108.13.111
boot system dross-system 131.108.1.111
!
exception dump 131.108.13.111
!
no ip ipname-lookup
!
decnet routing 13.1
decnet node-type area
decnet max-address 1023
!
interface Ethernet 0
ip address 131.108.1.1 255.255.255.0
ip helper-address 131.120.1.0
ip accounting
ip gdp
decnet cost 3
!
ip domain-name CISCO.COM
ip name-server 255.255.255.255
!
end
```

Related Commands

Command	Description
boot	Cisco IOS command removed from this manual. Refer to Appendix D.
cd	Cisco IOS command removed from this manual. Refer to Appendix D.

show flash

To display the layout and contents of Flash memory, use one of the following **show flash** EXEC commands.

show flash [**all** | **chips** | **filesys**]

Syntax Description

all	Displays the same information as the **dir** command when used with the **/all** and **/long** keywords. This information includes that displayed by the **filesys** and **chips** keywords.
chips	Displays information per partition and per chip, including which bank the chip is in, plus its code, size, and name.
filesys	Displays the Device Info Block, the Status Info, and the Usage Info.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **show flash** command displays the type of Flash memory present, any files that might currently exist in PC slot0: Flash memory, and the amounts of Flash memory used and remaining.

When you specify a PC slot as the device, the switch router displays the layout and contents of the Flash memory card inserted in the specified slot of the route processor card. When you omit the *device***:** argument, the switch router displays the default device specified by the **cd** command. Use the **pwd** command to show the current default device.

Examples

The following example is sample output from the **show flash** command.

```
Switch# show flash
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .D FFFFFFFF 9099E94C 233F8C  22   2047753  Feb 29 1997 06:30:03 xxxxxx-i-m_Z
2   .. 1        E9D05582 458C54  29   2247751  Apr 04 1997 16:07:33 pnni/ls101Z

3306412 bytes available (4295764 bytes used)
```

As the display shows, the Flash memory can store and display multiple, independent software images for booting itself or for TFTP server software for other products. This feature is useful for storing default system software. These images can be stored in compressed format (but cannot be compressed by the switch).

To eliminate any files from Flash memory (invalidated or otherwise) and free up all available memory space, the entire Flash memory must be erased; individual files cannot be erased from Flash memory.

Table 18-20 describes the **show flash** display fields.

Table 18-20 show flash Field Descriptions

Field	Description
Name	Filename and status of a system image file. The invalidated status appears when a file has been rewritten (recopied) into Flash memory. The first (now invalidated) copy of the file is still present within Flash memory, but it is unusable because of the newest version.
crc	Address of the file in Flash memory.
Length	Size of the system image file (in bytes).
Bytes available/used	Amount of Flash memory used/available amount of Flash memory.

Examples

The following example is sample output for the **show flash all** command that has Flash memory partitioned.

```
Switch# show flash all
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .D FFFFFFFF 9099E94C 233F8C  22   2047753  Feb 29 1997 06:30:03 xxxxxx-i-m_Z
2   .. 1        E9D05582 458C54  29   2247751  Apr 04 1997 16:07:33 Switch/ls101Z

3306412 bytes available (4295764 bytes used)

-------- F I L E   S Y S T E M   S T A T U S --------
  Device Number = 2
DEVICE INFO BLOCK:
  Magic Number          = 6887635   File System Vers = 10000    (1.0)
  Length                = 800000    Sector Size      = 40000
  Programming Algorithm = 5         Erased State     = FFFFFFFF
  File System Offset    = 40000     Length = 740000
  MONLIB Offset         = 100       Length = A570
  Bad Sector Map Offset = 3FFFC     Length = 4
  Squeeze Log Offset    = 780000    Length = 40000
  Squeeze Buffer Offset = 7C0000    Length = 40000
  Num Spare Sectors     = 0
    Spares:
STATUS INFO:
  Writable
  NO File Open for Write
  Complete Stats
  No Unrecovered Errors
  Squeeze in progress
USAGE INFO:
  Bytes Used     = 418C54  Bytes Available = 3273AC
  Bad Sectors    = 0       Spared Sectors  = 0
  OK Files       = 1       Bytes = 224C48
  Deleted Files  = 1       Bytes = 1F3F0C
  Files w/Errors = 0       Bytes = 0

******** RSP Internal Flash Bank -- Intel Chips ********
Flash SIMM Reg: 401
  Flash SIMM PRESENT
  2 Banks
  Bank Size = 4M
  HW Rev = 1
```

```
Flash Status Registers: Bank 0
  Intelligent ID Code  : 89898989 A2A2A2A2
  Status Reg: 80808080

Flash Status Registers: Bank 1
  Intelligent ID Code  : 89898989 A2A2A2A2
  Status Reg: 80808080

slot0, slot1, bootflash, nvram, tftp, rcp
```

Table 18-21 describes the **show flash all** display fields.

Table 18-21 show flash all Fields for Partitioned Flash Memory

Field	Description
Bank-Size	Size of bank in bytes
Chip	Chip number
Bank	Bank number
Code	Code number
Size	Size of chip
Name	Name of chip

Related Commands None

show frame-relay connection-traffic-table-row

To display the Frame Relay traffic table, use the **show frame-relay connection-traffic-table-row** EXEC command.

show frame-relay connection-traffic table row [**from-row** | **row** *row*]

Syntax Description

from-row	Shows the table from a specific row.
row *row*	Shows the row that you specify.

Command Modes

EXEC

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

The row index must be an integer between 1 and 2147483647. An asterisk is appended to row indexes created by SNMP but not made active. Since these rows are not active, they cannotbe used by connections. If neither the **row** nor **from-row** keywords are used, the entire table is displayed.

Examples

The following example shows information for a Frame Relay connection traffic table row.

```
Switch# show frame-relay connection-traffic-table-row
Row             cir      bc     be      pir      fr-atm      ATM Row
                                                Service-category
100           64000   32768   32768   64000     vbr-nrt         100
Swich#
```

Related Commands

Command	Description
frame-relay connection-traffic-table -row	Creates a table entry in the Frame Relay connection-traffic table.

show frame-relay interface resource

To display the current resource allocation on a Frame Relay interface, use the **show frame-relay interface resource** EXEC command.

show frame-relay interface resource serial *card/subcard/port***:***dlci*

Syntax Description

card/subcard/port	Interface card number, backplane slot number, port number, and logical serial port of the interface.
:dlci	Data-link connection identifier.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **show frame-relay interface resource** command display differs depending on whether the interface type is Frame Relay or Frame FUNI.

Examples

The following example displays detailed information about a Frame Relay port adapter.

```
Switch# show frame-relay interface resource serial 1/1/1:12
Encapsulation: FRAME-RELAY
Resource Management configuration:
    Input queues (PAM to switch fabric):
       Discard threshold: 87% vbr-nrt, 87% abr, 87% ubr
       Marking threshold: 75% vbr-nrt, 75% abr, 75% ubr
    Output queues (PAM to line):
       Discard threshold: 87% vbr-nrt, 87% abr, 87% ubr
       Marking threshold: 75% vbr-nrt, 75% abr, 75% ubr
    Overflow servicing for VBR: enabled
    Overbooking: 200%
Resource Management state:
  Available bit rates (in bps):
     3968000 vbr-nrt RX, 3968000 vbr-nrt TX
     3968000 abr RX,     3968000 abr TX
     3968000 ubr RX,     3968000 ubr TX
  Allocated bit rates (in bps):
     0 vbr-nrt RX, 0 vbr-nrt TX
     0 abr RX,     0 abr TX
     0 ubr RX,     0 ubr TX
Switch#
```

Related Commands

Command	Description
frame-relay input-queue	Configures discard marking thresholds on a Frame Relay interface in the input direction.
frame-relay output-queue	Configures discard marking thresholds on a Frame Relay interface in the output direction.

show frame-relay lmi

To display LMI specific status for an interface, use the **show frame-relay lmi** EXEC command.

show frame-relay lmi [**interface serial** *card/subcard/port*]

Syntax Description

card/subcard/port	Card, subcard, and port number for the serial interface.

Command Modes

EXEC

Command History

Release	Modification
12.0(1a)W5(5b)	New command

Usage Guidelines

Enter the **show frame-relay lmi** command without arguments to obtain statistics about all Frame Relay interfaces.

Examples

The following is sample output from the **show frame-relay lmi** command when the interface is an NNI:

```
Switch# show frame-relay lmi
LMI Statistics for interface Serial3/0/0:1 (Frame Relay NNI) LMI TYPE = CISCO
  Invalid Unnumbered info 0             Invalid Prot Disc 0
  Invalid dummy Call Ref 0              Invalid Msg Type 0
  Invalid Status Message 0              Invalid Lock Shift 0
  Invalid Information ID 0              Invalid Report IE Len 0
  Invalid Report Request 0              Invalid Keep IE Len 0
  Num Status Enq. Rcvd 11               Num Status msgs Sent 11
  Num Update Status Rcvd 0              Num St Enq. Timeouts 0
  Num Status Enq. Sent 10               Num Status msgs Rcvd 10
  Num Update Status Sent 0              Num Status Timeouts 0
```

Table 18-22 describes the field descriptions for the **show frame-relay lmi** command.

Table 18-22 show frame-relay lmi Field Descriptions

Field	Description
LMI Statistics	Signalling or LMI specification: CISCO, ANSI, or ITU-T.
Invalid Unnumbered info	Number of received LMI messages with an invalid unnumbered information field.
Invalid Prot Disc	Number of received LMI messages with an invalid protocol discriminator.
Invalid dummy Call Ref	Number of received LMI messages with invalid dummy call references.
Invalid Msg Type	Number of received LMI messages with an invalid message type.
Invalid Status Message	Number of received LMI messages with an invalid status message.

Table 18-22 show frame-relay lmi Field Descriptions (continued)

Field	Description
Invalid Lock Shift	Number of received LMI messages with an invalid lock shift type.
Invalid Information ID	Number of received LMI messages with an invalid information identifier.
Invalid Report IE Len	Number of received LMI messages with an invalid report IE length.
Invalid Report Request	Number of received LMI messages with an invalid report request.
Invalid Keep IE Len	Number of received LMI messages with an invalid keep IE length.
Num Status Enq. Sent	Number of LMI status inquiry messages sent.
Num Status Msgs Rcvd	Number of LMI status messages received.
Num Update Status Rcvd	Number of LMI asynchronous update status messages received.
Num Status Timeouts	Number of times the status message was not received within the keepalive time value.
Num Status Enq. Rcvd	Number of LMI status enquiry messages received.
Num Status Msgs Sent	Number of LMI status messages sent.
Num Status Enq. Timeouts	Number of times the status enquiry message was not received within the T392 DCE timer value.
Num Update Status Sent	Number of LMI asynchronous update status messages sent.

Related Commands

Command	Description
frame-relay pvc	Creates a Frame Relay-to-ATM network interworking or service interworking PVC or Frame-Relay- to-Frame Relay cross-connected PVC.

show functional-image-info

To display information about the in-system programmable device images (FPGA and PLD images) for a given module in the system, use the **show functional-image-info** EXEC command.

show functional-image-info {*slot* | *subslot*}

Syntax Description

slot	Physical slot number of the designated module. The range is 0 to 12.
subslot	Physical subslot number of the designated module. The range is 0 or 1.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example displays information about the motherboard in slot 8 of an ATM switch router.

```
Switch# show functional-image-info 8
Functional Version of the FPGA Image: 3.8
 #Jtag-Distribution-Format-B
 #HardwareRequired: 100(3.1,4.0,5.0)
 #FunctionalVersion: 3.8
 #Sections: 1
 #Section1Format: MOTOROLA_EXORMAX
  Copyright (c) 1996-98 by cisco Systems, Inc.
  All rights reserved.
  generated by:       holliday
  on:                 Fri Jul  3 14:43:15 PDT 1998
  using:              /cougar/bin/jtag_script Version 1.08
  config file:        cpu.jcf
  Chain description:
  Part type Bits Config file
  10k50     10   /cougar/custom/cpu/cidrFpga2/max/cidr_fpga.ttf
  xc4062    3    /cougar/custom/cpu/cubiFpga2/xil/cubi.bit
  xc4062    3    /cougar/custom/cpu/cubiFpga2/xil/cubi.bit
  generic   2
  XC4005    3    /cougar/custom/common/jtcfg/xil/jtcfg_r.bit
  Number devices             = 5
  Number of instruction bits = 21
  FPGA config file information:
  Bitgen date/time  Sum   File
  98/07/03 14:39:17 26503 /cougar/custom/cpu/cidrFpga2/max/cidr_fpga.ttf
  98/06/25 09:44:49 63850 /cougar/custom/cpu/cubiFpga2/xil/cubi.bit
  98/06/25 09:44:49 63850 /cougar/custom/cpu/cubiFpga2/xil/cubi.bit
  98/06/11 16:56:44 49904 /cougar/custom/common/jtcfg/xil/jtcfg_r.bit
```

Related Commands

Command	Description
reprogram	Upgrades nonvolatile microcode or programmable logic on a selected card from a Flash file.

show hardware

To display the revision number of the hardware, use the **show hardware** EXEC command.

Catalyst 8540 MSR

show hardware [**detail**]

Catalyst 8510 MSR and LightStream 1010

show hardware

Syntax Description

detail	Shows detailed hardware information. (Catalyst 8540 MSR)

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

Catalyst 8540 MSR

The following example is sample output from the **show hardware** command for anATM switch router.

```
Switch# show hardware

C8540 named Switch, Date: 10:54:26 UTC Thu Nov 19 1998

Slot Ctrlr-Type    Part No.  Rev  Ser No  Mfg Date   RMA No. Hw Vrs  Tst EEP
---- ------------  ---------- -- -------- --------- -------- ------- --- ---
 0/* OCM Board     73-2852-05 03 mic02360 Jan 00 00            1.0
 0/0 quad622 Gene  73-2852-05 03 mic02360 Jan 00 00            1.0
 2/* Super Cam               02 07285959 Jan 00 00            3.0
 2/0 155MM PAM     73-1496-03 06 02202232 Jan 15 96 00-00-00   3.0     0   2
 2/1 155MM PAM     73-1496-03 00 03115169 Feb 23 96 00-00-00   3.0     0   2
 4/* Route Proc    73-2644-05 02 mic02360 Jan 00 00            5.1
 5/* Switch Card   73-3315-07 02 MIC02390 Jan 00 00            7.1
 7/* Switch Card   73-3315-07 02 MIC02360 Jan 00 00            7.1
 8/* Route Proc    73-2644-05 00 mic02360 Jan 00 00            5.1
11/* Super Cam     73-2739-03 11 MIC02380 Jan 00 00            3.0
11/0 155MM PAM     73-1496-03 00 03114868 Feb 24 96 00-00-00   3.0     0   2

DS1201 Backplane EEPROM:
Model  Ver.  Serial  MAC-Address  MAC-Size  RMA  RMA-Number   MFG-Date
------ ---- -------- ------------ --------  ---  ----------  -----------
C8540  2   6312897 00107BC6F300   1024      0        0      Aug 21 1998
cubi version : D
```

Examples

The following is sample output from the **show hardware detail** command for an ATM switch router.

```
Switch# show hardware detail

C8540 named Switch, Date: 10:54:45 UTC Thu Nov 19 1998

Slot Ctrlr-Type    Part No.  Rev  Ser No  Mfg Date   RMA No. Hw Vrs  Tst EEP
---- ------------  ---------- -- -------- --------- -------- ------- --- ---
 0/* OCM Board     73-2852-05 03 mic02360 Jan 00 00            1.0
 0/0 quad622 Gene  73-2852-05 03 mic02360 Jan 00 00            1.0
 2/* Super Cam                02 07285959 Jan 00 00            3.0
 2/0 155MM PAM     73-1496-03 06 02202232 Jan 15 96 00-00-00   3.0     0   2
 2/1 155MM PAM     73-1496-03 00 03115169 Feb 23 96 00-00-00   3.0     0   2
11/* Super Cam     73-2739-03 11 MIC02380 Jan 00 00            3.0
11/0 155MM PAM     73-1496-03 00 03114868 Feb 24 96 00-00-00   3.0     0   2

slot:  0/*  Controller-Type : OCM Board
Part Number: 73-2852-05                          Revision: 03
Serial Number: mic0236002b                       Mfg Date: Jan 00 00
RMA Number:   H/W Version: 1.0

slot:  0/0  Controller-Type : quad622 Generic
Part Number: 73-2852-05                          Revision: 03
Serial Number: mic0236002b                       Mfg Date: Jan 00 00
RMA Number:   H/W Version: 1.0

slot:  2/*  Controller-Type : Super Cam
Part Number:                                     Revision: 02
Serial Number: 07285959                          Mfg Date: Jan 00 00
RMA Number:   H/W Version: 3.0

slot:  4/*  Controller-Type : Route Proc
Part Number: 73-2644-05                          Revision: 02
Serial Number: mic0236005c                       Mfg Date: Jan 00 00
RMA Number:   H/W Version: 5.1

slot:  5/*  Controller-Type : Switch Card
Part Number: 73-3315-07                          Revision: 02
Serial Number: MIC023900RD                       Mfg Date: Jan 00 00
RMA Number:   H/W Version: 7.1

slot:  7/*  Controller-Type : Switch Card
Part Number: 73-3315-07                          Revision: 02
Serial Number: MIC0236003C                       Mfg Date: Jan 00 00
RMA Number:   H/W Version: 7.1

slot:  8/*  Controller-Type : Route Proc
Part Number: 73-2644-05                          Revision: 00
Serial Number: mic0236005g                       Mfg Date: Jan 00 00
RMA Number:   H/W Version: 5.1

slot: 11/*  Controller-Type : Super Cam
Part Number: 73-2739-03                          Revision: 11
Serial Number: MIC0238007E                       Mfg Date: Jan 00 00
RMA Number:   H/W Version: 3.0

DS1201 Backplane EEPROM:
Model  Ver.  Serial  MAC-Address  MAC-Size  RMA  RMA-Number   MFG-Date
------ ---- -------- ------------ --------  ---  ----------  -----------
C8540  2   6312897 00107BC6F300   1024      0        0      Aug 21 1998
cubi version : D
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example is sample output from the **show hardware** command for an ATM switch router.

```
Switch# show hardware

LS1010 named Switch, Date: 12:27:09 UTC Tue Sep 30 1997
Feature Card's FPGA Download Version: 0

Slot Ctrlr-Type    Part No.  Rev  Ser No  Mfg Date   RMA No. Hw Vrs  Tst EEP
---- ------------  ---------- -- -------- --------- -------- ------- --- ---
0/0  155UTP PAM    73-1572-02 01 02749041 Jan 17 96 00-00-00   3.0     0   2
0/1  155MM PAM     73-1496-03 06 02180424 Jan 16 96 00-00-00   3.0     0   2
1/0  155MM PAM     73-1496-03 06 02180444 Jan 17 96 00-00-00   3.0     0   2
1/1  155MM PAM     73-1496-03 06 02202228 Jan 11 96 00-00-00   3.0     0   2
3/0  CE-T1 PAM     73-2176-02 A0 03669320 Feb 15 97 00-00-00   1.0     0   2
3/1  QUAD DS3 PAM  73-2197-02 A0 03816513 Jan 30 97 00-00-00   2.0     0   2
2/0  ATM Swi/Proc  73-1402-06 C2 05426230 Sep 23 97 00-00-00   4.0     0   2
2/1  FC-PFQ        73-2281-04 01 04845638 Sep 17 97 00-00-00   4.0     0   2

DS1201 Backplane EEPROM:
Model  Ver.  Serial  MAC-Address  MAC-Size  RMA  RMA-Number   MFG-Date
------ ---- -------- ------------ --------  ---  ----------  -----------
UNKNOWN  255   -1 FFFFFFFFFFFF   65535      255 16777215  `Vv8`x``V`u ^V` 255 65535
```

show history

To list the commands you have entered in the current EXEC session, use the **show history** EXEC command.

show history

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The command history feature provides a record of EXEC commands you have entered.

Table 18-23 lists the keys and functions you can use to recall commands from the command history buffer.

Table 18-23 History Keys

Key	Function
Ctrl-P or Up arrow	Recalls commands in the history buffer in a backward sequence, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Ctrl-N or Down arrow	Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up arrow. Repeat the key sequence to recall successively more recent commands.

Examples

The following example is sample output from the **show history** command, which lists the commands the user has entered in EXEC mode for this session.

```
Switch# show history
  help
  where
  show hosts
  show history
```

Related Commands

None

show hosts

To display the default domain name, the style of the name lookup service, a list of name server hosts, and the cached list of host names and addresses, use the **show hosts** EXEC command.

show hosts *hostname*

Syntax Description

hostname	Specifies the host name of the server to display.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show hosts** command.

```
Switch# show hosts

Default domain is CISCO.COM
Name/address lookup uses domain service
Name servers are 255.255.255.255
Host              Flag        Age   Type       Address(es)
SLAG.CISCO.COM    (temp, OK)  1     IP         131.108.4.10
CHAR.CISCO.COM    (temp, OK)  8     IP         192.31.7.50
CHAOS.CISCO.COM   (temp, OK)  8     IP         131.108.1.115
DIRT.CISCO.COM    (temp, EX)  8     IP         131.108.1.111
DUSTBIN.CISCO.COM (temp, EX)  0     IP         131.108.1.27
DREGS.CISCO.COM   (temp, EX)  24    IP         131.108.1.30
```

Table 18-24 describes the significant fields shown in the display.

Table 18-24 show hosts Field Descriptions

Field	Description
Flag	A temporary entry is entered by a name server; the switch removes the entry after 72 hours of inactivity. An entry marked perm is entered by a configuration command and is not timed out. Entries marked OK are considered valid. Entries with question marks (??) are suspect and subject to revalidation. Entries marked EX are expired.
Age	Indicates the number of hours since the switch last referred to the cache entry.
Type	Identifies the type of address, for example, IP, CLNS, or X.121. If you have used the **ip hp-host** global configuration command, the **show hosts** command displays these host names as type HP-IP.
Address(es)	Shows the address of the host. One host may have up to eight addresses.

Related Commands

Command	Description
clear host	Deletes entries from the host-name-and-address cache.

show ima interface

To display the IMA interface, IMA group, and ATM layer hardware configuration, use the **show ima interface** EXEC command.

show ima interface [{**atm** | **atm-p**} {*card/subcard/port* | *card/subcard/imagroup*} [**detailed**]]

Syntax Description

atm	Specifies an ATM interface.
atm-p	Specifies an ATM-P interface.
card/subcard/port	Specifies the card, subcard, and port number for the ATM or ATM-P interface.
*card/subcard/***ima***group*	Specifies the card, subcard, and IMA group number (0 to 3) for the ATM interface.
detailed	Displays more detailed information; must be the last keyword of the command.

Command Modes

EXEC

Command History

Release	Modification
12.0(4a)W5(11a)	New command. Originally **show ima interface (Catalyst 8510 MSR and LightStream 1010)**

Usage Guidelines

The **show ima interface** command has two specific display types, the IMA group information display and the IMA port adapter hardware information display.

The IMA group ATM layer information display is shown using the **ima** keyword and IMA group number instead of the port number in the hardware interface description.

Note If no ATM keyword is entered, the **show ima interface** command displays all IMA interfaces that are present in the system.

Note This command is only supported on systems equipped with FC-PFQ.

Examples

The following example shows how to use the **show ima interface** command with no interface variables to display the ATM layer information for all IMA groups in tabular mode.

```
Switch# show ima interface
ATM0/0/ima1 is up
        Group Index     = 1
        State: NearEnd = operational, FarEnd = operational
        FailureStatus  = noFailure
IMA Group Current Configuration:
        MinNumTxLinks = 2    MinNumRxLinks = 2
```

```
        DiffDelayMax  = 25   FrameLength   = 128
        NeTxClkMode   = common(ctc)  CTC_Reference_Link = ATM0/0/0
        TestLink      = 0    TestPattern   = 0
        TestProcStatus     = operating  GTSM change timestamp = 990618150733
IMA Link Information:
Link           Physical Status        NearEnd Rx Status       Test Status
-----          ---------------        -----------------      ---------------
ATM0/0/0       up                     active                 operating
ATM0/0/1       up                     active                 operating
ATM0/0/2       up                     active                 operating
```

The following example shows how to use the **show ima interface** command to display the ATM layer information for a specific IMA group in tabular mode.

```
Switch# show ima interface atm 0/0/ima1
ATM0/0/ima1 is up
        Group Index    = 1
        State: NearEnd = operational, FarEnd = operational
        FailureStatus  = noFailure
IMA Group Current Configuration:
        MinNumTxLinks = 2    MinNumRxLinks = 2
        DiffDelayMax  = 25   FrameLength   = 128
        NeTxClkMode   = common(ctc)  CTC_Reference_Link = ATM0/0/0
        TestLink      = 0    TestPattern   = 0
        TestProcStatus     = operating  GTSM change timestamp = 990618150733
IMA Link Information:
Link           Physical Status        NearEnd Rx Status       Test Status
-----          ---------------        -----------------      ---------------
ATM0/0/0       up                     active                 operating
ATM0/0/1       up                     active                 operating
ATM0/0/2       up                     active                 operating
```

Examples

The following example shows how to use the **show ima interface** command to display the ATM layer information for the IMA group in **detailed** mode.

```
Switch# show ima interface atm 0/0/ima1 detailed
ATM0/0/ima1 is up
        Group Index    = 1
        State: NearEnd = operational, FarEnd = operational
        FailureStatus  = noFailure
IMA Group Current Configuration:
        MinNumTxLinks = 2    MinNumRxLinks = 2
        DiffDelayMax  = 25   FrameLength   = 128
        NeTxClkMode   = common(ctc)  CTC_Reference_Link = ATM0/0/0
        TestLink      = 0    TestPattern   = 0
        TestProcStatus     = operating  GTSM change timestamp = 990618150733
Detailed group Information:
        Symmetry        = symmetricOperation
        FeTxClkMode     = common(ctc)
        RxFrameLength   = 128
        TxTimingRefLink = 0     RxTimingRefLink = 2
        TxImaId         = 1     RxImaId         = 1
        NumTxCfgLinks   = 3     NumRxCfgLinks   = 3
        NumTxActLinks   = 3     NumRxActLinks   = 3
        LeastDelayLink  = 2     DiffDelayMaxObs = 0
Group counters:
        NeNumFailures   = 1     FeNumFailures   = 1
```

```
        UnAvailSecs     = 2     RunningSecs     = 345032
IMA Detailed Link Information:
ATM0/0/0 is up
        RowStatus = active
        IfIndex   = 5           GroupIndex = 1
        State:
                NeTx = active   NeRx = active
                FeTx = active   FeRx = active
        FailureStatus:
                NeRx = noFailure        FeRx = noFailure
        TxLid           = 0    RxLid           = 2
        RxTestPattern    = 64   TestProcStatus   = operating
        RelativeDelay    = 0
IMA Link counters :
        ImaViolations    = 1
        NeSevErroredSecs = 1    FeSevErroredSecs = 1
        NeUnavailSecs    = 0    FeUnAvailSecs    = 0
        NeTxUnusableSecs = 2    NeRxUnUsableSecs = 1
        FeTxUnusableSecs = 2    FeRxUnusableSecs = 2
        NeTxNumFailures  = 0    NeRxNumFailures  = 0
        FeTxNumFailures  = 0    FeRxNumFailures  = 0
ATM0/0/1 is up
        RowStatus = active
        IfIndex   = 6           GroupIndex = 1
        State:
                NeTx = active   NeRx = active
                FeTx = active   FeRx = active
        FailureStatus:
                NeRx = noFailure        FeRx = noFailure
        TxLid           = 1    RxLid           = 3
        RxTestPattern    = 64   TestProcStatus   = operating
        RelativeDelay    = 2
IMA Link counters :
        ImaViolations    = 1
        NeSevErroredSecs = 0    FeSevErroredSecs = 1
        NeUnavailSecs    = 0    FeUnAvailSecs    = 0
        NeTxUnusableSecs = 1    NeRxUnUsableSecs = 1
        FeTxUnusableSecs = 1    FeRxUnusableSecs = 1
        NeTxNumFailures  = 0    NeRxNumFailures  = 0
        FeTxNumFailures  = 0    FeRxNumFailures  = 0
ATM0/0/2 is up
        RowStatus = active
        IfIndex   = 7           GroupIndex = 1
        State:
                NeTx = active   NeRx = active
                FeTx = active   FeRx = active
        FailureStatus:
                NeRx = noFailure        FeRx = noFailure
        TxLid           = 2    RxLid           = 4
        RxTestPattern    = 64   TestProcStatus   = operating
        RelativeDelay    = 0
IMA Link counters :
        ImaViolations    = 1
        NeSevErroredSecs = 1    FeSevErroredSecs = 1
        NeUnavailSecs    = 0    FeUnAvailSecs    = 0
        NeTxUnusableSecs = 2    NeRxUnUsableSecs = 2
        FeTxUnusableSecs = 1    FeRxUnusableSecs = 1
        NeTxNumFailures  = 0    NeRxNumFailures  = 0
        FeTxNumFailures  = 0    FeRxNumFailures  = 0
```

Examples

The following example shows how to use the **show ima interface** command to display the specific ATM interface hardware configuration in **detailed** mode.

```
Switch# show ima interface atm 0/0/0 detailed
ATM0/0/0 is up
        RowStatus = active
        IfIndex   = 5           GroupIndex = 1
        State:
                NeTx = active   NeRx = active
                FeTx = active   FeRx = active
        FailureStatus:
                NeRx = noFailure        FeRx = noFailure
        TxLid           = 0    RxLid           = 2
        RxTestPattern    = 64   TestProcStatus   = operating
        RelativeDelay    = 0
IMA Link counters :
        ImaViolations    = 1
        NeSevErroredSecs = 1    FeSevErroredSecs = 1
        NeUnavailSecs    = 0    FeUnAvailSecs    = 0
        NeTxUnusableSecs = 2    NeRxUnUsableSecs = 1
        FeTxUnusableSecs = 2    FeRxUnusableSecs = 2
        NeTxNumFailures  = 0    NeRxNumFailures  = 0
        FeTxNumFailures  = 0    FeRxNumFailures  = 0
```

Examples

The following example shows how to use the **show ima interface** command to display the specific ATM interface hardware configuration.

```
Switch# show ima interface atm 0/0/0
ATM0/0/0 is up
        RowStatus = active
        IfIndex   = 5           GroupIndex = 1
        State:
                NeTx = active   NeRx = active
                FeTx = active   FeRx = active
        FailureStatus:
                NeRx = noFailure        FeRx = noFailure
        TxLid           = 0    RxLid           = 2
        RxTestPattern    = 64   TestProcStatus   = operating
        RelativeDelay    = 0
IMA Link counters :
        ImaViolations    = 1
        NeSevErroredSecs = 1    FeSevErroredSecs = 1
        NeUnavailSecs    = 0    FeUnAvailSecs    = 0
        NeTxUnusableSecs = 2    NeRxUnUsableSecs = 1
        FeTxUnusableSecs = 2    FeRxUnusableSecs = 2
        NeTxNumFailures  = 0    NeRxNumFailures  = 0
        FeTxNumFailures  = 0    FeRxNumFailures  = 0
```

Table 18-25 describes some key fields in the **show ima interface** command displays.

Table 18-25 show ima interface Field Descriptions

Field	Description
MinNumTxLinks	Minimum number of transmit links configured for the IMA group to function.
MinNumRxLinks	Minimum number of receive links configured for the IMA group to function.
DiffDelayMax	Maximum differential delay configured for the IMA group.
FrameLength	Frame length configured for the IMA group.

Table 18-25 show ima interface Field Descriptions (continued)

Field	Description
NeTxClkMode	Near-end transmit clock mode configured for the IMA group.
TestProcStatus	Test procedure status configured for the IMA group.

Related Commands

Command	Description
show atm interface	Displays ATM-specific information about an ATM interface.
show interfaces	Displays the interface configuration, status, and statistics.

show interfaces

To display the interface configuration, status, and statistics, use the **show interfaces** command.

show interfaces {*type* [*card/subcard/port*[**:***cgn*] |*card/subcard/***ima***group*]}

Syntax Description

type	Specifies one of the interface types listed in Table 18-25.
card/subcard/port	Specifies the card, subcard, and port number of the ATM, ATM-P, CBR, or Ethernet interface.
:cgn	Specifies the channel-group number (identifier).
*card/subcard/***ima***group*	Specifies the card, subcard, and IMA group number of the ATM interface.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command. Originally **show interface**.

Usage Guidelines

Table 18-26 shows the interface types for the **show interfaces** EXEC command.

Table 18-26 Interface Types for the show interfaces Command

Type	Description
accounting	Shows the ATM accounting interface information.
atm	Specifies the ATM interface.
atm-p	Specifies the ATM pseudo interface.
cbr	Specifies the CBR interface.
ethernet	Specifies the main Ethernet interface (0).
serial	Specifies a serial interface, such as a channelized Frame Relay interface.

At Cisco, implementation of Frame Relay supports the following three LMI types: Cisco, ANSI Annex D, and ITU-T Q.933 Annex A. The LMI type is set per interface and is shown in the output of the **show interfaces** command. The default LMI type is Cisco.

Examples

The following is sample output from the **show interfaces** command. In this example, CRC is the number of correctable and uncorrectable input HCS errors.

Input and output packets are the number of terminated cells received or transmitted over the interface for physical ports. For the route processor port, the number represents AAL5 packets plus the terminating OAM cells received or transmitted.

```
Switch# show interfaces
Main-ATM0 is up, line protocol is up
  Hardware is ATMS2000 switch fabric
  Internet address is 1.2.2.2 255.0.0.0
  MTU 4470 bytes, BW 10000000 Kbit, DLY 0 usec, rely 255/255, load 1/255
  NSAP address: 47.009181000000000000CA7CE01.0003BBE42A06.00
  Encapsulation ATM, loopback not set, keepalive not set
  Encapsulation(s):
  2048 maximum active VCs, 0 VCs per VP, 0 current VCCs
  VC idle disconnect time: 300 seconds
  Signalling vc = 32, vpi = 0, vci = 5
  UNI Version = 3.0, Link Side = user
  Last input 0:00:02, output 0:00:02, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Output queue: 0/64/0 (size/threshold/drops)
     Conversations  0/0 (active/max active)
     Reserved Conversations 0/0 (allocated/max allocated)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     8977 packets input, 566317 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     8981 packets output, 475993 bytes, 0 underruns
5 output errors, 0 collisions, 0 interface resets, 0 restarts
     0 output buffer failures, 0 output buffers swapped out
Ethernet0 is up, line protocol is up
  Hardware is SonicT, address is 0002.bbe4.2a00 (bia 0002.bbe4.2a00)
  Internet address is 172.20.40.43 255.255.255.0
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 4:00:00
  Last input 0:00:03, output 0:00:04, output hang never
  Last clearing of "show interface" counters never
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 2000 bits/sec, 2 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     70468 packets input, 29650832 bytes, 0 no buffer
     Received 70458 broadcasts, 0 runts, 0 giants
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 input packets with dribble condition detected
     1140 packets output, 359630 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets, 0 restarts
     0 output buffer failures, 0 output buffers swapped out
```

Table 18-27 lists the keyword field descriptions for the **show interfaces** command.

Table 18-27 show interfaces serial Field Descriptions

Field	Description
MTU	Number of maximum transmission units.
BW	Number of bandwidth (kbps).
Dly	Number of station delay parameter (used by IGRP).
relay	Number of reliability coefficient.
load	Number of load (IGRP).
last input	Amount of time since last input in the following format: *hh:mm:ss.*
last output	Amount of time since last output in the following format: *hh:mm:ss.*
output hang	Time of last reset for output failure.
output queue	Size of output queue or default size of queue.
drops	Number of all output drops.
packets input	Number of all packets received since last reset.
bytes	Number of all bytes received since last reset.
no buffers	Number of all drops because of no buffers.
broadcasts, runts, giants	Not applicable if this is an ATM interface.
input errors	Number of damaged packets received.
crc	Number of packets received with correctable and uncorrectable input HCS errors.
frame	Number of packets with framing and alignment errors.
overrun, ignored, abort	Not applicable if this is an ATM interface.

Examples

The following example is sample output from the **show interfaces serial** command for a serial interface with Cisco LMI enabled.

```
Switch# show interfaces serial 0/1/0:5
Serial0/1/0:5 is up, line protocol is up
    Hardware is FRPAM-SERIAL
    MTU 4096 bytes, BW 1536 Kbit, DLY 0 usec, rely 229/255, load 14/255
    Encapsulation FRAME-RELAY, loopback not set, keepalive set (10 sec)
    LMI enq sent  0, LMI stat recvd 0, LMI upd recvd 0
    LMI enq recvd 8010, LMI stat sent  8010, LMI upd sent  0, DCE LMI up
    LMI DLCI 1023  LMI type is CISCO  frame relay DCE
    Last input never, output never, output hang never
    Last clearing of "show interface" counters never
    Input queue: 0/75/0 (size/max/drops); Total output drops: 0
    Queueing strategy: weighted fair
    Output queue: 0/64/0 (size/threshold/drops)
       Conversations  0/1 (active/max active)
       Reserved Conversations 0/0 (allocated/max allocated)
    5 minute input rate 67000 bits/sec, 786 packets/sec
    5 minute output rate 85000 bits/sec, 786 packets/sec
       32556459 packets input, 421648869 bytes, 0 no buffer
       Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
       690040 input errors, 425237 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
       32130599 packets output, 466708295 bytes, 36921560 underruns
```

```
     3094283652 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     28 carrier transitions
  Timeslots(s) Used: 1-24 on T1 5
  Frames Received with:
   DE set: 0, FECN set :4294879164, BECN set: 0
  Frames Tagged :
   DE: 0, FECN: 615698146 BECN: 0
  Frames Discarded Due to Alignment Error: 0
  Frames Discarded Due to Illegal Length: 0
  Frames Received with unknown DLCI: 0
  Frames with illegal Header : 0
  Transmit Frames with FECN set :0,  BECN Set :0
  Transmit Frames Tagged FECN : 3463814532 BECN : 3469839556
  Transmit Frames Discarded due to No buffers : 0
```

Examples

The following is sample output from the **show interfaces atm** command for an IMA group interface.

```
Switch# show interfaces atm 0/0/ima1
ATM0/0/ima1 is up, line protocol is up
  Hardware is imapam_t1_ima
  MTU 4470 bytes, sub MTU 4470, BW 1500 Kbit, DLY 0 usec, rely 255/255, load 1/2
55
  Encapsulation ATM, loopback not set, keepalive not supported
  Last input 00:00:01, output 00:00:01, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     16253 packets input, 861409 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     16168 packets output, 856904 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

Related Commands

Command	Description
show atm interface	Displays ATM-specific information about an ATM interface.
show ima interface	Displays the IMA interface, IMA group, and ATM layer hardware configuration.

show ip access-lists

To display the contents of all current IP access lists, use the **show ip access-list** EXEC command.

show ip access-list [*access-list-number* | *access-list-name*]

Syntax Description

access-list-number	Number of the IP access list to display. This is a decimal number from 1 to 199.
access-list-name	Name of the IP access list to display.

Defaults

Displays all standard and extended IP access lists.

Command Modes

EXEC

Command History

Release	Modification

Usage Guidelines

The **show ip access-list** command provides output identical to the **show access-lists** command, except that it is IP-specific and allows you to specify a particular access list.

Examples

The following example is sample output from the **show ip access-list** command.

```
Switch# show ip access-list

Extended IP access list 101
   deny udp any any eq ntp
   permit tcp any any
   permit udp any any eq tftp
   permit icmp any any
   permit udp any any eq domain
```

show ip accounting

To display the active accounting or checkpointed database or to display access-list violations, use the **show ip accounting** EXEC command.

show ip accounting [**access-violations** | **checkpoint** | **output-packets**]

Syntax Description

access-violations	Shows the access violation in the accounting database.
checkpoint	Displays the checkpointed database.
output-packets	Displays information pertaining to packets that passed access control and were successfully routed.

Defaults

If neither the **output-packets** nor **access-violations** keywords are specified, **show ip accounting** displays information pertaining to packets that passed access control and were successfully routed.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

If you do not specify any keywords, the **show ip accounting** command displays information about the active accounting database.

To display IP access violations, use the **access-violations** keyword with the command. If you do not specify the keyword, the command defaults to displaying the number of packets that have passed access lists and were routed.

To use the **show ip accounting** command, you must first enable ip accounting mode on a per-interface basis.

Examples

The following example is sample output from the **show ip accounting** command.

```
Switch# show ip accounting

   Source           Destination              Packets               Bytes
131.108.19.40    192.67.67.20                   7                 306
131.108.13.55    192.67.67.20                  67                2749
131.108.2.50     192.12.33.51                  17                1111
131.108.2.50     130.93.2.1                     5                 319
131.108.2.50     130.93.1.2                   463               30991
131.108.19.40    130.93.2.1                     4                 262
131.108.19.40    130.93.1.2                    28                2552
131.108.20.2     128.18.6.100                  39                2184
131.108.13.55    130.93.1.2                    35                3020
131.108.19.40    192.12.33.51                1986               95091
131.108.2.50     192.67.67.20                 233               14908
131.108.13.28    192.67.67.53                 390               24817
```

```
131.108.13.55    192.12.33.51              214669            9806659
131.108.13.111   128.18.6.23                27739            1126607
131.108.13.44    192.12.33.51               35412            1523980
192.31.7.21      130.93.1.2                    11               824
131.108.13.28    192.12.33.2                   21              1762
131.108.2.166    192.31.7.130                 797            141054
131.108.3.11     192.67.67.53                   4               246
192.31.7.21      192.12.33.51               15696            695635
192.31.7.24      192.67.67.20                  21               916
131.108.13.111   128.18.10.1                   16              1137
```

Examples

The following example is sample output from the **show ip accounting access-violations** command. The output pertains to packets that failed access lists and were not switched.

```
Switch# show ip accounting access-violations

Source DestinationPacketsBytesACL
131.108.19.40 192.67.67.20 7 306 77
131.108.13.55    192.67.67.20 67 2749185
131.108.2.50 192.12.33.51171111140
131.108.2.50 130.93.2.1 5319140
131.108.19.40 130.93.2.1426277
Accounting data age is 41
```

Table 18-28 describes the fields shown in the displays.

Table 18-28 show ip accounting (and access-violations) Field Descriptions

Field	Description
Source	Source address of the packet.
Destination	Destination address of the packet.
Packets	Number of packets transmitted from the source address to the destination address. With the **access-violations** keyword, the number of packets transmitted from the source address to the destination address that violated an access control list.
Bytes	Sum of the total number of bytes (IP header and data) of all IP packets transmitted from the source address to the destination address. With the **access-violations** keyword, the total number of bytes transmitted from the source address to the destination address that violated an access-control list.
ACL	Number of the access list of the last packet transmitted from the source to the destination that failed an access list filter.

Related Commands

Command	Description
clear ip accounting	Used to delete the cache table entries; however, this command or some of its parameters might not function as expected.
alias	This command or some of its parameters might not function as expected.
alias	This command or some of its parameters might not function as expected.
alias	This command or some of its parameters might not function as expected.
alias	This command or some of its parameters might not function as expected.

show ip aliases

To display the switch's IP addresses mapped to TCP ports (aliases) and SLIP addresses, which are treated similarly to aliases, use the **show ip aliases** EXEC command.

show ip aliases

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Catalyst 8510 MSR and LightStream 1010

To distinguish a SLIP address from a normal alias address, the command output uses the form SLIP TTY1 for the port number, where 1 is the auxiliary port.

Examples

Catalyst 8540 MSR

The following example is sample output from the **show ip aliases** command. The display lists the IP address and corresponding port number.

```
Switch# show ip aliases
IP Address    Port
131.108.29.245
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example is sample output from the **show ip aliases** command. The output lists the IP address and corresponding port number.

```
Switch# show ip aliases
IP Address    Port
131.108.29.245  SLIP TTY1
```

Related Commands

Command	Description
show line	Displays terminal line parameters.

show ip arp

To display the ARP cache, where SLIP addresses appear as permanent ARP table entries, use the **show ip arp** EXEC command.

show ip arp [*interface-type card/subcard/port* | *hostname* | *mac-addr*]

Syntax Description

interface-type	Specifies an interface type as **atm**, **atm-p**, **cbr**, **ethernet**, or **null**.
card/subcard/port	Identifies the interface specified in *interface-type*.
hostname	Specifies the IP address or host name of the ARP entry.
mac-addr	Specifies the 48-bit hardware address of the ARP entry.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

ARP establishes correspondences between network addresses (an IP address, for example) and LAN hardware addresses (Ethernet addresses). A record of each correspondence is kept in a cache for a predetermined amount of time and then discarded.

Examples

The following example is sample output from the **show ip arp** command.

```
Switch# show ip arp
Protocol  Address          Age (min)     Hardware Addr  Type   Interface
Internet  171.69.193.21          112     VCD#0000        ARPA   Ethernet0
Internet  172.20.40.43             -     0002.bbe4.2a00  ARPA   Ethernet0
```

Table 18-29 describes the significant fields shown in the display.

Table 18-29 show ip arp Field Displays

Field	Description
Protocol	Protocol for the network address in the Address field.
Address	The network address that corresponds to the Hardware Addr.
Age (min)	Age, in minutes, of the cache entry.
Hardware Addr	LAN hardware address of a MAC address that corresponds to the network address.

Table 18-29 show ip arp Field Displays (continued)

Field	Description
Type	Type of encapsulation: ARPA—Ethernet SNAP—RFC 1042 SAP—IEEE 802.3
Interface	Interface to which this address mapping is assigned.

show ip interface

To display the usability status of interfaces configured for IP, use the **show ip interface** EXEC command.

show ip interface [*interface-type* | *card/subcard/port*] [**brief**]

Syntax Description

interface-type	Specifies an interface type as **atm**, **atm-p**, **cbr**, **ethernet**, **null**, **serial**, or **tunnel**.
card/subcard/port	Card, subcard, and port number for the specified interface type.
brief	Displays a brief summary of IP status and configuration for all interfaces.

Command Modes

EXEC

Command History

Release	Modifcation
11.1(4)	New command

Usage Guidelines

A switch automatically enters a directly connected route in the routing table if the interface is usable. A usable interface is one through which the switch can send and receive packets. If the switch determines that an interface is not usable, it removes the directly connected routing entry from the routing table. Removing the entry allows the switch to use dynamic routing protocols to determine backup routes to the network (if any).

If the interface can provide two-way communication, the line protocol is marked "up." If the interface hardware is usable, the interface is marked "up."

If you specify an optional interface type, you will see only information on that specific interface.

If you specify no optional arguments, you will see information on all the interfaces.

Examples

The following example is sample output from the **show ip interface** command.

```
Switch# show ip interface

Ethernet0 is up, line protocol is up
  Internet address is 192.195.78.24, subnet mask is 255.255.255.240
  Broadcast address is 255.255.255.255
  Address determined by non-volatile memory
  MTU is 1500 bytes
  Helper address is not set
  Secondary address 131.192.115.2, subnet mask 255.255.255.0
  Directed broadcast forwarding is enabled
  Multicast groups joined: 224.0.0.1 224.0.0.2
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
```

```
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is enabled
  IP fast switching on the same interface is disabled
  IP SSE switching is disabled
RouterDiscovery is disabled
  IP output packet accounting is disabled
  IP access violation accounting is disabled
  TCP/IP header compression is disabled
  Probe proxy name replies are disabled
```

Table 18-30 describes the fields shown in the display.

Table 18-30 show ip interface Field Descriptions

Field	Description
Ethernet 0 is up	If the interface hardware is usable, the interface is marked "up." For an interface to be usable, both the interface hardware and line protocol must be up.
line protocol is up	If the interface can provide two-way communication, the line protocol is marked "up." For an interface to be usable, both the interface hardware and line protocol must be up.
Broadcast address	Shows the broadcast address.
Address determined by ...	Indicates how the IP address of the interface was determined.
MTU	Shows the MTU value set on the interface.
Helper address	Shows a helper address if one has been set.
Secondary address	Shows a secondary address if one has been set.
Directed broadcast forwarding	Indicates whether directed broadcast forwarding is enabled.
Multicast groups joined	Lists the multicast groups in which this interface is a member.
Outgoing access list	Indicates whether the interface has an outgoing access list set.
Inbound access list	Indicates whether the interface has an incoming access list set.
Proxy ARP	Indicates whether Proxy ARP is enabled for the interface.
Security level	Specifies the IPSO security level set for this interface.
ICMP redirects	Specifies whether redirects are sent on this interface.
ICMP unreachables	Specifies whether unreachable messages are sent on this interface.
ICMP mask replies	Specifies whether mask replies are sent on this interface.
IP fast switching	Specifies whether fast switching is enabled for this interface.
IP SSE switching	Specifies whether IP SSE switching is enabled.
Router Discovery	Specifies whether the discovery process has been enabled for this interface.
IP output packet accounting	Specifies whether IP accounting is enabled for this interface and the threshold (maximum number of entries).

Table 18-30 show ip interface Field Descriptions (continued)

Field	Description
TCP/IP header compression	Indicates whether compression is enabled or disabled.
Probe proxy name	Indicates whether HP Probe proxy name replies are generated.

show ip masks

To display the masks used for network addresses and the number of subnets using each mask, use the **show ip masks** EXEC command.

show ip masks *ip-address*

Syntax Description

ip-address	Network address for which a mask is required.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **show ip masks** command is useful for debugging when variable-length subnet masks are used. It shows the number of masks associated with the network and the number of routes for each mask.

Examples

The following example is sample output from the **show ip masks** command.

```
Switch# show ip masks 131.108.0.0

Mask            Reference count
255.255.255.255 2
255.255.255.0   3
255.255.0.0     1
```

show ip redirects

To display the address of a default gateway and the address of hosts for which a redirect has been received, use the **show ip redirects** EXEC command.

show ip redirects [*ip-address*]

Syntax Description

ip-address	IP address of network to display.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show ip redirects** command.

```
Switch# show ip redirects

Default gateway is 160.89.80.29

Host              Gateway           Last Use    Total Uses  Interface
131.108.1.111     160.89.80.240         0:00             9  Ethernet0
128.95.1.4        160.89.80.240         0:00             4  Ethernet0
```

Related Commands

Command	Description
ip route	Used to establish static routes.

show ip route summary

To display summary information about entries in the routing table, use the **show ip route summary** EXEC command.

show ip route summary

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show ip route summary** command.

```
Switch# show ip route summary

Route Source    Networks    Subnets     Overhead    Memory (bytes)
connected       0           3           126         360
static          1           2           126         360
igrp 109        747         12          31878       91080
internal        3                                   360
Total           751         17          32130       92160
```

Table 18-31 describes the fields shown in the display.

Table 18-31 show ip route summary Field Descriptions

Field	Description
Route Source	Routing protocol name, or **connected**, **static**, or **internal**. If **internal**, those routes that are in the primary routing table merely as markers to hold subnet routes. These routes are not owned by any routing protocol. There should be one of these internal routes for each subnetted network in the routing table.
Networks	The number of Class A, B, or C networks that are present in the routing table for each route source.
Subnets	The number of subnets that are present in the routing table for each route source, including host routes.
Overhead	Any additional memory involved in allocating the routes for the particular route source other than the memory specified under “Memory.”
Memory	The number of bytes allocated to maintain all the routes for the particular route source.

Related Commands

Command	Description
show ip interface	Displays the usability status of interfaces configured for IP.

show ip sockets

To display current information about open IP sockets, use the **show ip sockets** EXEC command.

show ip sockets

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show ip sockets** EXEC command.

```
Switch# show ip sockets
Proto    Remote      Port      Local       Port   In Out Stat TTY OutputIF
 17 0.0.0.0            0 --any--           67    0   0    1   0
 17 0.0.0.0          123 172.20.40.93     123    0   0    1   0
 17 0.0.0.0            0 172.20.40.93     161    0   0    1   0
```

show ip tcp header-compression

To display statistics about TCP header compression, use the **show ip tcp header-compression** EXEC command.

show ip tcp header-compression [*type*]

Syntax Description

type	Displays the buffers assigned to an input interface. You must specify an **atm**, **atm-p**, **cbr**, **ethernet**, **null**, **serial**, or **tunnel** interface.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show ip tcp header-compression** command.

```
Switch# show ip tcp header-compression

TCP/IP header compression statistics:
  Interface Aux 1: (passive, compressing)
    Rcvd:    4060 total, 2891 compressed, 0 errors
             0 dropped, 1 buffer copies, 0 buffer failures
    Sent:    4284 total, 3224 compressed,
             105295 bytes saved, 661973 bytes sent
             1.15 efficiency improvement factor
    Connect: 16 slots, 1543 long searches, 2 misses, 99% hit ratio
             Five minute miss rate 0 misses/sec, 0 max misses/sec
```

Table 18-32 describes the significant fields shown in the display.

Table 18-32 show ip tcp header-compression Field Descriptions

Field	Description
Rcvd:	
total	Total number of TCP packets received.
compressed	Total number of TCP packets compressed.
errors	Unknown packets.
dropped	Number of packets dropped due to invalid compression.
buffer copies	Number of packets that had to be copied into bigger buffers for decompression.
buffer failures	Number of packets dropped due to a lack of buffers.
Sent:	
total	Total number of TCP packets sent.

Table 18-32 show ip tcp header-compression Field Descriptions (continued)

Field	Description
compressed	Total number of TCP packets compressed.
bytes saved	Number of bytes reduced.
bytes sent	Number of bytes sent.
efficiency improvement factor	Improvement in line efficiency because of TCP header compression.
Connect:	
number of slots	Size of the cache.
long searches	Number of times the software had to look to find a match.
misses	Number of times a match could not be made. If your output shows a large miss rate, the number of allowable simultaneous compression connections may be too small.
hit ratio	Percentage of times the software found a match and was able to compress the header.
Five minute miss rate	Calculates the miss-rate over the previous 5 minutes for a longer-term (and more accurate) look at miss rate trends.
max misses/sec	Maximum value of the previous field.

Related Commands

Command	Description
ip tcp synwait-time	Sets a period of time that the switch waits while attempting to establish a TCP connection before it times out.

show ip traffic

To display statistics about IP traffic, use the **show ip traffic** EXEC command.

show ip traffic

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show ip traffic** command.

```
Switch# show ip traffic

IP statistics:
  Rcvd: 98 total, 98 local destination
        0 format errors, 0 checksum errors, 0 bad hop count
        0 unknown protocol, 0 not a gateway
        0 security failures, 0 bad options
  Frags:0 reassembled, 0 timeouts, 0 too big
        0 fragmented, 0 couldn't fragment
  Bcast:38 received, 52 sent
  Sent: 44 generated, 0 forwarded
        0 encapsulation failed, 0 no route
ICMP statistics:
  Rcvd: 0 checksum errors, 0 redirects, 0 unreachable, 0 echo
        0 echo reply, 0 mask requests, 0 mask replies, 0 quench
        0 parameter, 0 timestamp, 0 info request, 0 other
  Sent: 0 redirects, 3 unreachable, 0 echo, 0 echo reply
        0 mask requests, 0 mask replies, 0 quench, 0 timestamp
        0 info reply, 0 time exceeded, 0 parameter problem
UDP statistics:
  Rcvd: 56 total, 0 checksum errors, 55 no port
  Sent: 18 total, 0 forwarded broadcasts
TCP statistics:
  Rcvd: 0 total, 0 checksum errors, 0 no port
  Sent: 0 total
EGP statistics:
  Rcvd: 0 total, 0 format errors, 0 checksum errors, 0 no listener
  Sent: 0 total
IGRP statistics:
  Rcvd: 73 total, 0 checksum errors
  Sent: 26 total
HELLO statistics:
  Rcvd: 0 total, 0 checksum errors
  Sent: 0 total
ARP statistics:
  Rcvd: 20 requests, 17 replies, 0 reverse, 0 other
  Sent: 0 requests, 9 replies (0 proxy), 0 reverse
Probe statistics:
```

```
  Rcvd: 6 address requests, 0 address replies
0 proxy name requests, 0 other
  Sent: 0 address requests, 4 address replies (0 proxy)
        0 proxy name replies
```

Table 18-33 describes the significant fields shown in the display.

Table 18-33 show ip traffic Field Descriptions

Field	Description
format errors	A gross error in the packet format, such as an impossible Internet header length.
bad hop count	Occurs when a packet is discarded because its TTL field was decremented to zero.
encapsulation failed	Usually indicates that the switch had no ARP request entry and therefore did not send a datagram.
no route	Counted when the switch discards a datagram that it did not know how to route.
proxy name reply	Counted when the switch sends an ARP or Probe Reply on behalf of another host. The display shows the number of probe proxy requests received and the number of responses sent.

show ipc

Use the show ipc command to display IPC information.

show ipc {**nodes** | **ports** [**open**] | **queue** | **status**} [| {**begin** | **exclude** | **include**} *expression*]

Syntax Description

nodes	Show participating nodes
ports	Show local IPC ports.
open	Optional keyword used to display open ports only.
queue	Show the IPC retransmission queue.
status	Show status of local IPC server.
begin	Optional keyword orders the output display to begin with the line matching the *expression* variable.
exclude	Optional keyword orders the output display to exclude lines matching the *expression* variable.
include	Optional keyword orders the output display to include lines matching the *expression* variable.
expression	Expression in the output to use as a reference point.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(10)W5(18)	Introduced into this manual. Originally part of the Catalyst 6000 IOS command set.

Usage Guidelines

TBD..

Examples

The following example shows how to display participating nodes:

```
Switch# show ipc nodes
There are 3 nodes in this IPC realm.
   ID     Type                 Name                      Last  Last
                                                         Sent  Heard
   10000 Local      IPC Master                             0      0
       0 ATM-VC     Primary                                0      0
   20000 ATM-VC     Secondary                              39     5483
```

Examples

The following example shows how to display local IPC ports:

```
Switch# show ipc ports
There are 15 ports defined.

Port ID        Type       Name
   10000.1     unicast    IPC Master:Zone
   10000.2     unicast    IPC Master:Echo
   10000.3     unicast    IPC Master:Control
   10000.4     unicast    Primary:ehsa msgs
   20000.3     unicast    Secondary:Control
   20000.8     unicast    Slave : TTY Client Port
   20000.9     unicast    Secondary RFS Server Port
   20000.A     unicast    Secondary Old RFS Server Port
   20000.4     unicast    Secondary Services Port
   20000.5     unicast    Cougar EHSA Secondary IPC Port
   20000.6     unicast    Secondary:Netclkd Port
   20000.7     unicast    Secondary:ehsa msgs
   10000.5     unicast    Cougar EHSA Primary IPC Port
     port_index = 0  seat_id = 0x20000    last sent = 0     last heard = 0
     port_index = 1  seat_id = 0x20000    last sent = 0     last heard = 0
     port_index = 2  seat_id = 0x20000    last sent = 0     last heard = 0
     port_index = 3  seat_id = 0x20000    last sent = 0     last heard = 0

   10000.6     unicast    Primary:Netclkd Port
     port_index = 0  seat_id = 0x20000    last sent = 0     last heard = 0

   10000.7     unicast    Master : TTY Server Port
     port_index = 0  seat_id = 0x20000    last sent = 0     last heard = 0
```

The following example shows how to display open IPC ports:

```
Switch# show ipc ports open
There are 3 ports defined.

Port ID        Type       Name
   20000.4     unicast    Secondary Services Port
     port_index = 0  last sent = 5440  last heard = 0

   20000.6     unicast    Secondary:Netclkd Port
     port_index = 0  last sent = 0     last heard = 0

   20000.9     unicast    Secondary RFS Server Port
     port_index = 0  last sent = 19    last heard = 0
```

The following example shows how to display the contents of the IPC retransmission queue:

```
Switch# show ipc queue
There are 0 IPC messages waiting for acknowledgement in the transmit queue.
There are 0 IPC messages waiting for a response.
There are 0 IPC messages waiting for additional fragments.
There are 0 IPC messages currently on the IPC inboundQ.
There are 0 messages currently in use by the system.
```

Examples

The following example shows how to display the status of the local IPC server:

```
Switch# show ipc status
IPC System Status:

This processor is the IPC master server.

1000 IPC message headers in cache
227997 messages in, 222402 out, 217056 delivered to local port,
5486 acknowledgements received, 5484 sent,
0 NACKS received, 0 sent,
0 messages dropped on input, 0 messages dropped on output
0 no local port, 0 destination unknown, 0 no transport
0 missing callback or queue, 0 duplicate ACKs, 2 retries,
0 message timeouts.
0 ipc_output failures, 0 mtu failures,
0 msg alloc failed, 0 emer msg alloc failed, 0 no origs for RPC replies
0 pak alloc failed, 0 memd alloc failed
0 no hwq, 0 failed opens, 0 hardware errors
No regular dropping of IPC output packets for test purposes
```

show lane

To display global and per-VCC LANE information for all the LANE components configured on an interface or any of its subinterfaces, on a specified subinterface, or on an emulated LAN, use the **show lane** EXEC command.

show lane [**interface atm** *card/subcard/port*[**.***subinterface-number*] | **name** *elan-name*] [**brief**]

Syntax Description

card/subcard/port	Card, subcard, and port number for the ATM interface.
subinterface-number	Subinterface number.
elan-name	Name of emulated LAN. Maximum length is 32 characters.
brief	Displays the global information, but not the per-VCC information.

Command Modes

EXEC

Command History

Release	Modification
11.(4)	New command

Usage Guidelines

Entering the **show lane** command is equivalent to entering the **show lane config**, **show lane server**, **show lane bus**, and **show lane client** commands. The **show lane** command shows all LANE-related information except the **show lane database** information.

Examples

The following example is sample output of the **show lane** command.

```
Switch# show lane
LE Client ATM0  ELAN name: alpha  Admin: up  State: operational
Client ID: 2
HW Address: 0041.0b0a.2c82   Type: ethernet            Max Frame Size: 1516
ATM Address: 47.00918100000000410B0A2C81.001122334455.00

 VCD  rxFrames  txFrames  Type       ATM Address
   0         0         0  configure  47.333300000000000000000000.000111222333.00
 255         1         2  direct     47.333300000000000000000000.001122334455.00
 256         1         0  distribute 47.333300000000000000000000.001122334455.00
 257         0         0  send       47.333300000000000000000000.000000111111.00
 258         0         0  forward    47.333300000000000000000000.000000111111.00

LE Client ATM0.5  ELAN name: alpha5  Admin: up  State: operational
Client ID: 2
HW Address: 0041.0b0a.2c82   Type: ethernet            Max Frame Size: 1516
ATM Address: 47.00918100000000410B0A2C81.001122334455.05

 VCD  rxFrames  txFrames  Type       ATM Address
   0         0         0  configure  47.333300000000000000000000.000111222333.00
 259         1         5  direct     47.333300000000000000000000.001122334455.05
 260         7         0  distribute 47.333300000000000000000000.001122334455.05
```

```
261         0        13  send       47.333300000000000000000000.000000111111.05
262        19         0  forward    47.333300000000000000000000.000000111111.05
VCD  rxFrames  txFrames  Type       ATM Address
264        22        12  data       47.333300000000000000000000.000011112222.05
```

Table 18-34 describes the significant fields in the sample display.

Table 18-34 show lane Command Field Descriptions

Field	Description
LE Client	Interface on which the LANE configuration server is configured. Identifies the following lines as applying to the LANE configuration server. These lines are also displayed in output from the **show lane lecs** command.
config table	Name of the database associated with the LANE configuration server.
State	State of the configuration server: down or operational. If down, a "down reasons" field indicates why it is down. The reasons include the following: NO-config-table, NO-nsap-address, NO-config-pvc, and NO-interface-up.
ATM Address	ATM address or addresses of this configuration server.
LE Server	Identifies the following lines as applying to the LANE server. These lines are also displayed in output from the **show lane server** command.
ATM x/x/x.x	Interface or subinterface this LANE server is on.
ELAN name	Name of the emulated LAN served by this LE server.
State	Status of this LANE server. Possible states for a LANE server include down, waiting_ILMI, waiting_listen, up_not_registered, operational, and terminating.
Type	Type of emulated LAN.
Max Frame Size	Maximum frame size on this type of LAN.
ATM Address	ATM address of this server.
Config Server ATM addr	The ATM address used to reach the LANE configuration server.
control distribute: VCD 20, 2 members, 6 packets	Virtual circuit descriptor of the Control Distribute VCC.
proxy/ (ST: Init, Conn, Waiting, Adding, Joined, Operational, Reject, Term)	Status of the LANE client at the other end of the Control Distribute VCC.
lecid	Identifier for the LANE client at the other end of the Control Distribute VCC.
ST	Status of the LANE client at the other end of the Control Distribute VCC. Possible states are Init, Conn, Waiting, Adding, Joined, Operational, Reject, and Term.
VCD	Virtual channel descriptor used to reach the LANE client.
pkts	Number of packets sent by the LANE server on the Control Distribute VCC to the LANE client.
Hardware Addr	MAC-layer address of the LANE client.

Table 18-34 show lane Command Field Descriptions (continued)

Field	Description
ATM Address	ATM address of the LANE client.
LE BUS	Identifies the following lines as applying to the LANE broadcast-and-unknown server. These lines are also displayed in output from the **show lane bus** command.
ATM x/x/x.x	Interface or subinterface this LANE broadcast-and-unknown server is on.
ELAN name	Name of the emulated LAN served by this broadcast-and-unknown server.
State	Status of this LANE client. Possible states include down and operational.
Type	Type of emulated LAN.
Max Frame Size	Maximum frame size on this type of LAN.
ATM Address	ATM address of this LANE broadcast-and-unknown server.
data forward: vcd 22, 2 members, 10 packets	Virtual channel descriptor of the Data Forward VCC, number of LANE clients attached to the VCC, and the number of packets transmitted on the VCC.
lecid	Identifier assigned to each LANE client on the Data Forward VCC.
VCD	Virtual channel descriptor used to reach the LANE client.
Pkts	Number of packets sent by the broadcast-and-unknown server to the LANE client.
ATM Address	ATM address of the LANE client.
LE Client	Identifies the following lines as applying to a LANE client. These lines are also displayed in output from the **show lane client** command.
ATM x/x/x.x	Interface or subinterface this LANE client is on.
ELAN name	Name of the emulated LAN to which this client belongs.
State	Status of this LANE client. Possible states include initialState, lecsConnect, configure, join, busConnect, and operational.
HW Address	MAC address, in dotted hexadecimal notation, assigned to this LANE client.
Type	Type of emulated LAN.
Max Frame Size	Maximum frame size on this type of LAN.
ATM Address	ATM address of this LANE client.
VCD	Virtual channel descriptor for each of the VCCs established for this LANE client.
rxFrames	Number of frames received on the VCC.
txFrames	Number of frames transmitted on the VCC.
Type	Type of VCC; same as the SVC and PVC types. Possible VCC types are configure, direct, distribute, send, forward, and data.
ATM Address	ATM address of the LANE component at the other end of the VCC.

show lane bus

To display detailed LANE information for the broadcast-and-unknown server configured on an interface or any of its interfaces, on a specified subinterface, or on an emulated LAN, use the **show lane bus** EXEC command.

show lane bus [**interface atm** *card/subcard/port*[**.***subinterface-number*] | **name** *elan-name*] [**brief**]

Syntax Description

card/subcard/port	Card, subcard, and port number for the ATM interface.
subinterface-number	Subinterface number.
elan-name	Name of the emulated LAN. Maximum length is 32 characters.
brief	Keyword used to display the global information but not the per-VCC information.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show lane bus** command.

```
Switch# show lane bus interface atm 3/0/0.1

interface atm 3/0/0.1
type Ethernet name: pubsAAL5-SDU length:1516
max frame age: 2 secondsrelayed frames/sec: 116
NSAP: 45.000001415555121f.yyyy.zzzz.0800.200c.1002.01
lecidvcdcntNSAP
*8065945.000001415555121f.yyyy.zzzz.0800.200c.1002.01
1819945.000001415555121f.yyyy.zzzz.0800.200c.1000.01
5894145.000001415555122f.yyyy.zzzz.0800.200c.1100.01
69910145.000001415555124f.yyyy.zzzz.0800.200c.1300.01
```

Table 18-35 describes the significant fields in the sample display.

Table 18-35 show lane bus Command Field Descriptions

Field	Description
interface	Interface or subinterface for which information is displayed.
type	Type of emulated LAN interface.
name	Name of the emulated LAN.
MTU	Maximum transmission unit (packet) size on the emulated LAN.

Table 18-35 show lane bus Command Field Descriptions (continued)

Field	Description
AAL5-SDU	Maximum number of bytes in a LANE SDU encapsulated in an ATM AAL5 frame. This length includes a 2-byte marker and a full Ethernet-like frame from the destination MAC address field through the last byte of data. It does not include the Ethernet CRC or FRC, which is not present on emulated LAN frames. The number does not include the 8-byte AAL5 trailer in the last ATM cell of the frame, or the padding between the last data byte and the 8-byte trailer.
max frame age	After receiving a frame over Multicast Send VCC, the broadcast-and-unknown server must transmit the frame to all relevant Multicast Forward VCCs within this number of seconds. When the time expires, the server discards the frame.
NSAP	ATM address of this broadcast-and-unknown server.
lecid	Unique identifier of the LANE client at the other end of this VCC.
vcd	Virtual circuit descriptor that uniquely identifies this VCC.
cnt	For Multicast Send VCC, the number of packets sent from the client to the broadcast-and-unknown server. For Multicast Forward VCC, the number of packets sent from the broadcast-and-unknown server clients.
NSAP	For Multicast Send VCC, the ATM address of the LANE client at the other end of this VCC. For Multicast Forward VCC, the ATM address of the broadcast-and-unknown server.

show lane client

To display global and per-VCC LANE information for all the LANE clients configured on an interface or any of its subinterfaces, on a specified subinterface, or on an emulated LAN, use the **show lane client** EXEC command.

show lane client [**interface atm** *card/subcard/port*[**.***subinterface-number*] | **name** *elan-name*] [**brief** | **detail**]

Syntax Description

card/subcard/port	Card, subcard, and port number for the ATM interface.
subinterface-number	Subinterface number.
elan-name	Name of the emulated LAN. Maximum length is 32 characters.
brief	Keyword used to display the global information but not the per-VCC information.
detail	Keywork used to display backup server connection information.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show lane client** command.

```
Switch# show lane client
LE Client ATM0  ELAN name: alpha  Admin: up  State: operational
Client ID: 2
HW Address: 0041.0b0a.2c82   Type: ethernet             Max Frame Size: 1516
ATM Address: 47.00918100000000410B0A2C81.001122334455.00

 VCD  rxFrames  txFrames  Type       ATM Address
   0         0         0  configure  47.333300000000000000000000.000111222333.00
 255         1         2  direct     47.333300000000000000000000.001122334455.00
 256         1         0  distribute 47.333300000000000000000000.001122334455.00
 257         0         0  send       47.333300000000000000000000.000000111111.00
 258         1         0  forward    47.333300000000000000000000.000000111111.00

LE Client ATM0.5  ELAN name: alpha5  Admin: up  State: operational
Client ID: 2
HW Address: 0041.0b0a.2c82   Type: ethernet             Max Frame Size: 1516
ATM Address: 47.00918100000000410B0A2C81.001122334455.05

 VCD  rxFrames  txFrames  Type       ATM Address
   0         0         0  configure  47.333300000000000000000000.000111222333.00
 259         1         5  direct     47.333300000000000000000000.001122334455.05
 260         7         0  distribute 47.333300000000000000000000.001122334455.05
 261         0        13  send       47.333300000000000000000000.000000111111.05
 262        20         0  forward    47.333300000000000000000000.000000111111.05
 VCD  rxFrames  txFrames  Type       ATM Address
 264        22        12  data       47.333300000000000000000000.000011112222.05
```

Table 18-36 describes the significant fields in the sample display.

Table 18-36 show lane client Command Field Descriptions

Field	Description
Interface	Interface or subinterface for which information is displayed.
Name	Name of the emulated LAN.
MAC	MAC address of this LANE client.
type	Type of emulated LAN, Ethernet, or Token Ring.
MTU	Maximum transmission unit (packet) size on the emulated LAN.
AAL5-SDU length	Maximum number of bytes in a LANE SDU encapsulated in an AAL5 frame. This length includes a 2-byte marker and a full Ethernet-like frame from the destination MAC address field through the last byte of data. It does not include an Ethernet CRC (or FRC), which is not present on emulated LAN frames. The number does not include the 8-byte AAL5 trailer in the last ATM cell of the frame, or the padding between the last data byte and the 8-byte trailer.
NSAP	ATM address of this LANE client.
VCD	Virtual channel descriptor that uniquely identifies this VCC.
rxFrames	Number of packets received.
txFrames	Number of packets transmitted.
Type	Type of VCC; same as the SVC and PVC types. Possible VCC types are configure, direct, distribute, send, forward, and data.[1]
NSAP	ATM address of the LANE component at the other end of this VCC.

1. The Configure Direct VCC is shown in this display as *configure*. The Control Direct VCC is shown as *direct*; the Control Distribute VCC is shown as *distribute*. The Multicast Send VCC and Multicast Forward VC are shown as *send* and *forward*, respectively. The data Direct VCC is shown as *data*.

show lane config

To display global LANE information for the configuration server configured on an interface, use the **show lane config** EXEC command.

show lane config [**interface atm** *card/subcard/port*] [**brief**]

Syntax Description

card/subcard/port	Card, subcard, and port number for the ATM interface.
brief	Keyword used to display the global information, but not the per-VCC information.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show lane config** command on a configuration server with two ATM addresses.

```
Switch# show lane config
LE Config Server ATM 1/0/0 config table: table State: operational
ATM Address: 39.000000000000000000000000.000000000500.00
ATM Address: 39.000000000000000000000000.000000000500.01
cumulative total number of unrecognized packets received so far:0
cumulative total number of config requests received so far: 10
cumulative total number of config failures so far: 0
```

The following example shows an operational server even though the addresses are not completely registered. The first address in not registered with the ILMI, as indicated by the ilmi-state. The second address is not registered with either the ILMI or the ATM signalling subsystem, as indicated by the atmsig-state.

```
Switch# show lane config
LE Config Server ATM 1/0/0 config table: table State: operational
ATM Address: 39.000000000000000000000000.000000000500.00 ilmi-
ATM Address: 39.000000000000000000000000.000000000500.01 ilmi- atmsig-
cumulative total number of unrecognized packets received so far:0
cumulative total number of config requests received so far: 10
cumulative total number of config failures so far: 0
```

The following example displays some physical connectivity problems with the result that the configuration server ATM address is undetermined. Either the prefix was not obtained, or it is not there. As a result, the address cannot be computed and you see the message "EXACT ADDRESS NOT YET SET (NO PREFIX?)" in the display.

```
Switch# show lane config
LE Config Server ATM 1/0/0 config table: table State: operational
ATM Address: EXEACT ADDRESS NOT YET SET (NO PREFIX ?) ilmi- atmsig-
   actual user specified form:...
cumulative total number of unrecognized packets received so far:0
cumulative total number of config requests received so far: 0
cumulative total number of config failures so far: 0
```

Table 18-37 describes the significant fields in the sample displays.

Table 18-37 show lane config Command Field Descriptions

Field	Description
LE Config Server	Major interface on which the LANE configuration server is configured.
config-table	Name of the database associated with the LANE configuration server.
State	State of the configuration server: down or operational. If down, the reasons field indicates why it is down. The reasons include the following: NO-config, NO-nsap-address, and No-interface-up.
ATM address	ATM address of this configuration server.

show lane database

To display the database of the configuration server, use the **show lane database** EXEC command.

show lane database [*name*]

Syntax Description

name	Specific database name.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Defaults

Shows all databases.

Examples

The following example is sample output from the **show lane database** command.

```
Switch# show lane database
config-table: engandmkt - bound to interface/s: atm 1/0/0
default ELAN: none
ELAN eng: les NSAP 45.000001415555121f.yyyy.zzzz.0800.200c.1001.01
  LEC MAC 0800.200c.1100
  LEC NSAP 45.000001415555121f.yyyy.zzzz.0800.200c.1000.01
  LEC NSAP 45.000001415555121f.yyyy.zzzz.0800.200c.1300.01
ELAN mkt: les NSAP 45.000001415555121f.yyyy.zzzz.0800.200c.1001.02
  LEC MAC 0800.200c.1100
  LEC NSAP 45.000001415555121f.yyyy.zzzz.0800.200c.1000.02
  LEC NSAP 45.000001415555121f.yyyy.zzzz.0800.200c.1300.02
```

Table 18-38 describes the significant fields in the sample display.

Table 18-38 show lane database Command Field Descriptions

Field	Description
config-table	Name of current database.
default ELAN	Default name, if one is established.
ELAN	Name of the emulated LAN whose data is reported in the line and the next three lines.
LEC MAC	MAC addresses of an individual LANE client in the emulated LAN. This display includes a separate line for every LANE client in this emulated LAN.
LEC NSAP	ATM addresses of all LANE clients in the emulated LAN.

show lane default-atm-addresses

To display the automatically assigned ATM address of each LANE component in a switch router or on a specified interface or subinterface, use the **show lane default-atm-addresses** EXEC command.

show lane default-atm-addresses [**interface atm** *card/subcard/port***.***subinterface-number*]

Syntax Description

card/subcard/port	Card, subcard, and port number for the ATM interface.
.*subinterface-number*	Specifies the number of the subinterface.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

You do not need any of the LANE components running on this switch before using this command.

Examples

The following example is sample output from the **show lane default-atm-addresses** command for the ATM 1/0/0 when all LANE components are located on that interface.

```
Switch# show lane default-atm-addresses interface atm 1/0/0
interface ATM1/0/0:
LANE Client:47.00000000000000000000000.00000C304A98.**
LANE Server:47.00000000000000000000000.00000C304A99.**
LANE Bus:47.00000000000000000000000.00000C304A9A.**
LANE Config Server:47.00000000000000000000000.00000C304A9B.00
note: ** is the subinterface number byte in hex
```

Table 18-39 describes the significant fields shown in the display.

Table 18-39 show lane default-atm-addresses Field Descriptions

Field	Description
interface	Displays the specified interface.
LANE Client	Displays the ATM address of the LANE client on the interface.
LANE Server	Displays the ATM address of the LANE server on the interface.
LANE Bus	Displays the ATM address of the LANE broadcast-and-unknown server on the interface.
LANE Config Server	Displays the ATM address of the LANE configuration server on the interface.

show lane le-arp

To display the LANE ARP table of the LANE client configured on an interface or any of its subinterfaces, on a specified subinterface, or on an emulated LAN, use the **show lane le-arp** EXEC command.

show lane le-arp [**interface atm** *card/subcard/port*[**.***subinterface-number*] | **name** *elan-name*]

Syntax Description

card/subcard/port	Card, subcard, and port number of the ATM interface.
.*subinterface-number*	Specifies the number of the subinterface.
elan-name	Name of the emulated LAN. Maximum length is 32 characters.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output of the **show lane le-arp** command.

```
Switch# show lane le-arp
Hardware Addr   ATM Address                                  VCD  Interface
0000.0c52.3bc8  47.33330000000000000000000.000011112222.05 264  ATM0.5
```

Table 18-40 describes the significant fields shown in the display.

Table 18-40 show lane le-arp Field Descriptions

Field	Description
Hardware Addr	MAC address, in dotted hexadecimal notation, assigned to the LANE component at the other end of this VCD.
ATM Address	ATM address of the LANE component at the other end of this VCD.
VCD	Virtual channel descriptor.
Interface	Interface or subinterface used to reach the specified component.

show lane name

To show the LAN emulation ARP server, use the **show lane name** EXEC command.

show lane name *elan-name* [**brief**]

Syntax Description

elan-name	Specifies the name for the emulated LAN.
brief	Displays all the information about the LANE except the connection client information.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

show lane server

To display global information for the LANE server configured on an interface or any of its subinterfaces, on a specified subinterface, or on an emulated LAN, use the **show lane server** EXEC command.

show lane server [**interface atm** *card/subcard/port*[**.***subinterface-number*] | **name** *elan-name*] [**brief**]

Syntax Description

card/subcard/port	Card, subcard, and port number for the ATM interface.
.*subinterface-number*	Specifies the number for the subinterface.
elan-name	Name of the emulated LAN. Maximum length is 32 characters.
brief	Keyword used to display the global information but not the per-VCC information.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show lane server** command.

```
Switch# show lane server interface atm 3/0/0.1

interface atm 3/0/0.1name: pubs
type: Ethernet MTU:1500AAL5-SDU length:1516
NSAP: 45.000001415555121f.yyyy.zzzz.0800.200c.1001.01
lecid/
proxyvcdcntNSAP
*7533045.000001415555121f.yyyy.zzzz.0800.200c.1001.01
1763345.000001415555121f.yyyy.zzzz.0800.200c.1000.01
5/P871545.000001415555122f.yyyy.zzzz.0800.200c.1100.01
6/P955345.000001415555124f.yyyy.zzzz.0800.200c.1300.01
```

Table 18-41 describes the significant fields in the sample display.

Table 18-41 show lane server Command Field Descriptions

Field	Description
interface	Interface or subinterface on which this LANE server is configured.
name	Name of emulated LAN.
type	Type of emulated LAN interface.
MTU	Maximum transmission unit (packet) size on the emulated LAN.

Table 18-41 show lane server Command Field Descriptions (continued)

Field	Description
AAL5-SDU	Maximum number of bytes in a LANE SDU encapsulated in an AAL5 frame. This length includes a 2-byte marker and a full Ethernet-like frame from the destination MAC address field through the last byte of data. It does not include the Ethernet CRC or FRC, which is not present on emulated LAN frames. The number does not include the 8-byte AAL5 trailer in the last ATM cell of the frame, nor the padding between the last data byte and the 8-byte trailer.
NSAP	ATM address of this broadcast-and-unknown server.
lecid	Unique identifier of the LANE client at the other end of this VCC.
proxy	When a LANE client joins an emulated LAN, it includes a proxy bit that tells the LANE server that the LANE client does not guarantee to register all its MAC address-ATM address pairs with the LANE server. The Cisco Systems LANE clients must set the proxy bit. Workstation LANE clients, directly attached to ATM, do not set the proxy.
vcd	Virtual circuit descriptor that uniquely identifies this VCC.
cnt	For Multicast Send VCC, the number of packets sent from the client to the broadcast-and-unknown server. For Multicast Forward VCC, the number of packets sent from the broadcast-and-unknown server clients.
NSAP	For Multicast Send VCC, the ATM address of the LANE client at the other end of this VCC. For Multicast Forward VCC, the ATM address of the broadcast-and-unknown server.

show line

To display terminal line parameters, use the **show line** EXEC command.

Catalyst 8540 MSR

show line [*line-num* | **console 0** | **vty** *vty-line-num*]

Catalyst 8510 MSR and LightStream 1010

show line [*line-num* | **aux 0** | **console 0** | **vty** *vty-line-num*]

Syntax Description

line-num	Absolute line number of the terminal line.
aux 0	Displays parameters for the auxiliary line. (Catalyst 8510 MSR and LightStream 1010)
console 0	Displays parameters for the primary terminal line.
vty-line-num	VTY line number.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following sample output from the **show line** command shows line 2 as a virtual terminal with a transmit and receive rate of 9600 bps. The modem state, and the terminal screen width and length are also displayed.

Overruns occur when the UART serving the line receives a byte but has nowhere to put it because previous bytes were not taken from the UART by the host route processor. The byte is lost, and the overrun count increases when the route processor next looks at the UART status.

```
Switch# show line 2
 Tty Typ     Tx/Rx     A Modem  Roty AccO AccI  Uses    Noise   Overruns
   2 VTY   9600/9600   -    -      -    -    -     0        0        0/0

Line 2, Location: "", Type: ""
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 9600/9600
Status: No Exit Banner
Capabilities: none
Modem state: Idle
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
                ^^x    none   -     -       none
Timeouts:      Idle EXEC    Idle Session   Modem Answer  Session   Dispatch
               0:10:00        never                        none     not set
Session limit is not set.
Time since activation: never
Editing is enabled.
History is enabled, history size is 10.
```

```
Full user help is disabled
Allowed transports are telnet.  Preferred is telnet.
No output characters are padded
No special data dispatching characters
```

Table 18-42 describes the fields shown in the display.

Table 18-42 show line Field Descriptions

Field	Description
Tty	Line number. In this case, 17.
Typ	Type of line. In this case, a virtual terminal line (vty), which is active, in asynchronous mode denoted by the preceding "A." Possible values include: CTY—Console AUX—Auxiliary port (Catalyst 8510 MSR and LightStream 1010) TTY—Asynchronous terminal port lpt—Parallel printer
Tx/Rx	Transmit rate/receive rate of the line.
A	Indicates whether or not autobaud has been configured for the line. A value of "F" indicates that autobaud has been configured; a hyphen (-) indicates that it has not been configured.
Modem	Types of modem signals configured for the line. Possible values include: callin callout cts-req DTR-Act inout RIisCD
Roty	Rotary group configured for the line.
AccO, AccI	Output or Input access list number configured for the line.
Uses	Number of connections established to or from the line since the system was restarted.
Noise	Number of times noise has been detected on the line since the system was restarted.
Overruns	Hardware (UART) overruns or software buffer overflows, both defined as the number of overruns or overflows that occurred on the specified line since the system was restarted. Hardware overruns are buffer overruns; the UART chip has received bits from the software faster than it can process them. A software overflow occurs when the software has received bits from the hardware faster than it can process them.
Line	Current line.
Location	Location of the current line.
Type	Type of line, as specified by the **line** global configuration command.

Table 18-42 show line Field Descriptions (continued)

Field	Description
Length	Length of the terminal or screen display.
Width	Width of the terminal or screen display.
Baud rate (TX/RX)	Transmit rate/receive rate of the line.
Status	State of the line: ready or not, connected or disconnected, active or inactive, exit banner or no exit banner, async interface active or inactive.
Capabilities	Current terminal capabilities. In this case, the line is usable as an asynchronous interface.
Modem state	Modem control state. This field should always read READY.
Special characters	Current settings that were input by the user (or taken by default) from the following global configuration commands: • **escape-character** • **hold-character** • **stop-character** • **start-character** • **disconnect-character** • **activation-character**
Timeouts	Current settings that were input by the user (or taken by default) from the following global configuration commands: **exec-timeout** **session-timeout** **dispatch-timeout** **modem answer-timeout**
Session limit	Maximum number of sessions.
Time since activation	Last time **start_process** was run.
Editing	Whether or not command line editing is enabled.
History	Current history length, set by the user (or taken by default) from the **history** configuration command.
Full user help	Whether or not full user help is enabled, set by the user (or taken by default) from the **help** line configuration command.
Transport methods	Current set transport method, set by the user (or taken by default) from the **transport preferred** line configuration command.
Character padding	Current set padding, set by the user (or taken by default) from the **padding** line configuration command.
Data dispatching characters	Current dispatch character set by the user (or taken by default) from the **dispatch-character** line configuration command.
Line protocol	Definition of the specified line's protocol and address.
Output, Input Packets	Number of output and input packets queued on this line.
Group codes	AT group codes.

show location

To display the system location, use the **show location** EXEC command.

show location

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use this command to display information for analyzing and evaluating the system.

show logging

To display the state of logging to the syslog, use the **show logging** EXEC command.

show logging

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command displays the state of syslog error and event logging, including host addresses, and whether console logging is enabled. This command also displays SNMP configuration parameters and protocol activity.

Examples

The following example is sample output from the **show logging** command.

```
Switch# show logging
Syslog logging: enabled
     Console logging: disabled
     Monitor logging: level debugging, 266 messages logged.
     Trap logging: level informational, 266 messages logged.
     Logging to 131.108.2.238
```

Table 18-43 describes the significant fields shown in the display.

Table 18-43 show logging Field Descriptions

Field	Description
Syslog logging	When enabled, system logging messages are sent to a UNIX host that acts as a syslog server; that is, it captures and saves the messages.
Console logging	If enabled, states the level; otherwise, this field displays disabled.
Monitor logging	Minimum level of severity required for a log message to be sent to a monitor terminal (not the console).
Trap logging	Minimum level of severity required for a log message to be sent to a syslog server.

show memory

To show statistics about switch memory, including memory free pool statistics, use the **show memory** EXEC command.

show memory [*type*] [**allocating process**] [**dead**] [**free**] [**pci**]

Syntax Description

type	Memory type to display (see Table 18-44). If *type* is not specified, statistics for all memory types present in the switch are displayed.
allocating-process	Displays allocating process name.
dead	Displays memory owned by dead processes.
free	Displays free memory statistics.
pci	Displays PCI memory statistics.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

You should use the **summary** option to limit the amount of information presented.

Table 18-44 lists the types of memory statistics that you specify in the **show memory** *type* EXEC command.

Table 18-44 show memory Type Options

Type	Description
address	Displays memory starting at 0 through 4294967294.
allocating-process	Shows allocating process name.
dead	Displays memory owned by dead processes.
failures alloc	Displays memory allocation failures.
fast	Displays fast memory statistics.
free	Displays free memory statistics.
io	Displays IO memory statistics.
multibus	Displays multibus memory statistics.
pci	Displays PCI memory statistics.
processor	Displays processor memory statistics.
summary	Displays summary of memory usage per allocated PC.

Examples

The following example is sample output from the **show memory** command.

```
Switch# show memory
              Head  FreeList    Total(b)     Used(b)     Free(b)  Largest(b)
Processor  6059E050  603F96C8    10887088     3249548     7637540     7601484
     Fast  6057E050  603FA454      131072       43444       87628       87280

          Processor memory

 Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What
6059E050   1056 0        6059E498   1                   6001F4B4  List Elements
6059E498   2656 6059E050 6059EF20   1                   6001F4B4  List Headers
6059EF20   6000 6059E498 605A06B8   1                   60020628  *Init*
605A06B8   6000 6059EF20 605A1E50   1                   60020628  *Init*
605A1E50    168 605A06B8 605A1F20   1                   6002FBEC  *Init*
605A1F20   2548 605A1E50 605A293C   1                   600324B4  TTY data
605A293C   2000 605A1F20 605A3134   1                   600353B0  TTY Input Buf
605A3134    512 605A293C 605A335C   1                   600353E4  TTY Output Buf
605A335C   6000 605A3134 605A4AF4   1                   60020628  *Init*
605A4AF4   1056 605A335C 605A4F3C   1                   6001F4B4  messages
605A4F3C   1032 605A4AF4 605A536C   1                   6005D99C  *Init*
605A536C     52 605A4F3C 605A53C8   1                   60063034  ILMI Request
605A53C8  12528 605A536C 605A84E0   0  608B666 0        600441E0  (coalesced)
605A84E0   2548 605A53C8 605A8EFC   1                   60060C68  *Init*
605A8EFC     84 605A84E0 605A8F78   1                   60063280  Init
605A8F78     84 605A8EFC 605A8FF4   1                   60063280  Init
605A8FF4     84 605A8F78 605A9070   1                   60063280  Init
605A9070   3456 605A8FF4 605A9E18   1                   6001F4B4  Reg Service
```

The following example is sample output from the **show memory free** command.

```
Switch# show memory free
Head  FreeList    Total(b)     Used(b)     Free(b)  Largest(b)
Processor  6059E050  603F96C8    10887088     3249536     7637552     7601484
     Fast  6057E050  603FA454      131072       43444       87628       87280

Processor memory

 Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What

             24    Free list 1
608B4724     36 608B46F8 608B4770   0  0       608198D 60069ED4  Exec
608198DC     24 608198B0 6081991C   0  608B472 608B3E4 60069ED4  Exec
608B3E48     52 608B3E10 608B3EA4   0  608198D 0       6006A0FC  Exec

             88    Free list 2

            104    Free list 3
608B60B4    112 608B6084 608B614C   0  0       0       60034890  (coalesced)

            116    Free list 4

            120    Free list 5

            124    Free list 6

            152    Free list 7
Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What
608B3D08    204 608B3CD0 608B3DFC   0  0       0       60034890  (coalesced)
```

```
            216    Free list 8
608B5BD0    248 608B5B98 608B5CF0   0  0       0       60034890  (coalesced)

            264    Free list 9

            280    Free list 10
608BA45C    296 608BA430 608BA5AC   0  0       0       60034890  (coalesced)

            344    Free list 11

            384    Free list 12

            408    Free list 13

            472    Free list 14

            672    Free list 15
608BA848    712 608BA690 608BAB38   0  0       0       0         (fragment)

            760    Free list 16
 Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What

           1144    Free list 17

           1500    Free list 18

           1684    Free list 19
608BAD50   1740 608BACFC 608BB444   0  0       0       0         (coalesced)

           2000    Free list 20

           3000    Free list 21

           4256    Free list 22

           4680    Free list 23

           5000    Free list 24

           5184    Free list 25
608BB514   7588 608BB4C0 608BD2E0   0  0       0       6006D054  (coalesced)

           9376    Free list 26
 Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What

          10000    Free list 27
608B6664  12528 608B661C 608B977C   0  0       605A53C 0         (coalesced)
605A53C8  12528 605A5380 605A84E0   0  608B666 0       600441E0  (coalesced)

          18184    Free list 28

          20000    Free list 29

          32768    Free list 30

          65536    Free list 31

         131072    Free list 32

         262144    Free list 33
608C028C7601484 608BD398 0          0  0       0       60067AC8  (coalesced)

Total:   7637552
```

```
          Fast memory

 Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What

            24    Free list 1
6057E050     36 603FA214 6057E09C   0  0       6057F6F 0         (fragment)
6057F6F8     28 6057E0B0 6057F73C   0  6057E05 60580D9 0         (fragment)
60580D98     28 6057F750 60580DDC   0  6057F6F 6058243 0         (fragment)
60582438     28 60580DF0 6058247C   0  60580D9 60582CA 0         (fragment)
60582CA4     48 60582490 60582CFC   0  6058243 60582F2 0         (fragment)
60582F24     48 60582D10 60582F7C   0  60582CA 605830A 0         (fragment)
605830A4     48 60582F90 605830FC   0  60582F2 6058475 0         (fragment)
60584758     28 60583110 6058479C   0  605830A 60585DF 0         (fragment)
60585DF8     28 605847B0 60585E3C   0  6058475 6058749 0         (fragment)
60587498     28 60585E50 605874DC   0  60585DF 0       0         (fragment)

            88    Free list 2

           152    Free list 3

           216    Free list 4

           280    Free list 5

           344    Free list 6
 Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What

           408    Free list 7

           472    Free list 8

          1500    Free list 9

          2000    Free list 10

          3000    Free list 11

          5000    Free list 12

         10000    Free list 13

         20000    Free list 14

         32768    Free list 15

         65536    Free list 16
60588B38  87280 605874F0 0          0  0       0       0         (fragment)

 Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What
        131072    Free list 17

        262144    Free list 18

Total:     87628
```

The display of **show memory free** contains the same types of information as the **show memory** display, except that only free memory is displayed, and the information is displayed, in order, for each free list.

The first section of the display includes summary statistics about the activities of the system memory allocator.

Table 18-45 describes significant fields shown in the first section of the display.

Table 18-45 show memory Field Descriptions—First Section

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Free List	Hexadecimal address of the base of the free list.
Total (b)	Sum of used bytes plus free bytes.
Used (b)	Amount of memory in use.
Free (b)	Amount of memory not in use.
Largest (b)	Size of largest available free block.

The second section of the display is a block-by-block listing of memory use. Table 18-46 describes the significant fields in the second section of the display.

Table 18-46 Characteristics of Each Block of Memory—Second Section

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block, in bytes.
Prev.	Address of the previous block (should match the Address field on previous line).
Next	Address of the next block (should match the address on the next line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the previous free block (if free).
NextF	Address of the next free block (if free).
Alloc PC	Address of the system call that allocated the block.
What	Name of process that owns the block, or “(fragment)” if the block is a fragment, or “(coalesced)” if the block was coalesced from adjacent free blocks.

The **show memory io** command displays the free IO memory blocks. This command quickly shows how much unused IO memory is available.

The following example is sample output from the **show memory io** command.

```
Switch# show memory io
Address   Bytes Prev.   Next     Ref  PrevF   NextF   Alloc PC  What
6132DA0   59264 6132664 6141520  0    0       600DDEC  3FCF0     *Packet Buffer*
600DDEC     500 600DA4C 600DFE0  0   6132DA0 600FE68 0
600FE68     376 600FAC8 600FFE0  0   600DDEC 6011D54 0
6011D54     652 60119B4 6011FEO  0   600FE68 6013D54 0
614FCA0     832 614F564 614FFE0  0   601FD54 6177640 0
6177640 2657056 6172E90 0        0   614FCA0 0       0
Total: 2723244
```

show ncdp path root

To display the NCDP path from the current node to its root clock source, use the **show ncdp path root** command.

show ncdp path root

When this command is executed, a PDU is built and sent towards its root clock source. As the PDU traverses nodes in the network, the NCDP entity on each node adds path information to the PDU. When the PDU reaches the node with the root clock source, it is routed back to the originating node. When the PDU is received by the originating node, the accumulated path information is displayed.

Syntax Description

This command has no keywords or arguments.

Defaults

Disabled

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

The operation of this command is asynchronous, and thus the PDU or response PDU could be dropped within the network, causing this command to fail.

Examples

```
Switch# show ncdp path root
Ncdp:name         :low-sodium
Ncdp:address      :4700918100000000603E7B6E0100603E7B6E0100
Ncdp:hop count    :0
Ncdp:clock source :BITS 0

Ncdp:name         :ls1010-b
Ncdp:address      :4700918100000000E0F751CC0100E0F751CC0100
Ncdp:hop count    :1
Ncdp:clock source :ATM0/1/3

Ncdp:name         :ls1010-c
Ncdp:address      :4700918100000000E0F751CD0100E0F751CD0100
Ncdp:hop count    :2
Ncdp:clock source :ATM0/1/0
```

Related Commands

Command	Description
debug ncdp	Displays NCDP errors, events, and packet information.
ncdp (interface)	Enables NCDP and configures the network clocking hardware at the interface level.
show ncdp ports	Displays NCDP information at the port level.
show ncdp sources	Displays all of the NCDP clock sources configured on the node and their attributes.
show ncdp status	Displays NCDP status information.
show ncdp timers	Displays NCDP information for the node-level timers.

show ncdp ports

To display NCDP information at the port level, use the **show ncdp ports** command.

show ncdp ports {*port_number* | {atm | cbr} *card/subcard/port* **| all}**

Syntax Description

port_number	Displays NCDP information for the given port.
card/subcard/port	Displays NCDP information for the given ATM interface.
all	Displays NCDP information for all ports.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Use this command to show NCDP information at the port and interface level.

Examples

The following example is sample output from the **show ncdp ports** command.

```
Switch# show ncdp ports 14
 port data --(14)-----ATM3/1/1--------------
 port_id                          : 14
 state                            : forwarding
 admin weight                     : 10
 root vector priority             : 1
 root vector stratum level        : 4
 root vector prs id               : 255
 root vector switch stratum level  : 4
 root vector address              : 4700918100000000E0F75D040100E0F75D040100
 designated_cost                  : 0
 hop_count                        : 0
 switch vector priority           : 1
 switch vector stratum level      : 4
 switch vector prs id             : 255
 switch vector switch stratum level: 4
 switch vector address            : 4700918100000000E0F75D040100E0F75D040100
 designated_port                  : 7
 topology_change_acknowledge      : 0
 tx_sequence_number               : 628
 rx_sequence_number               : 1212285
 config_pending                   : 0
 health                           : unknown
```

Related Commands

Command	Description
debug ncdp	Displays NCDP errors, events, and packet information.
national reserve (Catalyst 8510 MSR and LightStream 1010)	Selects the national bits for E1 IMA interfaces.
ncdp (interface)	Enables NCDP and configure the network clocking hardware at the interface level.
show ncdp path root	Displays the NCDP path from the current node to its root clock source
show ncdp sources	Displays all of the NCDP clock sources configured on the node and their attributes.
show ncdp status	Displays NCDP status information.
show ncdp timers	Displays NCDP information for the node-level timers.

show ncdp sources

To display all of the NCDP clock sources configured on the node and their attributes, use the **show ncdp sources** command.

show ncdp sources

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Use this command to display NCDP clock sources configured on the node and their attributes.

Examples

The following example is sample output from the **show ncdp sources** command.

```
Switch# show ncdp sources
 = ncdp clock source information ==========================
 Source type: Normal port (ATM0/1/3, 26, DOWN) (health: unknown)
   Priority             : 1
   Stratum level        : 3e
   Prs id               : 0
   Switch stratum level : 4
   Address              : 4700918100000000400B0A2A8100400B0A2A8100

 Source type: ASP free running
   Priority             : 128
   Stratum level        : 4
   Prs id               : 255
   Switch stratum level : 4
   Address              : 4700918100000000400B0A2A8100400B0A2A8100
```

Related Commands

Command	Description
debug ncdp	Displays NCDP errors, events, and packet information.
national reserve (Catalyst 8510 MSR and LightStream 1010)	Selects the national bits for E1 IMA interfaces.
ncdp (interface)	Enables NCDP and configures the network clocking hardware at the interface level.

Command	Description
show ncdp path root	Displays the NCDP path from the current node to its root clock source.
show ncdp ports	Displays NCDP information at the port level.
show ncdp status	Displays NCDP status information.
show ncdp timers	Displays NCDP information for the node-level timers.

show ncdp status

To display NCDP status information, use the **show ncdp status** command.

show ncdp status

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Use this command to display NCDP status information on the local node.

Examples

The following example is sample output from the **show ncdp status** command.

```
LS1010# show ncdp status
 = ncdp switch information ==== enabled ==============
 revertive
 root clock source priority:      1
 root clock source stratum level: 4
 root clock source prs id:        255
 stratum level of root switch:    4
 clocking root address:           4700918100000000E0F75D040100E0F75D040100
 hop count:                       1
 root path cost:                  10
 root port:                       14 <ATM3/1/1>
 max age:                         20
 hello time:                      500
 priority      of best source:    128
 stratum level of best source:    4
 prs id        of best source:    255
 switch stratum level:            4
 address:                         4700918100000000400B0A2A8100400B0A2A8100
 switch max age:                  11
 switch hello time:               500
 switch hold time:                500
 max diameter:                    11
 converged root count:            1181224
 converged:                       1
 total timer events:              1524768
 total queue events:              1195449
 rx config messages:              1195449
 tx config messages:              332043
```

```
rx tcn messages:                1
tx tcn messages:                6
rx non-participant messages:    14
rx unknown messages:            0
```

Related Commands

Command	Description
debug ncdp	Displays NCDP errors, events, and packet information.
national reserve (Catalyst 8510 MSR and LightStream 1010)	Selects the national bits for E1 IMA interfaces.
ncdp (interface)	Enables NCDP and configures the network clocking hardware at the interface level.
show ncdp path root	Displays the NCDP path from the current node to its root clock source.
show ncdp ports	Displays NCDP information at the port level.
show ncdp sources	Displays all of the NCDP clock sources configured on the node and their attributes.
show ncdp timers	Displays NCDP information for the node-level timers.

show ncdp timers

To display NCDP information for the node-level timers, use the **show ncdp timers** command.

show ncdp timers

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Use this command to display NCDP information for the node-level timers.

Examples

The following example is sample output from the **show ncdp timers** command.

```
LS1010# show ncdp timers
 = ncdp switch timer information ============================
 hello   events           : 714
 tcn     events           : 0
 topo    events           : 1
 port    events           : 4
 msg_age events           : 0
 hold    events           : 332061
 ncdp    events           : 1195205
```

Related Commands

Command	Description
debug ncdp	Displays NCDP errors, events, and packet information.
national reserve (Catalyst 8510 MSR and LightStream 1010)	Selects the national bits for E1 IMA interfaces.
ncdp (interface)	Enables NCDP and configures the network clocking hardware at the interface level.
show ncdp path root	Displays the NCDP path from the current node to its root clock source.
show ncdp ports	Displays NCDP information at the port level.
show ncdp sources	Displays all of the NCDP clock sources configured on the node and their attributes.
show ncdp status	Displays NCDP status information.

show network-clocks

To show which ports are designated as network clock sources, use the **show network-clocks** EXEC command.

show network-clocks

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command also displays what is configured at each priority, and the current priority of the functioning clock.

Examples

Catalyst 8540 MSR

The following is sample output from the **show network-clocks** EXEC command for anATM switch router.

```
Switch# show network-clocks
Network clocking information:
--------------------------------------
Source switchover mode:    non-revertive
Netclkd state:             Active
Source selection method:   provisioned
NCLKM hardware status:     installed & usable
NCLKM status:              software enabled
Primary   clock source:    BITS 0 in T1 mode
Secondary clock source:    not configured
Present   clock source:    BITS 0 in T1 mode Locking
```

Catalyst 8510 MSR and LightStream 1010

The following is sample output from the **show network-clocks** EXEC command for an ATM switch router.

```
Switch# show network-clocks
clock configuration is NON-Revertive
Priority 1 clock source: No clock
Priority 2 clock source: No clock
Priority 3 clock source: No clock
Priority 4 clock source: No clock
Priority 5 clock source: System clock
Current clock source:System clock, priority:5
```

Related Commands

Command	Description
network-clock-select	Allows the recovered clock to specify a particular port to provide network clocking.

show ntp associations

To show the status of NTP associations, use the **show ntp associations** EXEC command.

show ntp associations [**detail**]

Syntax Description

detail	Shows detailed information about each NTP association.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

Detailed descriptions of the information displayed by this command can be found in the NTP specification (RFC 1305).

The following example is sample output from the **show ntp associations** command.

```
Switch# show ntp associations
     address         ref clock     st  when  poll reach  delay  offset    disp
 ~160.89.32.2      160.89.32.1       5    29  1024  377     4.2   -8.59     1.6
+~131.108.13.33    131.108.1.111     3    69   128  377     4.1    3.48     2.3
*~131.108.13.57    131.108.1.111     3    32   128  377     7.9   11.18     3.6
* master (synced), # master (unsynced), + selected, - candidate, ~ configured
```

Table 18-47 describes the significant fields shown in the display.

Table 18-47 show ntp associations Field Descriptions

Field	Description
address	Address of the peer.
ref clock	Address of the peer reference clock.
st	Peer stratum.
when	Time since the last NTP packet was received from the peer.
poll	Polling interval (seconds).
reach	Peer reachability (bit string, in octal).
delay	Round-trip delay to the peer (milliseconds).
offset	Relative time of the peer's clock to the local clock (milliseconds).
disp	Dispersion.
The first character of the line can be one or more of the following:	
*	Synchronized to this peer.
#	Almost synchronized to this peer.
+	Peer selected for possible synchronization.

Table 18-47 show ntp associations Field Descriptions (continued)

Field	Description
-	Peer is a candidate for selection.
~	Peer is statically configured.

The following example is sample output of the **show ntp associations detail** command.

```
Switch# show ntp associations detail
160.89.32.2 configured, insane, invalid, stratum 5
ref ID 160.89.32.1, time AFE252C1.6DBDDFF2 (00:12:01.428 PDT Fri Apr 4 1997)
our mode active, peer mode active, our poll intvl 1024, peer poll intvl 64
root delay 137.77 msec, root disp 142.75, reach 376, sync dist 215.363
delay 4.23 msec, offset -8.587 msec, dispersion 1.62
precision 2**19, version 3
org time AFE252E2.3AC0E887 (00:12:34.229 PDT Fri Apr 4 1997)
rcv time AFE252E2.3D7E464D (00:12:34.240 PDT Fri Apr 4 1997)
xmt time AFE25301.6F83E753 (00:13:05.435 PDT Fri Apr 4 1997)
filtdelay =     4.23    4.14    2.41    5.95    2.37    2.33    4.26    4.33
filtoffset =   -8.59   -8.82   -9.91   -8.42  -10.51  -10.77  -10.13  -10.11
filterror =     0.50    1.48    2.46    3.43    4.41    5.39    6.36    7.34

131.108.13.33 configured, selected, sane, valid, stratum 3
ref ID 131.108.1.111, time AFE24F0E.14283000 (23:56:14.078 PDT Sun Jul 4 1993)
our mode client, peer mode server, our poll intvl 128, peer poll intvl 128
root delay 83.72 msec, root disp 217.77, reach 377, sync dist 264.633
delay 4.07 msec, offset 3.483 msec, dispersion 2.33
precision 2**6, version 3
org time AFE252B9.713E9000 (00:11:53.442 PDT Fri Apr 4 1997)
rcv time AFE252B9.7124E14A (00:11:53.441 PDT Fri Apr 4 1997)
xmt time AFE252B9.6F625195 (00:11:53.435 PDT Fri Apr 4 1997)
filtdelay =     6.47    4.07    3.94    3.86    7.31    7.20    9.52    8.71
filtoffset =    3.63    3.48    3.06    2.82    4.51    4.57    4.28    4.59
filterror =     0.00    1.95    3.91    4.88    5.84    6.82    7.80    8.77

131.108.13.57 configured, our_master, sane, valid, stratum 3
ref ID 131.108.1.111, time AFE252DC.1F2B3000 (00:12:28.121 PDT Mon Jul 5 1993)
our mode client, peer mode server, our poll intvl 128, peer poll intvl 128
root delay 125.50 msec, root disp 115.80, reach 377, sync dist 186.157
delay 7.86 msec, offset 11.176 msec, dispersion 3.62
precision 2**6, version 2
org time AFE252DE.77C29000 (00:12:30.467 PDT Fri Apr 4 1997)
rcv time AFE252DE.7B2AE40B (00:12:30.481 PDT Fri Apr 4 1997)
xmt time AFE252DE.6E6D12E4 (00:12:30.431 PDT Fri Apr 4 1997)
filtdelay =    49.21    7.86    8.18    8.80    4.30    4.24    7.58    6.42
filtoffset =   11.30   11.18   11.13   11.28    8.91    9.09    9.27    9.57
filterror =     0.00    1.95    3.91    4.88    5.78    6.76    7.74    8.71
```

Table 18-48 describes the significant fields shown in the display.

Table 18-48 show ntp associations detail Field Descriptions

Field	Descriptions
configured	Peer was statically configured.
dynamic	Peer was dynamically discovered.
our_master	Local machine is synchronized to this peer.
selected	Peer is selected for possible synchronization.

Table 18-48 show ntp associations detail Field Descriptions (continued)

Field	Descriptions
candidate	Peer is a candidate for selection.
sane	Peer passes basic sanity checks.
insane	Peer fails basic sanity checks.
valid	Peer time is believed to be valid.
invalid	Peer time is believed to be invalid.
leap_add	Peer is signalling that a leap second is added.
leap-sub	Peer is signalling that a leap second is subtracted.
unsynced	Peer is not synchronized to any other machine.
ref ID	Address of the machine to which peer is synchronized.
time	Last time stamp peer received from its master.
our mode	Our mode relative to peer (active/passive/client/server/bdcast/bdcast client).
peer mode	Peer's mode relative to us.
our poll ivl	Our poll interval to the peer.
peer poll ivl	Peer's poll interval to us.
root delay	Delay along the path to the root (ultimate stratum 1 time source).
root disp	Dispersion of the path to the root.
reach	Peer reachability (bit string in octal).
sync dist	Peer synchronization distance.
delay	Round-trip delay to the peer.
offset	Offset of the peer clock relative to our clock.
dispersion	Dispersion of the peer clock.
precision	Precision of the peer clock (in Hz).
version	NTP version number that peer is using.
org time	Originate time stamp.
rcv time	Receive time stamp.
xmt time	Transmit time stamp.
filtdelay	Round-trip delay, in milliseconds, of each sample.
filtoffset	Clock offset, in milliseconds, of each sample.
filterror	Approximate error of each sample.

show ntp status

To show the status of NTP, use the **show ntp status** EXEC command.

show ntp status

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show ntp status** command.

```
Switch# show ntp status
Clock is synchronized, stratum 4, reference is 131.108.13.57
nominal freq is 250.0000 Hz, actual freq is 249.9990 Hz, precision is 2**19
reference time is AFE2525E.70597B34 (00:10:22.438 PDT Fri Apr 4 1997)
clock offset is 7.33 msec, root delay is 133.36 msec
root dispersion is 126.28 msec, peer dispersion is 5.98 msec
```

Table 18-49 shows the significant fields in the display.

Table 18-49 show ntp status Field Descriptions

Field	Description
synchronized	System is synchronized to an NTP peer.
unsynchronized	System is not synchronized to any NTP peer.
stratum	NTP stratum of this system.
reference	Address of the peer to which the unit is synchronized.
nominal freq	Nominal frequency of the system hardware clock.
actual freq	Measured frequency of the system hardware clock.
precision	Precision of this system's clock (in Hz).
reference time	Reference time stamp.
clock offset	Offset of our clock to synchronized peer.
root delay	Total delay along the path to the root clock.
root dispersion	Dispersion of the root path.
peer dispersion	Dispersion of the synchronized peer.

show ppp multilink

To display bundle information for the multilink PPP bundles, use the **show ppp multilink** EXEC command.

show ppp multilink

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output when no bundles are on a system.

```
impulse# show ppp multilink
No active bundles
```

The following example is sample output when a single multilink PPP bundle (named *rudder*) is on a system.

```
systema# show ppp multilink
Bundle rudder, 3 members, first link is BRI0: B-channel 1
0 lost fragments, 8 reordered, 0 unassigned, sequence 0x1E/0x1E rcvd/sent
```

The following example is sample output when two active bundles are on a system. Subsequent bundles would be displayed below the previous bundle.

```
impulse# show ppp multilink
Bundle rudder, 3 members, first link is BRI0: B-Channel 1
  0 lost fragments, 8 reordered, 0 unassigned, sequence 0x1E/0x1E rcvd/sent
Bundle dallas, 4 members, first link is BRI2: B-Channel 1
  0 lost fragments, 28 reordered, 0 unassigned, sequence 0x12E/0x12E rcvd/sent
```

The following example shows output when a stack group was created. On stack group member *systema* on stack group *stackq*, multilink PPP bundle *hansolo* has bundle interface Virtual-Access4. Two child interfaces are joined to this bundle interface. The first is a local PRI channel (serial 0:4), and the second is an interface from stack group member *systemb.*

```
systema# show ppp multilink
Bundle hansolo 2 members, Master link is Virtual-Access4
0 lost fragments, 0 reordered, 0 unassigned, 100/255 load
0 discarded,  0 lost received, sequence 40/66 rcvd/sent
members 2
 Serial0:4
 systemb:Virtual-Access6    (1.1.1.1)
```

show privilege

To display your current level of privilege, use the **show privilege** EXEC command.

show privilege

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show privilege** command. The current privilege level is 15.

```
Switch# show privilege
Current privilege level is 15
```

Related Commands

Command	Description
enable password	Cisco IOS command removed from this manual.

show processes

To display information about the active processes, use the **show processes** EXEC command.

show processes [**cpu**]

Syntax Description

cpu	Displays utilization statistics. Displays detailed route processor utilization statistics. (Catalyst 840 MSR)

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example is sample output from the **show processes** command.

```
Switch# show processes
CPU utilization for five seconds: 0%/0%; one minute: 0%; five minutes: 0%
 PID QTy       PC Runtime (ms)    Invoked   uSecs    Stacks TTY Process
   1 M*         0         2156       3194     67510408/12000  0 Exec
   2 Lst 6001EFF0         4532       2266    2000 5808/6000   0 Check heaps
   3 Mst 6004867C            0          2       0 5680/6000   0 Timers
   4 Lwe 600804C0          908       7752     117 5404/6000   0 ARP Input
   5 Mwe 601A05A4            0          1       0 2712/3000   0 OIR Handler
   6 HE  6022A61C            0          1       0 5840/6000   0 ATM OAM input
   7 LE  6022BDA0            0          1       0 5852/6000   0 ATM ARP Input
   8 Lsp 6019F048            0      13593       0 5792/6000   0 Aal5 Reassembly
   9 Mwe 600E0344            0       6798       0 5524/6000   0 CDP Protocol
  10 Lwe 6011C744            0          1       0 5680/6000   0 Probe Input
  11 Mwe 6011C038            0          1       0 5716/6000   0 RARP Input
  12 Hwe 6010B7A0          660       3449     19110648/12000  0 IP Input
  13 Mwe 60138A70            0      13593       0 5764/6000   0 TCP Timer
  14 Lwe 6013A674            0          3       0 5640/6000   0 TCP Protocols
  15 Mwe 6026CE40            0          4       0 5696/6000   0 ATM-RT Background
  16 Mwe 60117C78            0          1       0 5544/6000   0 BOOTP Server
  17 Lsi 6016B72C            0       1133       0 5788/6000   0 IP Cache Ager
  18 Hwe 602691B8           28          9    3111 5032/6000   0 ILMI Input
  19 Mwe 60263284            8          5    1600 5268/6000   0 ILMI Request
  20 Mwe 60263338            4          5     800 5176/6000   0 ILMI Response
  21 Lwe 602522E4            0          1       0 5828/6000   0 Resource Mgmt ba
 22 Mwe 602496F8             0          2       0 5680/6000   0 ATMCORE OAM Proc
  23 Mwe 6024CA90            0          2       0 5684/6000   0 ATMCORE OAM Ping
  24 Mwe 60203D50            0          7       0 5680/6000   0 ATMSIG Timer
  25 Mwe 6022528C            0       4534       0 5132/6000   0 SSCOP Input
  26 Mwe 6022555C            0       2266       0 5176/6000   0 SSCOP Output
  27 Mst 60225924            0          3       0 5252/6000   0 SSCOP Timer
  28 Mwe 602024D4            0          2       0 5680/6000   0 ATMSIG Input
  29 Mwe 602028E8            0          3       0 5364/6000   0 ATMSIG Output
  30 Mwe 60238488            0          2       0 5688/6000   0 ATM Soft VC Time
  31 Mwe 602923B8            0          2       0 5286/6000   0 IISP router
  32 Cwe 60012040            0          1       0 5720/6000   0 Critical Bkgnd
  33 Mwe 60011E68           36          2   18000 4720/6000   0 Net Background
  34 Lwe 600424F8            0          9       0 5544/6000   0 Logger
```

```
 35 Msp 600204E4            4       67968        0 5088/6000   0 TTY Background
 36 Hwe 6001235C         2100       62468       33 2708/3000   0 Net Input
 37 Msp 60011D98        13584        1133    11989 5120/6000   0 Per-minute Jobs
```

Examples

The following example is sample output from the **show processes cpu** command.

```
Switch# show processes cpu
CPU utilization for five seconds: 0%/0%; one minute: 0%; five minutes: 0%
 PID  Runtime(ms)  Invoked  uSecs    5Sec   1Min   5Min TTY Process
   1        2180     3212    678   0.00%  0.03%  0.07%   0 Exec
   2        4536     2268   2000   0.00%  0.00%  0.00%   0 Check heaps
   3           0        2      0   0.00%  0.00%  0.00%   0 Timers
   4         912     7787    117   0.00%  0.00%  0.00%   0 ARP Input
   5           0        1      0   0.00%  0.00%  0.00%   0 OIR Handler
   6           0        1      0   0.00%  0.00%  0.00%   0 ATM OAM input
   7           0        1      0   0.00%  0.00%  0.00%   0 ATM ARP Input
   8           0    13605      0   0.00%  0.00%  0.00%   0 Aal5 Reassembly Tim
   9           0     6804      0   0.00%  0.00%  0.00%   0 CDP Protocol
  10           0        1      0   0.00%  0.00%  0.00%   0 Probe Input
  11           0        1      0   0.00%  0.00%  0.00%   0 RARP Input
  12         660     3452    191   0.00%  0.00%  0.00%   0 IP Input
  13           0    13605      0   0.00%  0.00%  0.00%   0 TCP Timer
  14           0        3      0   0.00%  0.00%  0.00%   0 TCP Protocols
  15           0        4      0   0.00%  0.00%  0.00%   0 ATM-RT Background
  16           0        1      0   0.00%  0.00%  0.00%   0 BOOTP Server
  17           0     1134      0   0.00%  0.00%  0.00%   0 IP Cache Ager
  18          28        9   3111   0.00%  0.00%  0.00%   0 ILMI Input
  19           8        5   1600   0.00%  0.00%  0.00%   0 ILMI Request
  20           4        5    800   0.00%  0.00%  0.00%   0 ILMI Response
  21           0        1      0   0.00%  0.00%  0.00%   0 Resource Mgmt backg
 PID  Runtime(ms)  Invoked  uSecs    5Sec   1Min   5Min TTY Process
  22           0        2      0   0.00%  0.00%  0.00%   0 ATMCORE OAM Process
  23           0        2      0   0.00%  0.00%  0.00%   0 ATMCORE OAM Ping Rc
  24           0        7      0   0.00%  0.00%  0.00%   0 ATMSIG Timer
  25           0     4538      0   0.00%  0.00%  0.00%   0 SSCOP Input
  26           0     2268      0   0.00%  0.00%  0.00%   0 SSCOP Output
  27           0        3      0   0.00%  0.00%  0.00%   0 SSCOP Timer
  28           0        2      0   0.00%  0.00%  0.00%   0 ATMSIG Input
  29           0        3      0   0.00%  0.00%  0.00%   0 ATMSIG Output
  30           0        2      0   0.00%  0.00%  0.00%   0 ATM Soft VC Timer
  31           0        2      0   0.00%  0.00%  0.00%   0 IISP router
  32           0        1      0   0.00%  0.00%  0.00%   0 Critical Bkgnd
  33          36        2  18000   0.00%  0.00%  0.00%   0 Net Background
  34           0        9      0   0.00%  0.00%  0.00%   0 Logger
  35           4    68023      0   0.00%  0.00%  0.00%   0 TTY Background
  36        2100    62522     33   0.00%  0.00%  0.00%   0 Net Input
  37       13596     1134  11989   0.00%  0.01%  0.00%   0 Per-minute Jobs
```

Table 18-50 describes the significant fields shown in the two displays.

Table 18-50 show processes Field Descriptions

Field	Description
utilization for five seconds	CPU utilization for the last 5 seconds, 1 minute, and 5 minutes.
route processor utilization for five seconds (Catalyst 8540 MSR)	CPU utilization for the last 5 seconds, 1 minute, and 5 minutes.
PID	Process ID.

Table 18-50 show processes Field Descriptions (continued)

Field	Description
Q	Process queue priority. Possible values are: H (high), M (medium), L (low).
Ty	Scheduler test. Possible values: * (currently running), E (waiting for an event), S (ready to run, voluntarily relinquished processor), rd (ready to run, wakeup conditions occurred), we (waiting for an event), sa (sleeping until an absolute time), si (sleeping for a time interval), sp (sleeping for a time interval [alternate call]), st (sleeping until a timer expires), hg (hung; the process never executes again), xx (dead; the process has terminated, but has not yet been deleted).
PC	Current program counter.
Runtime (ms)	CPU time the process has used, in milliseconds.
Invoked	Number of times the process has been invoked.
uSecs	Microseconds of CPU time for each process invocation.
Stacks	Low water mark/total stack space available (in bytes).
TTY	Terminal that controls the process.
Process	Name of process.
five seconds	CPU utilization by task in last 5 seconds (in hundredths of seconds).
one minute	CPU utilization by task in last minute (in hundredths of seconds).
five minutes	CPU utilization by task in last 5 minutes (in hundredths of seconds).

Note Because the network server has a 4-ms clock resolution, run times are considered reliable only after a large number of invocations or a reasonable, measured run time.

show processes memory

To show memory utilization, use the **show processes memory** EXEC command.

show processes memory

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example is sample output from the **show processes memory** command.

```
Switch# show processes memory
Total: 10887088, Used: 3249408, Free: 7637680
 PID  TTY  Allocated      Freed    Holding    Getbufs    Retbufs Process
   0    0      45016        300      32056          0          0 *Init*
   0    0        300      38640        300          0          0 *Sched*
   0    0    1649012     107596    2956340    1715216          0 *Dead*
   1    0     254992     253508      14144          0          0 Exec
   2    0          0          0       6660          0          0 Check heaps
   3    0         92         92       6660          0          0 Timers
   4    0         92          0       6752          0          0 ARP Input
   5    0         92          0       3752          0          0 OIR Handler
   6    0          0          0       6660          0          0 ATM OAM input
   7    0          0          0       6660          0          0 ATM ARP Input
   8    0          0          0       6660          0          0 Aal5 Reassemblk
   9    0        332         92       6900          0          0 CDP Protocol
  10    0        228          0       6888          0          0 Probe Input
  11    0         92          0       6752          0          0 RARP Input
  12    0        204          0      12864          0          0 IP Input
  13    0          0          0       6660          0          0 TCP Timer
  14    0        728          0       7388          0          0 TCP Protocols
  15    0        184         92       6752          0          0 ATM-RT Backgrod
  16    0        528          0       7188          0          0 BOOTP Server
  17    0          0          0       6660          0          0 IP Cache Ager
  18    0      37576      37056       6788          0          0 ILMI Input
  19    0      10164       8360       6752          0          0 ILMI Request
  20    0       1688       6956       6844          0          0 ILMI Response
  21    0          0          0       6660          0          0 Resource Mgmt d
  22    0        184         92       6752          0          0 ATMCORE OAM Prs
  23    0        184         92       6752          0          0 ATMCORE OAM Pis
  24    0         92         92       6660          0          0 ATMSIG Timer
  25    0        184         92       6752          0          0 SSCOP Input
  26    0        184         92       6752          0          0 SSCOP Output
  27    0         92         92       6660          0          0 SSCOP Timer
  28    0        184         92       6752          0          0 ATMSIG Input
  29    0        796       1512       7364          0          0 ATMSIG Output
  30    0         92         92       6660          0          0 ATM Soft VC Tir
  31    0        628         92       7196          0          0 IISP router
  32    0        128          0       6844          0          0 Critical Bkgnd
```

```
 33    0       24440       11224        8028          0          0 Net Background
 34    0         184          92        6752          0          0 Logger
 35    0       17236        2964        6844          0          0 TTY Background
 36    0         184           0        3844          0          0 Net Input
 37    0           0           0        6660          0          0 Per-minute Jobs
                                     3249012 Total
```

Table 18-51 describes the significant fields shown in the display.

Table 18-51 show processes memory Field Descriptions

Field	Description
Total	Total amount of memory held.
PID	Process ID.
TTY	Terminal that controls the process.
Allocated	Sum of all memory that the process has requested from the system.
Freed	How much memory a process has returned to the system.
Holding	Allocated memory minus freed memory. A value can be negative when it has freed more than it was allocated.
Process	Process name.
Init	System initialization.
Sched	The scheduler.
Dead	Processes (as a group) that are now dead.

show protocols

To display the configured protocols, use the **show protocols** EXEC command.

show protocols [*type card/subcard/port*]

Syntax Description

type	Specifies an interface type as **atm**, **atm-p**, **cbr**, **ethernet**, or **null**.
card/subcard/port	Specifies the card, subcard and port numbers for the *interface-type*.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New document

Usage Guidelines

This command shows the global and interface-specific status of any configured IP protocol.

Examples

The following example is sample output from the **show protocols** command.

```
Switch# show protocols
Global values:
ATM0 is up, line protocol is up
  Internet address is 1.2.2.2 255.0.0.0
Ethernet0 is up, line protocol is up
  Internet address is 172.20.40.43 255.255.255.0
ATM3/0/0 is up, line protocol is up
ATM3/0/1 is down, line protocol is down
ATM3/0/2 is down, line protocol is down
ATM3/0/3 is up, line protocol is up
```

show redundancy (Catalyst 8540 MSR)

To list all redundancy-related information, use the **show redundancy** EXEC command.

show redundancy

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

This command is available on the primary route processor only.

Examples

The following example shows how to list redundancy information for an ATM switch router.

```
Switch# show redundancy
Primary
-------
Slot:                          a4/0/0
Uptime:                        4 minutes
Image:                         Version 11.3(19980716:020138)
[kartik-ehsa-integ
107]
Last Running Config. Sync:     4 minutes
Last Startup Config. Sync:     4 minutes
Last Restart Reason:           Normal boot
Secondary
---------
Slot:                          a8/0/0
Uptime:                        4 minutes
Image:                         Version 11.3(19980716:020138)
```

Related Commands

Command	Description
main-cpu (Catalyst 8540 MSR)	
redundancy (Catalyst 8540 MSR)	Switches to the redundancy mode.

show registry

To show the function registry information, use the **show registry** EXEC command.

show registry [*registry-name* [*registry-num*] [**brief**]] [**brief** | **statistics**]

Syntax Description

registry-name	Name of the registry to examine.
registry-num	Number of the registry to examine.
brief	Displays limited functions and services information.
statistics	Displays function registry statistics.

Defaults

Brief

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show registry** command.

```
Switch# show registry atm 0
Registry objects: 1799  bytes: 213412

--
Registry 23: ATM Registry
  Service 23/0:
      Stub service with 5 arguments
            0x6025E890
  Service 23/1:
      Stub service with 4 arguments
            0x602649A0
  Service 23/2:
      Stub service with 3 arguments
            0x60264B20
  Service 23/3:
      Stub service with 1 argument
            0x60263790
  Service 23/4:
      Stub service with 1 argument
            0x60261C30
  Service 23/5:
      Stub service with 1 argument
            0x60261CC0
  Service 23/6:
Stub service with 1 argument
            0x60261E78
  Service 23/7:
      Stub service with 2 arguments
            0x60262038
```

```
  Service 23/8:
      Stub service with 1 argument
            0x602620C0
  Service 23/9:
      Stub service with 2 arguments
            0x6023F610
  Service 23/10:
      List service with 1 argument
            0x602677A4
            0x60212F0C
            0x60233CA4
  Service 23/11:
      Stub service with 1 argument
  Service 23/12:
      Case service with 1 argument, 7 maximum cases
         3  0x6027CFCC
         6  0x602120B8
    default 0x60211BA8
Service 23/13:
      Stub service with 1 argument
            0x602650C0
  Service 23/14:
      Stub service with 1 argument

--
Registry 25: ATM routing Registry
  Service 25/0:
      List service with 2 arguments
            0x60268A50
```

Examples

The following example is sample output of a brief **show display** command.

```
Switch# show registry atm 3/0/0 brief
Registry objects: 1799  bytes: 213412

--
Registry 23: ATM Registry
  Service 23/0:
  Service 23/1:
  Service 23/2:
  Service 23/3:
  Service 23/4:
  Service 23/5:
  Service 23/6:
  Service 23/7:
  Service 23/8:
  Service 23/9:
  Service 23/10:
  Service 23/11:
  Service 23/12:
  Service 23/13:
  Service 23/14:

--
Registry 25: ATM routing Registry
  Service 25/0:
```

show reload

To display the reload status on the switch, use the **show reload** EXEC command.

show reload

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use **show reload** command to display a pending software reload.

Examples

The following **show reload** command represents a reload scheduled for 12:00 a.m. (midnight) on Saturday, April 20, 1998.

```
Switch# show reload
Reload scheduled for 00:00:00 PDT Sat April 20 1998 (in 12 hours and 12 minutes)
```

Related Commands

Command	Description
reload	Cisco IOS command removed from this manual. See Appendix D.

show rhosts

To display information about current remote hosts, use the **show rhosts** EXEC command.

show rhosts

Syntax Description

This command has no keywords or arguments

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use this command to display information about current users on the remote host. The information shows the local user, the host address, and the remote user.

Examples

The following example is sample output from the **show rhosts** EXEC command.

```
Switch# show rhosts
Local user   Host            Remote user
jhunt          171.69.194.9    jhunt
```

show rif

To display the current contents of the RIF cache, use the **show rif** privileged EXEC command.

show rif

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example is sample output from the **show rif** command:

```
Switch# show rif
Codes: * interface, - static, + remote
Hardware Addr  How   Idle (min)  Routing Information Field
5A00.0000.2333 atm0               3   08B0.0101.2201.0FF0
5B01.0000.4444 -                  -   -
0000.1403.4800 atm0               0   -
0000.2805.4C00 atm0               *   -
0000.2807.4C00 atm0               *   -
0000.28A8.4800 atm0               0   -
0077.2201.0001 atm0               10   0830.0052.2201.0FF0
```

In the display, entries marked with an asterisk (*) are the interface addresses of the router. Entries marked with a dash (-) are static entries. Entries with a number indicate cached entries. If the RIF timeout is set to a value other than the default of 15 minutes, the timeout is displayed at the top of the display. Table 18-52 describes the significant fields shown in the display.

Table 18-52 show rif Field Descriptions

Field	Description
Hardware Addr	MAC address for this entry.
How	Describes how the RIF has been learned. Possible values are atm0 or "-".
Idle (min)	Indicates how long (in minutes) since the last response was received directly from this node.
Routing Information Field	RIF number.

Related Commands

Command	Description
multiring	Enables collection and use of RIF information on a subinterface.
rif	Used to enter static source-route information into the routing information field (RIF) cache.

show rmon alarms

To display the contents of the switch's RMON alarm table, use the **show rmon alarms** EXEC command.

show rmon alarms

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

For additional information, refer to the RMON MIB described in RFC 1757.

You must have first enabled RMON on the interface, and configured RMON alarms to display alarm information with the **show rmon alarms** command.

Examples

The following example is sample output from the **show rmon alarms** command.

```
Switch# show rmon alarms
Alarm 2 is active, owned by manager1
 Monitors ifEntry.1.1 every 30 seconds
 Taking delta samples, last value was 0
 Rising threshold is 15, assigned to event 12
 Falling threshold is 0, assigned to event 0
 On startup enable rising or falling alarm
```

Table 18-53 describes the fields shown in the display.

Table 18-53 show rmon alarms Field Descriptions

Field	Description
Alarm 2 is active, owned by manager1	Unique index into the alarmTable, showing the alarm status is active, and the owner of this row, as defined in the RMON alarmTable.
Monitors ifEntry.1.1	Object identifier of the particular variable to be sampled. Equivalent to alarmVariable in RMON.
every 30 seconds	Interval in seconds over which the data is sampled and compared with the rising and falling thresholds. Equivalent to alarmInterval in RMON.
Taking delta samples	Method of sampling the selected variable and calculating the value to be compared against the thresholds. Equivalent to alarmSampleType in RMON.

Table 18-53 show rmon alarms Field Descriptions (continued)

Field	Description
last value was	Value of the statistic during the last sampling period. Equivalent to alarmValue in RMON.
Rising threshold is	Threshold for the sampled statistic. Equivalent to alarmRising Threshold in RMON.
assigned to event	Index of the eventEntry that is used when a rising threshold is crossed. Equivalent to alarmRisingEventIndex in RMON.
Falling threshold is	Threshold for the sampled statistic. Equivalent to alarmFallingThreshold in RMON.
assigned to event	Index of the eventEntry that is used when a falling threshold is crossed. Equivalent to alarmFallingEventIndex in RMON.
On startup enable rising or falling alarm	Alarm that may be sent when this entry is first set to valid. Equivalent to alarmStartupAlarm in RMON.

Related Commands

Command	Description
rmon alarm	Cisco IOS command removed from this manual. See Appendix D.

show rmon events

To display the contents of the switches RMON event table, use the **show rmon events** EXEC command.

show rmon events

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

For additional information, refer to the RMON MIB described in RFC 1757.

You must have first enabled RMON on the interface, and configured RMON events to display alarm information with the **show rmon events** command.

Examples

The following example is sample output from the **show rmon events** command.

```
Switch# show rmon events
Event 12 is active, owned by manager1
 Description is interface-errors
 Event firing causes log and trap to community rmonTrap, last fired 00:00:00
```

Table 18-54 describes the fields shown in the display.

Table 18-54 show rmon events Field Descriptions

Field	Description
Event 12 is active, owned by manager 1	Unique index into the eventTable, showing the event status is active, and the owner of this row, as defined in the eventTable of RMON.
Description is interface-errors	Type of event, in this case an interface error.
Event firing causes log and trap	Type of notification that the switch makes about this event. Equivalent to eventType in RMON.
community rmonTrap	If an SNMP trap is sent, it is sent to the SNMP community specified by this octet string. Equivalent to eventCommunity in RMON.
last fired	Last time the event was generated.

Related Commands

Command	Description
rmon event	Cisco IOS command removed from this manual. See Appendix D.

show running-config

To display the configuration information currently running on the terminal, use the **show running-config** EXEC command. This command replaces the **write terminal** command.

show running-config

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	Modified: Replaced **write terminal**.

Usage Guidelines

Use this command in conjunction with the **show startup-config** command to compare the information in running memory to the information stored in a location specified by the *config_file* environment variable. This variable specifies the configuration file used for initialization (startup). Use the **bert (Catalyst 8510 MSR and LightStream 1010)** command in conjunction with the **copy running-config startup-config** command to set the *config_file* environment variable.

Examples

The following example shows how to display the running configuration.

```
Switch# show running-config
Building configuration...

Current configuration:
!
version 12.0
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Switch
!
boot host tftp dplatz/dummy.cfg 172.20.52.3
boot network tftp dplatz/dummy.cfg 172.20.52.3
boot system tftp dplatz/dummy.cfg 172.20.52.3
boot system flash cat8540m-wp-mz.120-2.5.W5.7.20
logging buffered 4096 debugging
enable password lab
!
no facility-alarm core-temperature major
no facility-alarm core-temperature minor
redundancy
 main-cpu
  sync config startup
  sync config running
no ip subnet-zero
ip host-routing
```

```
!
atm address 47.0091.8100.0000.0090.2156.d801.0090.2156.d801.00
atm address 47.0091.8100.0000.0040.0b0a.c501.0040.0b0a.c501.00
atm router pnni
 no aesa embedded-number left-justified
 node 1 level 56 lowest
  redistribute atm-static
!
!
lane database x
sgcp
!
!
interface Tunnel0
 no ip address
 no ip directed-broadcast
!
interface ATM0
 no ip address
 no ip directed-broadcast
 atm service-class 8 wrr-weight 15
 atm maxvp-number 0
!
interface Ethernet0
 ip address 172.20.52.11 255.255.255.224
 no ip directed-broadcast
!
interface Async1
 no ip address
 no ip directed-broadcast
 hold-queue 10 in
!
ip default-gateway 172.20.52.1
ip classless
!
!
atm pnni explicit-path identifier 1 name LS1010.path enable
 next-node LS1010 port 81901001
 next-node dallas
 next-node NewLs1010
!
atm pnni explicit-path identifier 2 name newpath enable
!
atm pnni explicit-path identifier 5 name test enable
!
line con 0
 no exec
 exec-timeout 0 0
 transport input none
line aux 0
 exec-timeout 0 0
line vty 0 4
 exec-timeout 0 0
 password lab
 no login
!
end
```

Related Commands

Command	Description
bert (Catalyst 8510 MSR and LightStream 1010)	Checks the bit errors on a line for a specified interval.
copy running-config	Copies the switch's running configuration file to another destination.
copy startup-config	Copies the switch's startup configuration file to another destination.
show startup-config	Shows the configuration file pointed to by the *config_file* environment variable.

show sessions

To display information about open Telnet or rlogin connections, use the **show sessions** EXEC command.

show sessions

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command displays the host name, address, number of unread bytes for the user to receive, idle time, and connection name.

Examples

The following example is sample output from the **show sessions** command.

```
Switch# show sessions
Conn Host                Address          Byte    Idle  Conn Name
   1 MATHOM              192.31.7.21         0       0  MATHOM
*  2 CHAFF               131.108.12.19       0       0  CHAFF
```

Table 18-55 describes the significant fields shown in the display.

Table 18-55 show sessions Field Descriptions

Field	Description
Conn	Name or address of the remote host to which the connection is made.
Host	Remote host to which the switch is connected through a Telnet session.
Address	IP address of the remote host.
Byte	Number of unread bytes displayed for the user to receive.
Idle	Interval (in minutes) since data was last sent on the line.
Conn Name	Assigned name of the connection.

Related Commands

Command	Description
resume	switch to another open Telnet, LAT, or PAD session
where	Cisco IOS command removed from this manual. See Appendix D.

show sgcp

To display global configuration, operational state, and a summary of connection activity for SGCP, use the **show sgcp** EXEC command.

show sgcp

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

This command shows the global configuration, operational state, and a summary of connection activity.

Examples

The following example shows how to display the global configuration, operational state, and a summary of connection activity.

```
Switch# show sgcp
SGCP Admin State ACTIVE, Oper State ACTIVE
SGCP call-agent: none  , SGCP graceful-shutdown enabled? FALSE
SGCP request timeout 2000, SGCP request retries 6
74 CES endpoint connections created
74 CES endpoints in active connections
```

Table 18-56 lists the field descriptions for the **show sgcp** command.

Related Commands

Command	Description
sgcp	Enables the operation of the SGCP to interconnect ATM CES interface circuits on a switch.
sgcp call-agent	Sends SGCP response packets to a predetermined IP address and UDP port.
sgcp graceful-shutdown	Shuts down SGCP operation.
sgcp request retries	Specifies the number of times the ATM switch sends an SGCP request to the call agent without receiving a response and before ceasing to retry.
sgcp request timeout	Specifies the time the ATM switch waits after sending an SGCP request to the call agent before considering the request lost.
show sgcp connection	Displays a global list of SGCP connections or a single interface based on a related keyword.
show sgcp endpoint	Displays CES circuit endpoints that might or might not have connections created.
show sgcp statistics	Displays global statistics pertaining to SGCP activity.

show sgcp connection

To display a global list of SGCP connections or a single interface based on a related keyword, use the **show sgcp connection** EXEC command.

show sgcp connection [**interface cbr** *card/subcard/port*]

Syntax Description

card/subcard/port	Specifies the card, subcard and port numbers for the CBR interface.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

If you show the allocated SGCP connections, it is easier to determine which single endpoints to display.

Examples

The following example shows how to display the global list of SGCP connections.

```
Switch> show sgcp connection
Conn Endpt          Soft VC State         Call ID
CBR1.1.0/1          Dest- active VC       1564abc
CBR1.1.0/2          Src - active VC       123372c
CBR1.1.0/3          Dest- active VC       12343bc
CBR1.1.0/4          Src - active VC       1238926
CBR1.1.0/5          Dest- active VC       1003abc
CBR1.1.0/6          Src - active VC       12596dc
CBR1.1.0/7          Dest- active VC       124567c
CBR1.1.0/8          Src - active VC       14322bc
CBR1.1.0/9          Dest- active VC       120095c
CBR1.1.0/10         Src - active VC       129999c
CBR1.1.0/11         Dest- active VC       167776c
CBR1.1.0/12         Src - active VC       123456c
CBR1.1.0/14         Dest- active VC       1278764
CBR1.1.0/15         Src - active VC       123424c
CBR1.1.0/16         Dest- active VC       122345c
```

Related Commands

Command	Description
sgcp	Enables the operation of the SGCP to interconnect ATM CES interface circuits on a switch.
show sgcp endpoint	Displays CES circuit endpoints that might or might not have connections created.

show sgcp endpoint

To display CES circuit endpoints that might or might not have connections created, use the **show sgcp endpoint** EXEC command.

show sgcp endpoint [**interface cbr** *card/subcard/port* [*endpoint_val*]]

Syntax Description

card/subcard/portl	Specifies the card, subcard, and port numbers for the CBR interface.
endpoint_val	CES circuit ID: • T1 = 1 to 24 • E1 = 1 to 31

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

This command displays the endpoints that might be eligible for SGCP connections. The ATM switch router displays endpoints that follow:

- Are assigned a single time slot
- Do not have a PVC or soft PVC defined

Examples

The following example shows all CES circuits eligible to be SGCP endpoints.

```
Switch> show sgcp endpoint
Endpt         Timeslots Conn State           Call ID
CBR1.1.0/1         1    no connection
CBR1.1.0/2         1    no connection
CBR1.1.0/3         1    no connection
CBR1.1.0/4         1    no connection
CBR1.1.0/5         1    no connection
CBR1.1.0/6         1    no connection
CBR1.1.0/7         1    no connection
CBR1.1.0/8         1    no connection
CBR1.1.0/9         1    no connection
CBR1.1.0/10        1    no connection
CBR1.1.0/11        1    active
CBR1.1.0/12        1    no connection
CBR1.1.0/14        1    active            1234abc
CBR1.1.0/15        1    active            1234abc
CBR1.1.0/16        1    active            1234abc
CBR1.1.0/17        1    active            1234abc
CBR1.1.0/18        1    active            1234abc
```

```
CBR1.1.0/19        1    active             1234abc
CBR1.1.0/20        1    active             1234abc
CBR1.1.0/21        1    active             1234abc
CBR1.1.0/22        1    active             1234abc
CBR1.1.0/23        1    active             1234abc
CBR1.1.0/24        1    active             1234abc
```

The following example shows a particular CES circuit SGCP endpoint.

```
Switch> show sgcp endpoint interface c1/1/0 1
 Call ID:    Conn ID:    CES VC state: no VC
 Conn Mode none    , Conn State no connection
 CreateConn rx 554, successful 552, failed 2
 DeleteConn rx 554, successful 554, failed 0
 ModifyConn rx 0, successful 0, failed 0
 DeleteConn tx 2, successful 2, failed 0
 Peer RELEASE rx 0, Net RELEASE rx 0
```

Table 18-56 lists possible strings that appear with the **show sgcp endpoint** command.

Table 18-56 Possible Strings with show sgcp endpoint

Field	Possible Strings
CES VC states:	no VC waiting VC initiating VC active VC tearing down VC
Connection states:	no connection created-passive created-initiator active ca delete pending waiting delete rsp waiting ca delete
Connection modes:	none SendOnly RecvOnly SendRecv Inactive Loopback ContTest

Related Commands

Command	Description
sgcp	Enables the operation of the SGCP to interconnect ATM CES interface circuits on a switch.
show sgcp	Displays global configuration, operational state, and a summary of connection activity for SGCP.
show sgcp connection	Displays a global list of SGCP connections or a single interface based on a related keyword.

show sgcp statistics

To display global statistics pertaining to SGCP activity, use the **show sgcp statistics** EXEC command.

show sgcp statistics

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Because circuit endpoint structures can be lost when you change interface circuit configuration, global statistics are useful once endpoint statistics are unavailable.

Examples

The following example displays global statistics for SGCP.

```
Switch# show sgcp stat
 UDP pkts rx 104517, tx 104874
 Unrecognized rx pkts 0, SGCP message parsing errors 0
 Duplicate SGC rsp tx 18
 CreateConn rx 53677, successful 48954, failed 4723
 DeleteConn rx 50808, successful 48872, failed 1936
 ModifyConn rx 20, successful 20, failed 0
 DeleteConn tx 357, successful 6, failed 351
 Peer RELEASE rx 24442, Net RELEASE rx 0
```

Table 18-57 lists field descriptions for the **show sgcp statistics** command.

Table 18-57 sgcp statistics Field Descriptions

Field	Description
UDP pkts rx	Number of UDP packets SGCP received.
UDP pkts tx	Number of UDP packets SGCP transmitted.
Unrecognized rx pkts	Number of packets that did not have a recognizable SGCP header.
SGCP message parsing errors	Number of packets that had an SGCP header, but had other parsing errors.

Table 18-57 sgcp statistics Field Descriptions (continued)

Field	Description
Duplicate SGCP rsp tx	This counter increments if an SGCP request is received that duplicates one for which a response exists in the response cache and a duplicate response is sent.
CreateConn rx	Total number of CreateConnection SGCP packets received.
CreateConn successful	Total number of CreateConnection requests to which SGCP positively responded.
CreateConn failed	Total number of CreateConnection requests to which SGCP responded negatively.
DeleteConn rx	Total number of DeleteConnection SGCP packets received, or retries were exceeded.
DeleteConn successful	Total number of DeleteConnection requests to which SGCP responded positively.
DeleteConn failed	Total number of DeleteConnection requests to which SGCP responded negatively.
ModifyConn rx	Total number of ModifyConnection SGCP packets received.
ModifyConn successful	Total number of ModifyConnection requests to which SGCP responded positively.
ModifyConn failed	Total number of ModifyConnection requests to which SGCP responded negatively.
DeleteConn tx	Total number of DeleteConnection SGCP packets transmitted.
Peer RELEASE rx	Total number of RELEASE messages received from the circuit peer.
Net RELEASE rx	Total number of network-generated RELEASE messages received.

Related Commands

Command	Description
sgcp	Enables the operation of the SGCP to interconnect ATM CES interface circuits on a switch.
show sgcp	Displays global configuration, operational state, and a summary of connection activity for SGCP.
show sgcp connection	Displays a global list of SGCP connections or a single interface based on a related keyword.
show sgcp endpoint	Displays CES circuit endpoints that might or might not have connections created.

show snmp

To check the status of communications between the SNMP agent and SNMP manager, use the **show snmp** EXEC command.

show snmp

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command provides counter information for RFC 1213 SNMP operations. It also displays the chassis ID string defined with the **snmp-server chassis-id** command.

Examples

The following example is sample output from the **show snmp** command.

```
Switch# show snmp
Chassis: SN#TS02K229
167 SNMP packets input
    0 Bad SNMP version errors
    0 Unknown community name
    0 Illegal operation for community name supplied
    0 Encoding errors
    167 Number of requested variables
    0 Number of altered variables
    0 Get-request PDUs
    167 Get-next PDUs
    0 Set-request PDUs
167 SNMP packets output
    0 Too big errors (Maximum packet size 484)
    0 No such name errors
    0 Bad values errors
    0 General errors
    167 Get-response PDUs
    0 SNMP trap PDUs
```

Related Commands

Command	Description
snmp-server community	Cisco IOS command removed from this manual. See Appendix D.

show sscop

To show SSCOP details for all ATM interfaces, use the **show sscop** EXEC command.

show sscop

Syntax Description

This command has no keywords or arguments

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show sscop** command.

```
Switch# show sscop atm 3/0/0
SSCOP details for interface ATM3/0/0
   Current State = Data Transfer Ready
   Send Sequence Number: Current = 2, Maximum = 9
   Send Sequence Number Acked = 3
   Rcv Sequence Number: Lower Edge = 2, Upper Edge = 2, Max = 9
   Poll Sequence Number = 1876, Poll Ack Sequence Number = 2
   Vt(Pd) = 0
   Connection Control: timer = 1000
   Timer currently Inactive
   Keep Alive Timer = 30000
   Current Retry Count = 0, Maximum Retry Count = 10
      Statistics -
      Pdu's Sent = 0, Pdu's Received = 0, Pdu's Ignored = 0
      Begin = 0/1, Begin Ack = 1/0, Begin Reject = 0/0
      End = 0/0, End Ack = 0/0
      Resync = 0/0, Resync Ack = 0/0
      Sequenced Data = 2/0, Sequenced Poll Data = 0/0
      Poll = 1591/1876, Stat = 0/1591, Unsolicited Stat = 0/0
      Unassured Data = 0/0, Mgmt Data = 0/0, Unknown Pdu's = 0
```

Table 18-58 describes the fields shown in the display. Interpreting this output requires an understanding of the SSCOP; it is usually displayed by Cisco technicians to help diagnose network problems.

Table 18-58 show sscop Field Descriptions

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

Table 18-58 show sscop Field Descriptions (continued)

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

show stacks

To monitor the stack utilization of processes and interrupt routines, use the **show stacks** EXEC command. The display includes the reason for the last system reboot.

show stacks *number*

Syntax Description

number	Shows the detail for a specific process (enable mode only).

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

If the system was reloaded because of a system failure, a saved system stack trace is displayed. This information is useful to Cisco engineers for troubleshooting purposes.

Examples

The following example is sample output from the **show stacks** command following a system failure.

```
Switch# show stacks
Minimum process stacks:
Free/Size  Name
5724/6000  Autoinstall
5192/6000  Setup
11528/12000  BootP Resolver
10504/12000  Init

Interrupt level stacks:
Level    Called Unused/Size  Name
  1        9137   4460/6000  Switch Interrupt
  2       71781   5292/6000  Ethernet Interrupt
  3           0   5676/6000  OIR interrupt
  4           0   6000/6000  PCMCIA Interrupt
  5      326900   5624/6000  Console Uart
  6           0   6000/6000  Error Interrupt
  7    34179793   5668/6000  NMI Interrupt Handle
```

show startup-config

To show the configuration file pointed to by the *config_file* environment variable, use the **show startup-config** EXEC command. This command replaces the **show configuration** command.

show startup-config

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command. Originally **show configuration**.
12.0(3c)W5(9)	Modified: Changed to **show startup-config**.

Usage Guidelines

The **show startup-config** command shows the configuration file specified by the *config_file* environment variable. The switch informs you whether the displayed configuration is a complete configuration or a distilled version. A distilled configuration is one that does not contain access lists.

Examples

Catalyst 8540 MSR

The following example is sample output from the **show startup-config** command.

```
Switch# show startup-config
Using 1288 out of 129016 bytes
!
version xx.x
no service pad
service udp-small-servers
service tcp-small-servers
!
hostname Switch3
!
boot bootldr bootflash:/home/cyadaval/xxxxxx-i-m.bin.Z
!
atm address 47.0091.8100.0000.0000.0ca7.ce01.0000.0ca7.ce01.00
!
interface ATM0
 ip address 1.2.2.2 255.0.0.0
 no ip route-cache
 map-group ab
 atm maxvp-number 0
!
interface Ethernet0
 ip address 172.20.40.43 255.255.255.0
 no ip route-cache
!
interface ATM3/0/0
 no atm auto-link-determination
 no atm address-registration
```

```
 atm uni type public side user
!
interface ATM3/1/0
 no keepalive
!
interface ATM3/1/1
 no keepalive
!
interface ATM3/1/2
 no keepalive
 atm pvc 0 100 rx-cttr 1 tx-cttr 1 interface  ATM3/1/1 0 100
 atm pvp 1 rx-cttr 1 tx-cttr 1
 atm pvp 2 rx-cttr 1 tx-cttr 1
 atm pvp 3 rx-cttr 1 tx-cttr 1
!
interface ATM3/1/2.1 point-to-point
 atm maxvp-number 0
!
interface ATM3/1/2.2 point-to-point
 atm maxvp-number 0
!
interface ATM3/1/2.3 point-to-point
 atm maxvp-number 0
!
interface ATM3/1/3
 no keepalive
 atm pvc 0 200 rx-cttr 1 tx-cttr 1 interface  ATM0 0 200  encap aal5snap
!
ip domain-name cisco.com
ip name-server 198.92.30.32
!
map-list ab
 ip 1.1.1.1 atm-vc 200
!
line con 0
 exec-timeout 0 0
line vty 0
 password Switch
 login
line vty 1 4
 login
!
end
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example is sample output from the **show startup-config** command.

```
Switch# show startup-config
Using 1288 out of 129016 bytes
!
version xx.x
no service pad
service udp-small-servers
service tcp-small-servers
!
hostname Switch3
```

```
!
boot bootldr bootflash:/home/cyadaval/xxxxxx-i-m.bin.Z
!
atm address 47.0091.8100.0000.0000.0ca7.ce01.0000.0ca7.ce01.00
!
interface ATM0
 ip address 1.2.2.2 255.0.0.0
 no ip route-cache
 map-group ab
 atm maxvp-number 0
!
interface Ethernet0
 ip address 172.20.40.43 255.255.255.0
 no ip route-cache
!
interface ATM3/0/0
 no atm auto-link-determination
 no atm address-registration
 atm uni type public side user
!
interface ATM3/1/0
 no keepalive
!
interface ATM3/1/1
 no keepalive
!
interface ATM3/1/2
 no keepalive
 atm pvc 0 100 rx-cttr 1 tx-cttr 1 interface  ATM3/1/1 0 100
 atm pvp 1 rx-cttr 1 tx-cttr 1
 atm pvp 2 rx-cttr 1 tx-cttr 1
 atm pvp 3 rx-cttr 1 tx-cttr 1
!
interface ATM3/1/2.1 point-to-point
 atm maxvp-number 0
!
interface ATM3/1/2.2 point-to-point
 atm maxvp-number 0
!
interface ATM3/1/2.3 point-to-point
 atm maxvp-number 0
!
interface ATM3/1/3
 no keepalive
 atm pvc 0 200 rx-cttr 1 tx-cttr 1 interface  ATM0 0 200  encap aal5snap
!
ip domain-name cisco.com
ip name-server 198.92.30.32
!
map-list ab
 ip 1.1.1.1 atm-vc 200
!
line con 0
 exec-timeout 0 0
line aux 0
 transport input all)
line vty 0
 password Switch
 login
line vty 1 4
 login
!
end
```

Examples

The following example is partial sample output from the **show startup-config** command when the configuration file is compressed.

```
Switch# show startup-config
Using 21542 out of 65536 bytes, uncompressed size = 142085 bytes
!
version 11.2
service compress-config
!
hostname rose
!
boot system flash gs7-k.sthormod_clean
boot system rom
```

Related Commands

Command	Description
copy running-config	Copies the switch's running configuration file to another destination.
description	Cisco IOS command removed from this manual. See Appendix D.
service compress-config	Cisco IOS command removed from this manual. SeeAppendix D .
show bootflash:	Displays information about the bootflash: file system.
show running-config	Displays the configuration information currently running on the terminal.

show subsys

To display the subsystem information, use the **show subsys** EXEC command.

show subsys [**class** *class* | **name** *name*]

Syntax Description

class	Specifies the subsystem class to display. Valid entries are **driver**, **kernel**, **library**, **management**, **protocol**, and **registry**.
name	Specifies the name of a subsystem to display.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

Catalyst 8540 MSR

The following example is sample output from the **show subsys** command.

```
Switch# show subsys

                    Class         Version   Required Subsystems
static_map          Kernel      1.000.001
arp                 Kernel      1.000.001
ether               Kernel      1.000.001
compress            Kernel      1.000.001
alignment           Kernel      1.000.002
monvar              Kernel      1.000.001
slot                Kernel      1.000.001
oir                 Kernel      1.000.001
atm                 Kernel      1.000.001
ip_addrpool_sys     Library     1.000.001
chat                Library     1.000.001
dialer              Library     1.000.001
flash_services      Library     1.000.001
ip_localpool_sys    Library     1.000.001   ip_addrpool_sys
nvram_common        Driver      1.000.001
route processor     Driver      1.000.001
sonict              Driver      1.000.001
oc3suni             Driver      1.000.001
oc12suni            Driver      1.000.001
ds3suni             Driver      1.000.001
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example is sample output from the **show subsys** command.

```
Switch# show subsys

                    Class         Version   Required Subsystems
static_map          Kernel      1.000.001
arp                 Kernel      1.000.001
ether               Kernel      1.000.001
compress            Kernel      1.000.001
alignment           Kernel      1.000.002
monvar              Kernel      1.000.001
slot                Kernel      1.000.001
oir                 Kernel      1.000.001
atm                 Kernel      1.000.001
ip_addrpool_sys     Library     1.000.001
chat                Library     1.000.001
dialer              Library     1.000.001
flash_services      Library     1.000.001
ip_localpool_sys    Library     1.000.001   ip_addrpool_sys
nvram_common        Driver      1.000.001
ASP                 Driver      1.000.001
sonict              Driver      1.000.001
oc3suni             Driver      1.000.001
oc12suni            Driver      1.000.001
ds3suni             Driver      1.000.001
```

show switch fabric (Catalyst 8540 MSR)

To show the details of the switch fabric for an ATM switch router, use the **show switch fabric** EXEC command.

show switch fabric

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

This command shows the details of all MSCs in one display. It also displays the condition of the entire ATM switch router.

Examples

The following example shows how to display information about the fabric of an ATM switch router.

```
Switch# show switch fabric
MMC Switch Fabric (idb=0x60848BE0)

  Key: Rej. Cells  - # cells rejected due to lack of resources
                           or policing (16-bit)
       Inv. Cells    - # good cells that came in on a non-existent conn.
       Mem Buffs     - # cell buffers currently in use
       RX Cells      - # rx cells (16-bit)
       TX Cells      - # tx cells (16-bit)
       Rx HEC        - # cells Received with HEC errors
       Tx PERR       - # cells with memory parity errors

  MSC#     Rej. Cells    Inv. Cells    Mem. Buffs    Rx Cells     Tx Cells     R x HEC
Tx PErr
 -----    -----------   ------------   -----------  -----------  ----------   ----------
----------
 MSC 0:            0              0           0           0           0          0
0
 MSC 1:            0              0           0           0           0          0
0
 MSC 2:            0              0           0           0           0          0
0
 MSC 3:            0              0           0           0           0          0
0
 MSC 4:            0              0           0           0           0          0
0
 MSC 5:            0              0           0           0           0          0
0
 MSC 6:            0              0           0           0           0          0
0
```

```
 MSC 7:           0              0           0           0           0           0
0

 Switch Fabric Statistics

      Rejected Cells: 0
      Invalid Cells: 0
      Memory Buffers: 0
      Rx Cells: 0
      Tx Cells: 0
      RHEC: 0
      TPE: 0
# marker intrs = 0
# marker list entries = 0
# ivcs used = 0
# ovcs used = 0
     ivcs used for MSC 0 = 0
     ivcs used for MSC 1 = 0
     ivcs used for MSC 2 = 0
     ivcs used for MSC 3 = 0
     ivcs used for MSC 4 = 0
     ivcs used for MSC 5 = 0
     ivcs used for MSC 6 = 0
     ivcs used for MSC 7 = 0
     ovcs used for MSC 0 = 0
     ovcs used for MSC 1 = 0
     ovcs used for MSC 2 = 0
     ovcs used for MSC 3 = 0
     ovcs used for MSC 4 = 0
     ovcs used for MSC 5 = 0
     ovcs used for MSC 6 = 0
     ovcs used for MSC 7 = 0
#     vpts used for MSC 0 = 0
#     vpts used for MSC 1 = 0
#     vpts used for MSC 2 = 0
#     vpts used for MSC 3 = 0
#     vpts used for MSC 4 = 0
#     vpts used for MSC 5 = 0
#     vpts used for MSC 6 = 0
#     vpts used for MSC 7 = 0
# vpts used = 0
# vpt ovcs used = 0
 port   type   status  RXcells TXcells RHEC   TPE
 0/0/0 155MBPS xytrpm 0x0000 0x0000 0x0000
 0/0/1 155MBPS xytrpm 0x0000 0x0000 0x0000
 0/0/2 155MBPS xytrpm 0x0000 0x0000 0x0000
 0/0/3 155MBPS xytrpm 0x0000 0x0000 0x0000

Switch#
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.
show switch module (Catalyst 8540 MSR)	Displays interface, Max vpi-bits, and status information per switch module.

show switch module (Catalyst 8540 MSR)

To display interface, Max vpi-bits, and status information per switch module, use the **show switch module** EXEC command.

show switch module [**interface | atm**] *card/subcard/port*

Syntax Description

module	Specifies a module.
interface	Specifies an interface type.
atm	Specifies an ATM interface.
card/subcard/port	Identifies the card, subcard, and port number of the interface.

Defaults

None

Command Modes

EXEC

Command History

Release	Modification
12.0(4a)W5(11a)	New command

Usage Guidelines

None

Examples

The following example shows the interface, Max vpi-bits, and status information per switch module:

```
Switch# show switch module
Module ID  Interface  Maxvpi-bits  State
----------------------------------------
2            ATM2/0/0   8            DOWN
========================================
3            ATM2/0/1   8            DOWN
========================================
4            ATM9/0/0   8            DOWN
========================================
5           ATM10/0/0   8         UP-LPBK
            ATM10/0/2   8            DOWN
            ATM10/0/1   8            DOWN
            ATM10/0/3   8            DOWN
========================================
6           ATM11/0/0   8            DOWN
========================================
7           ATM12/0/0   8              UP
            ATM12/0/2   8            DOWN
            ATM12/0/1   8            DOWN
            ATM12/0/3   8            DOWN
========================================
```

The following example shows how to display interface, Max vpi-bits, and status information for interface atm 10/0/0:

```
Switch# show switch module interface atm10/0/0
Module ID  Interface  Maxvpi-bits  State
---------------------------------------
5           ATM10/0/0   8        UP-LPBK
            ATM10/0/2   8           DOWN
            ATM10/0/1   8           DOWN
            ATM10/0/3   8           DOWN
=======================================
```

The following example shows how to display interface, Max vpi-bits, and status information for module 0:

```
Switch# show switch module module-id 0
Module ID  Interface  Maxvpi-bits  State
---------------------------------------
0            ATM0/0/0   8             UP
             ATM0/0/4   8           DOWN
             ATM0/0/1   8           DOWN
             ATM0/0/5   8           DOWN
             ATM0/0/2   8             UP
             ATM0/0/6   8           DOWN
             ATM0/0/3   8             UP
             ATM0/0/7   8           DOWN
=======================================
```

Related Commands

Command	Description
show switch fabric (Catalyst 8540 MSR)	Displays the details of the switch fabric for an ATM switch router.
show controllers	Displays information about a physical port device.

show tacacs

To show current TACACS+ server statistics, use the **show tacacs** EXEC command.

show tacacs

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use this command to display information for analyzing and evaluating the TACACS+ server.

show tag-switching atm-tdp bindings

To display the requested entries from the ATM TDP tag binding database, use the **show tag-switching atm-tdp bindings** privileged EXEC command.

show tag-switching atm-tdp bindings [*ip-address* {*mask* | *length*}] [**local-tag | remote-tag** *vpi vci*] [**neighbor atm** *card/subcard/port*] [**remote-tag** *vpi vci*]

Syntax Description

ip-address	Destination prefix.
mask	Destination netmask prefix.
length	Netmask length, in the range of 1 to 32.
local-tag *vpi vci*	Selects tag values assigned by this switch.
neighbor atm *card/subcard/port*	Selects tags assigned by a neighbor on the specified ATM interface.
remote-tag *vpi vci*	Selects tag values assigned by another switch.

Defaults

Displays all database entries.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The display output can show the entire database or a subset of entries based on the prefix, the VC tag value, or an assigning interface.

Examples

The following example shows the display from the **show tag-switching atm-tdp bindings** command.

```
Switch# show tag-switching atm-tdp bindings
Destination: 13.0.0.0/8
    Tailend Switch ATM0/1/0 1/33 Active -> Terminating Active
    Tailend Switch ATM0/1/0 1/34 Active -> Terminating Active
    Tailend Switch ATM0/0/0.10 10/33 Active -> Terminating Active
 Destination: 11.0.0.0/8
    Transit ATM0/1/0 1/45 Active -> ATM0/0/0.10 10/33 Active
 Destination: 128.1.0.0/16
    Transit ATM0/1/0 1/46 Active -> ATM0/0/0.10 10/34 Active
 Destination: 167.1.0.0/16
    Transit ATM0/0/0.10 10/34 Active -> ATM0/1/0 1/36 Active
```

Table 18-59 show tag-switching atm-tdp bindings Field Descriptions

Field	Description
Destination: 10.16.0.16/32	Destination IP address/length of netmask
Tailend Switch	VC type: • Tailend—VC that terminates at this switch • Headend—VC that originates at this switch • Transit—VC that passes through this switch
ATM1/0/1	ATM interface
1/35	VPI/VCI
Active	TVC state: • Active—Set up and working • Bindwait—Waiting for response

Related Commands

Command	Description
show tag-switching atm-tdp summary	Displays summary information on ATM tag bindings.

show tag-switching atm-tdp capability

To display the ATM TDP tag capabilities for all interfaces, use the **show tag-switching atm-tdp capability** privileged EXEC command.

show tag-switching atm-tdp capability

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example shows the display from the **show tag-switching atm-tdp capability** command.

```
Switch# show tag-switching atm-tdp capability

VPI           VCI           Alloc   Odd/Even VC Merge
ATM0/1/0       Range         Range          Scheme  Scheme    IN    OUT
  Negotiated   [1 - 1]       [33 - 1023]    UNIDIR            -     -
  Local        [1 - 1]       [33 - 16383]   UNIDIR            NO    NO
  Peer         [1 - 1]       [33 - 1023]    UNIDIR            -     -

               VPI           VCI            Alloc   Odd/Even VC Merge
ATM0/0/0.10    Range         Range          Scheme  Scheme    IN    OUT
  Negotiated   [10 - 10]     [33 - 16383]   UNIDIR            -     -
  Local        [10 - 10]     [33 - 16383]   UNIDIR            NO    NO
  Peer         [10 - 10]     [33 - 16383]   UNIDIR            -     -
```

Related Commands

Command	Description
tag-switching atm control-vc	Configures the VPI/VCI to be used for the initial link to the tag switching peer.

show tag-switching atm-tdp summary

To display summary information on ATM tag bindings, use the **show tag-switching atm-tdp summary** privileged EXEC command.

show tag-switching atm-tdp summary

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example displays output from the **show tag-switching atm-tdp summary** command.

```
Switch# show tag-switching atm-tdp summary
Total number of destinations: 40

TC-ATM bindings summary
interface      total   active  local   remote  Bwait   Rwait   IFwait
ATM0/0/0       21      21      10      11      0       0       0
ATM0/0/1       21      21      11      10      0       0       0
ATM0/0/2       49      49      31      18      0       0       0
ATM0/0/3       45      45      31      14      0       0       0
ATM0/1/0       6       6       0       6       0       0       0
ATM0/1/2       64      64      34      30      0       0       0
ATM0/1/0.18    20      20      10      10      0       0       0
ATM0/1/0.19    25      25      13      12      0       0       0
ATM0/1/1.51    15      15      9       6       0       0       0
ATM0/1/1.52    3       3       1       2       0       0       0
```

Table 18-61 describes the show tag-switching atm-tdp summaries.

Table 18-60 show tag-switching atm-tdp summary Field Descriptions

Field	Description
Total number of destinations	Number of known destination address prefixes.
interface	Name of an interface with associated ATM tag bindings.
total	Total number of ATM tags on this interface.
active	Number of ATM tags in an “active” state, ready to use for data transfer.
local	Number of ATM tags on this interface assigned by this tag switch.
remote	Number of ATM tags on this interface assigned by the neighbor tag switch.
Bwait	Number of bindings waiting for a tag assignment from the neighbor tag switch.

Table 18-60 show tag-switching atm-tdp summary Field Descriptions (continued)

Field	Description
Rwait	Number of TVCs waiting for remote resources because the neighbor has run out of VC space.
IFwait	Number of TVCs waiting for response from the tag ATM API. For the ATM switch router, this value is always 0.

Related Commands

Command	Description
show tag-switching atm-tdp bindings	Displays the requested entries from the ATM TDP tag binding database.

show tag-switching interfaces

To display information about interfaces where tag switching is enabled, use the **show tag-switching interface** privileged EXEC command.

show tag-switching interfaces [*type card/subcard/port* | **all**] [**detail**]

Syntax Description

type	Specifies one of the interface types listed in Table 18-61.
card/subcard/port	Specifies the card, subcard, and port number of the interface.
detail	Displays detailed tag switching information by interface.

Defaults

Displays tag switching information for all interfaces.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

Displays information about the requested interface or all interfaces where tag switching is enabled.

Table 18-61 Interface Types for the show tag-switching interfaces Command

Type	Description
atm	Specifies the ATM interface.
atm-p	Specifies the ATM pseudo interface.
cbr	Specifies the CBR interface.
ethernet	Specifies the Ethernet interface (0).
null	Specifies the null interface.
serial	Specifies the serial interface.
tunnel	Specifies the tunnel interface.

Examples

The following example shows the display from the **show tag-switching interfaces** command.

```
Switch# show tag-switching interface
Interface              IP    Tunnel   Operational
ATM0/0/0               Yes   No       Yes         (ATM tagging)
ATM0/0/1               Yes   No       Yes         (ATM tagging)
ATM0/0/2               Yes   No       Yes         (ATM tagging)
ATM0/0/3               Yes   No       Yes         (ATM tagging)
ATM0/1/0               Yes   No       Yes         (ATM tagging)
ATM0/1/0.18            Yes   No       Yes         (ATM tagging)
ATM0/1/0.19            Yes   No       Yes         (ATM tagging)
```

```
ATM0/1/1.51            Yes   No       Yes         (ATM tagging)
ATM0/1/1.52            Yes   No       Yes         (ATM tagging)
ATM0/1/2               Yes   No       Yes         (ATM tagging)
```

Tag-switching interface descriptions are provided in Table 18-62.

Table 18-62 show tag-switching interface Field Descriptions

Field	Description
Interface	Interface name.
IP	Whether the interface is configured to tag IP packets.
Tunnel	Whether a tunnel is configured through this interface.
Operational	Whether packets are being tagged.

The following example shows the display from the **show tag-switching interfaces** command for a single interface using the **detail** option.

```
Switch# show tag interfaces atm 0/0/1 detail
Interface ATM0/0/1:
        IP tagging enabled
        TSP Tunnel tagging not enabled
        Tagging operational
        MTU = 8940
        ATM tagging: Tag VPI range = 2 - 5, Control VC = 6/32
```

Related Commands

Command	Description
tag-switching ip (interface)	Enables tag switching of IPv4 packets on an interface.

show tag-switching tdp discovery

To display the status of the TDP discovery process, use the **show tag-switching tdp discovery** privileged EXEC command.

show tag-switching tdp discovery

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example shows the display from the **show tag-switching tdp discovery** command. The interfaces over which TDP discovery is running follow.

```
Switch# show tag-switching tdp discovery
Local TDP Identifier:
    172.20.40.161:0
TDP Discovery Sources:
    Interfaces:
        ATM0/1/0: xmit/recv
            TDP Id: 172.20.40.164:1
        ATM0/0/0.10: xmit/recv
            TDP Id: 172.20.40.163:1
```

Table 18-63 show tag-switching tdp discovery Field Descriptions

Field	Description
Local TDP Identifier	TDP identifier for the local switch. A TDP identifier is a 6-byte quantity displayed as *IP address:number*. The Cisco convention is to use a switch identification for the first 4 bytes of the TDP identifier, and integers starting with 0 for the last 2 bytes.
Interfaces	Interfaces engaging in TDP discovery activity: xmit indicates that the interface is transmitting TDP discovery Hello packets; recv indicates that the interface is receiving TDP discovery Hello packets.

Related Commands

Command	Decription
show tag-switching tdp neighbor	Displays the status of TDP sessions.

show tag-switching tdp neighbor

To display the status of TDP sessions, use the **show tag-switching tdp neighbor** privileged EXEC command.

show tag-switching tdp neighbor [*ip-addres type card/subcard/port*] [**detail**]

Syntax Description

ip-address	Specifies the IP address of the neighbor.
type	Specifies one of the interface types listed in Table 18-64.
card/subcard/port	Specifies the card, subcard, and port number of the interface.
detail	Displays detailed TDP neighbor information by interface.

Defaults

Displays information about all TDP neighbors.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

The neighbor information branch can give information about all TDP neighbors or can be limited to the following:

- The neighbor with a specific IP address
- TDP neighbors accessible over a specific interface

Displays information about the requested interface or all interfaces where tag switching is enabled.

Table 18-64 Interface Types for the show tag-switching tdp neighbor Command

Type	Description
atm	Specifies the ATM interface.
atm-p	Specifies the ATM pseudo interface.
cbr	Specifies the CBR interface.
ethernet	Specifies the Ethernet interface (0).
null	Specifies the null interface.
serial	Specifies the serial interface.
tunnel	Specifies the tunnel interface.

Examples

The following example shows the display from the **show tag-switching tdp neighbor** command.

```
Switch# show tag-switching tdp neighbor
Peer TDP Ident: 1.0.12.12:2; Local TDP Ident 1.0.11.11:2
        TCP connection: 1.0.12.12.11008 - 1.0.11.11.711
        State: Oper; PIEs sent/rcvd: 2199/2198; Downstream on demand
        Up time: 02:31:58
        TDP discovery sources:
          ATM0/0/1
Peer TDP Ident: 1.0.12.12:8; Local TDP Ident 1.0.11.11:7
        TCP connection: 1.0.12.12.11015 - 1.0.11.11.711
        State: Oper; PIEs sent/rcvd: 2119/2130; Downstream on demand
        Up time: 02:31:39
        TDP discovery sources:
          ATM0/1/0.19
Peer TDP Ident: 1.0.12.12:7; Local TDP Ident 1.0.11.11:6
        TCP connection: 1.0.12.12.11016 - 1.0.11.11.711
        State: Oper; PIEs sent/rcvd: 2120/2119; Downstream on demand
        Up time: 02:31:38
        TDP discovery sources:
          ATM0/1/0.18
```

Table 18-65 show tag-switching tdp neighbor Field Descriptions

Field	Description
Peer TDP Ident	TDP identifier of the neighbor (peer) for this session.
Local TDP Ident	TDP identifier for the local tag switch for this session.
TCP connection	Specifies the TCP connection used to support the TDP session. The format for displaying the TCP connection is: *peer I address.peer port* *local IP address.local port*
State	State of the TDP session. Generally this is Oper (operational); or transient.
PIEs sent/rcvd	Number of TDP PIEs sent to and from the session peer, including transmission and receipt of periodic keepalive PIEs required to maintain the TDP session.
Downstream	Indicates that the downstream method of tag distribution is being used for this TDP session. When this method is being used, a tag switch advertises all of its locally assigned (incoming) tags to its TDP peer (subject to any configured access list restrictions).
Downstream on demand	Indicates that the downstream on-demand method of tag distribution is being used for this TDP session. When this method is being used, a tag switch advertises its locally assigned (incoming) tags to its TDP peer only when the peer asks for them.
Up time	Length of time the TDP session has existed.
TDP Discovery Sources	Source(s) of TDP discovery activity that led to the establishment of this TDP session.
Addresses bound to peer TDP Ident	The known interface addresses of the TDP session peer. These are addresses that might appear as “next hop” addresses in the local routing table, and are used to maintain the TFIB.

Related Commands

Command	Description
show tag-switching tdp discovery	Displays the status of the TDP discovery process.

show tag-switching tdp parameters

To display available TDP parameters, use the **show tag-switching tdp parameters** privileged EXEC command.

show tag-switching tdp parameters

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example shows the display from the **show tag-switching tdp parameters** command.

```
Switch# show tag-switching tdp parameters
Protocol version: 1
 No tag pool for downstream tag distribution
 Session hold time: 15 sec; keep alive interval: 5 sec
 Discovery hello: holdtime: 15 sec; interval: 5 sec
 Discovery directed hello: holdtime: 15 sec; interval: 5 sec
```

Related Commands

Command	Description
tag-switching tdp holdtime	Configures the hold time for a TDP session.

show tag-switching tsp-tunnels

To display TSP tunnel status and configuration, use the **show tag-switching tsp tunnels** privileged EXEC command.

show tag-switching tsp-tunnels [*ip-address* | **all** | **head** | **middle** | **tail** | **remote**} [*tunnel-interface-num*]] [**brief**]

Syntax Description

ip-address	Specifies an IP address that restricts the display to TSP tunnels originating at this IP address.
all	Restricts the display to TSP tunnels that originate, transit, or terminate locally.
head	Restricts the display to TSP tunnels that originate at the node.
middle	Restricts the display to TSP tunnels that transit through the node.
tail	Restricts the display to TSP tunnels that terminate at the node.
remote	Restricts the display to TSP tunnels originating elsewhere. This is, in effect, a combination of **middle** and **tail**.
tunnel-interface-num	The interface number part of the TSP tunnel identifier. See "Usage Guidelines."
brief	Displays TSP tunnels using a format of one line per tunnel.

Defaults

Displays all TSP tunnels through the node.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

Each TSP tunnel has a globally unique identifier that is used when signalling the TSP tunnel. This identifier, available at each hop, is the combination of the originating IP address (*ip-address*) and the interface number of the tunnel interface (*tunnel-interface-num*) used to configure the TSP tunnel at the head end.

Examples

The following example is sample output from the **show tag-switching tsp-tunnels** command.

```
Switch# show tag-switching tsp-tunnels
Signalling Summary:
            TSP Tunnels Process:            running
            RSVP Process:                   running
            Forwarding:                     enabled
TUNNEL ID               DESTINATION      STATUS           CONNECTION
10.106.0.6 0            10.2.0.12        up               up
```

Related Commands

Command	Description
tag-switching tsp-tunnels	Enables support for TSP tunnel negotiation.

show tcp

To display the status of TCP connections, use the **show tcp** EXEC command.

Catalyst 8540 MSR

show tcp [*line-number*] {**brief** | **console** | **vty**}

Catalyst 8510 MSR and LightStream 1010

show tcp [*line-number*] {**aux** | **brief** | **console** | **vty**}

Syntax Description

line-number	Absolute line number of the line for which you want to display the Telnet connection status.
brief	Keyword used to limit the display of information.
console	Keyword used to display the primary terminal line.
vty	Keyword used to display the virtual terminal.
aux	(Catalyst 8510 MSR and LightStream 1010) Line number on which to execute the chat script. If a line number is not specified, the current line number is chosen. If the specified line is busy, the script is not executed and an error message appears. This command is not optional if you specify a *dialer-string*. If the *dialer-string* argument is specified, aux 0 must be entered. This command functions only on physical terminal (tty) lines. It does not function on virtual terminal (vty) lines.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Examples

The following example is sample output from the **show tcp** command.

```
Switch# show tcp
con0 (console terminal), connection 1 to host MATHOM
Connection state is ESTAB, I/O status: 1, unread input bytes: 1
Local host: 172.30.7.18, 33537 Foreign host: 192.31.7.17, 23
Enqueued packets for retransmit: 0, input: 0, saved: 0
Event Timers (current time is 2043535532):
Timer:       Retrans   TimeWait    AckHold    SendWnd   KeepAlive
Starts:           69          0         69          0           0
Wakeups:           5          0          1          0           0
Next:     2043536089          0          0          0           0
iss: 2043207208 snduna: 2043211083 sndnxt: 2043211483    sndwnd: 1344
irs: 3447586816 rcvnxt: 3447586900 rcvwnd:       2144 delrcvwnd:   83
RTTO: 565 ms, RTV: 233 ms, KRTT: 0 ms, minRTT: 68 ms, maxRTT: 1900 ms
```

```
ACK hold: 282 ms
Datagrams (max data segment is 536 bytes):
Rcvd: 106 (out of order: 0), with data: 71, total data bytes: 83
Sent: 96 (retransmit: 5), with data: 92, total data bytes: 4678
```

Table 18-66 describes the following lines of output shown in the display.

```
con0 (console terminal), connection 1 to host MATHOM
Connection state is ESTAB, I/O status: 1, unread input bytes: 1
Local host: 172.30.7.18, 33537 Foreign host: 192.31.7.17, 23
Enqueued packets for retransmit: 0, input: 0, saved: 0
```

Table 18-66 show tcp Field Descriptions—First Section of Output

Field	Description
con0	Number identifying the line (console terminal) and location string.
connection 1	Number identifying the TCP connection.
to host MATHOM	Name of the remote host to which the connection has been made. Connection state is ESTAB. A connection progresses through a series of states during its lifetime. A connection progresses through these states in the following order: • LISTEN—Waiting for a connection request from any remote TCP and port. • SYNSENT—Waiting for a matching connection request after having sent a connection request. • SYNRCVD—Waiting for a confirming connection request acknowledgment after having both received and sent a connection request. • ESTAB—Indicates an open connection; data received can be delivered to the user. This is the normal state for the data transfer phase of the connection. • FINWAIT1—Waiting for a connection termination request from the remote TCP or an acknowledgment of the connection termination request previously sent. • FINWAIT2—Waiting for a connection termination request from the remote TCP host.

Table 18-66 show tcp Field Descriptions—First Section of Output (continued)

Field	Description
to host MATHOM (Continued)	• CLOSEWAIT—Waiting for a connection termination request from the local user. • CLOSING—Waiting for a connection termination request acknowledgment from the remote TCP host. • LASTACK—Waiting for an acknowledgment of the connection termination request previously sent to the remote TCP host. • TIMEWAIT—Waiting for enough time to pass to be sure the remote TCP host has received the acknowledgment of its connection termination request. • CLOSED—Indicates no connection state at all. For more information, refer to RFC 793, Transmission Control Protocol functional specification.
I/O status: 1	Number describing the current internal status of the connection.
unread input bytes:1	Number of bytes that the lower-level TCP processes read, but the higher-level TCP processes have not yet processed.
Local host: 192.31.7.18	IP address of the network server. 33537 local port number, as derived from the following equation: *line-number* + (512 * *random-number*). (The line number uses the lower nine bits; the other bits are random.)
Foreign host: 192.31.7.17	IP address of the remote host to which the TCP connection has been made.
23	Destination port for the remote host.
Enqueued packets for retransmit: 0	Number of packets waiting on the retransmit queue. These are packets on this TCP connection that were sent but not acknowledged by the remote TCP host.
input: 0	Number of packets that are waiting on the input queue to be read by the user.
saved: 0	Number of received out-of-order packets that are waiting for all packets comprising the message to be received before they enter the input queue. For example, if packets 1, 2, 4, 5, and 6 were received, packets 1 and 2 enter the input queue, and packets 4, 5, and 6 enter the saved queue.

Examples

The following lines of output show the current time according to the system clock of the local host.

```
Event Timers (current time is 2043535532):
The time shown is the number of milliseconds since the system started.
```

The following lines of output display the number of times that various local TCP timeout values were reached during this connection. In this example, the local host retransmitted 69 times because it received no response from the remote host, and it transmitted an acknowledgment many more times because there was no data on which to piggyback.

```
Timer:        Retrans   TimeWait    AckHold    SendWnd   KeepAlive
Starts:            69          0         69          0           0
Wakeups:            5          0          1          0           0
Next:      2043536089          0          0          0           0
```

Table 18-67 describes the fields in the preceding lines of output.

Table 18-67 show tcp Field Descriptions—Second Section of Output

Field	Description
Timer:	Names of the timers in the display.
Starts:	Number of times the timer has been started during this connection.
Wakeups:	Number of keepalives transmitted without receiving any response. (This field is reset to zero when a response is received.)
Next:	System clock setting that triggers the next time this timer goes off.
Retrans	Retransmission interval time TCP packets that were not acknowledged and are waiting for retransmission.
TimeWait	TimeWait timer ensures that the remote system receives a request to disconnect a session.
AckHold	Acknowledgment timer delays the sending of acknowledgments to the remote TCP in an attempt to reduce network use.
SendWnd	Send Window timer ensures that there is no closed window due to a lost TCP acknowledgment.
KeepAlive	KeepAlive timer controls the transmission of test messages to the remote TCP to ensure that the interface has not been broken without the local TCP's knowledge.

Examples

The following lines of output display the sequence numbers that TCP uses to ensure sequenced, reliable transport of data. The local host and remote host each use these sequence numbers for flow control and to acknowledge receipt of datagrams. Table 18-68 describes the specific fields in the following lines of output.

```
iss: 2043207208 snduna: 2043211083 sndnxt: 2043211483    sndwnd: 1344
irs: 3447586816 rcvnxt: 3447586900 rcvwnd:       2144 delrcvwnd:   83
```

Table 18-68 show tcp Field Descriptions—Sequence Number

Field	Description
iss: 2043207208	Initial send sequence number.
snduna: 2043211083	Last send sequence number the local host sent for which it has not received an acknowledgment.
sndnxt: 2043211483	Sequence number the local host is sending next.
sndwnd: 1344	TCP window size of the remote host.
irs: 3447586816	Initial receive sequence number.
rcvnxt: 3447586900	Last receive sequence number the local host has acknowledged.
rcvwnd: 2144	Local host's TCP window size.
delrcvwnd: 83	Delayed receive window—The data the local host has read from the connection but has not yet subtracted from the receive window that the host has advertised to the remote host. The value in this field gradually increases until it is larger than a full-sized packet, at which point it is applied to the rcvwnd field.

Examples

The following lines of output display values that the local host uses to track transmission times so that TCP can adjust to the network it is using.

Table 18-69 describes the fields in the following line of output.

```
RTTO: 565 ms, RTV: 233 ms, KRTT: 0 ms, minRTT: 68 ms, maxRTT: 1900 ms
ACK hold: 282 ms
```

Table 18-69 show tcp Field Descriptions—Line Beginning with RTTO

Field	Description
RTTO: 565 ms	Round-trip timeout.
RTV: 233 ms	Variance of the round-trip time.
KRTT: 0 ms	New round-trip timeout (using the Karn algorithm). This field separately tracks the round-trip time of packets that were retransmitted.
minRTT: 68 ms	Smallest recorded round-trip timeout (hard-wired value used for calculation).
maxRTT: 1900 ms	Largest recorded round-trip timeout.
ACK hold: 282 ms	Time the local host delays an acknowledgment in order to piggyback data on it.

For more information on these fields, refer to "Round Trip Time Estimation," P. Karn & C. Partridge, ACM SIGCOMM-87, August 1987.

Table 18-70 describes the fields in the following lines of output.

```
Datagrams (max data segment is 536 bytes):
Rcvd: 106 (out of order: 0), with data: 71, total data bytes: 83
Sent: 96 (retransmit: 5), with data: 92, total data bytes: 4678
```

Table 18-70 show tcp Field Descriptions—Last Section of Output

Field	Description
Rcvd: 106 (out of order: 0)	Number of datagrams the local host has received during this connection (and the number of these datagrams that were out of order).
with data: 71	Number of these datagrams that contained data.
total data bytes: 83	Total number of bytes of data in these datagrams.
Sent: 96 (retransmit: 5)	Number of datagrams the local host sent during this connection (and the number of these datagrams that had to be retransmitted).
with data: 92	Number of these datagrams that contained data.
total data bytes: 4678	Total number of bytes of data in these datagrams.

show tech-support

To show information about the switch router for use when contacting technical support, use the **show tech-support** EXEC configuration command.

show tech-support [**page**] [**password**] [**ipmulticast** | **rsvp**]

Syntax Description

page	Pages through output.
password	Includes passwords in output.
ipmulticast	Displays IP multicast-related information.
rsvp	Displays RSVP-related information.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

Use the **show tech-support** to gather information about the current software image, configuration, controllers, counters, stacks, interfaces, memory, and buffers.

The output from this command contains a lot of information. Use the **page** option to control the amount of information presented on the screen. When you use the **page** option, pressing the space bar displays the next page of information.

Examples

The following example is sample output from the **show tech-support** EXEC command. Not all the information from this command is in the example.

```
Switch# show tech-support page
------------------ show version ------------------

Cisco Internetwork Operating System Software
IOS (tm) XXXXXX WA4-x Software (XXXXXX-WP-M), Version x.x(x.x)WA4(x.x)
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Mon 19-Jan-98 02:41 by
Image text-base: 0x60010910, data-base: 0x605B8000

ROM: System Bootstrap, Version 11.2(1.4.WA3.0) [integ 1.4.WA3.0], RELEASE SOFTWARE

Switch uptime is 4 days, 20 hours, 38 minutes
System restarted by reload
System image file is "slot0:xxxxxx-wp-mz.113-0.8.TWA4.1.30", booted via slot0:

cisco xxx (R4600) processor with 65536K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
1 Ethernet/IEEE 802.3 interface(s)
22 ATM network interface(s)
123K bytes of non-volatile configuration memory.
```

```
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x100


------------------ show running-config ------------------


Building configuration...

Current configuration:
!
version xx.x
no service pad
no service udp-small-servers
no service tcp-small-servers
!
hostname Switch
!
enable password <removed>
!
ip host-routing
!
atm e164 translation-table
!
atm threshold-group 5 max-cells 50000
atm abr-mode efci
atm address 47.0091.8100.0000.0040.0b0a.2a81.0040.0b0a.2a81.00
atm router pnni
 node 1 level 80 lowest peer-group-identifier 80:47.01B1.0000.0000.0000.0000.000
0
  parent 2
  redistribute atm-static
  election leadership-priority 205
 node 2 level 72 peer-group-identifier 72:B7.809A.0000.0000.0000.0000.0000
   aggregation-mode link CBR     aggressive
!
!
interface ATM0/0/0
 no ip address
 loopback pif
 tag-switching ip
!
interface ATM0/0/1
 no ip address
 atm pvp 51
 ntp broadcast client
!
interface ATM0/0/1.51 point-to-point
!
interface ATM0/0/2
 no ip address
!
interface ATM0/0/3
 no ip address
!
interface ATM0/1/0
 --More--
```

show terminal

To obtain information about the terminal configuration parameter settings for the current terminal line, use the **show terminal** EXEC command.

show terminal

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Examples

The following example is sample output from the **show terminal** command.

```
Switch# show terminal
Line 0, Location: "", Type: ""
Length: 24 lines, Width: 80 columns
Status: Ready, Active
Capabilities: none
Modem state: Ready
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
                ^^x    none   -     -       none
Timeouts:      Idle EXEC    Idle Session   Modem Answer  Session   Dispatch
               00:10:00        never                        none     not set
                            Idle Session Disconnect Warning
                              never
Modem type is unknown.
Session limit is not set.
Time since activation: 00:23:38
Editing is enabled.
History is enabled, history size is 10.
DNS resolution in show commands is enabled
Full user help is disabled
Allowed transports are telnet.  Preferred is telnet.
No output characters are padded
No special data dispatching characters
```

Table 18-71 describes the fields in the first two lines of **show terminal** output.

Table 18-71 show terminal Field Descriptions—First Two Lines of Output

Field	Description
Line 0	Current terminal line.
Location: ""	Location of the current terminal line, as specified using the **location** line configuration command.
Type: ""	Type of the current terminal line, as specified using the **line** global configuration command.

Table 18-71 show terminal Field Descriptions—First Two Lines of Output (continued)

Field	Description
Length: 24 lines	Length of the terminal display.
Width: 80 columns	Width of the terminal display, in character columns.

The following line of output indicates the status of the line.

```
Status: Ready, Active
```

Table 18-72 describes the possible values for the Status field.

Table 18-72 show terminal Field Description—Status Field

Field	Description
Active	A process is actively using the line.
Autobauding	The line is running the autobaud process.
Carrier Dropped	Some sense of "carrier" was dropped, and the line process should be stopped.
Connected	The line has at least one active connection.
Input Stopped	The input was turned off because of hardware flow control or overflow.
No Exit Banner	The normal exit banner is not displayed on this line.
Ready	The line state is "ready."
SLIP Mode	The line is running SLIP or PPP.

The following line of output indicates the status of the capabilities of the line. These capabilities correspond closely to configurable parameters that can be set using configuration commands.

```
Capabilities: Enabled
```

Table 18-73 describes the possible values for the Capabilities field.

Table 18-73 show terminal Field Descriptions—Capabilities Field

Field	Description
Autobaud Full Range	Corresponds to the **autobaud** command.
Enabled	The user is successfully "enabled."
EXEC Suppressed	Corresponds to the **no exec** command.
Hangup on Last Close	Corresponds to the **autohangup** command.
Notification Set	Corresponds to the **notify** command.
Output Non-Idle	Corresponds to the **session-timeout** command.

The following line of output indicates the modem state. Possible values include Autobauding, Carrier Dropped, Hanging Up, Idle, and Ready.

```
Modem state: Ready
```

The following lines of output indicate the special characters that can be entered to activate various terminal operations. The none or hyphen (-) values imply that no special characters are set.

```
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
                ^^x    none   -     -       none
```

The following lines of output indicate the timeout values that were configured for the line.

```
Timeouts:      Idle EXEC    Idle Session   Modem Answer  Session   Dispatch
                never          never         0:00:15      not imp   not set
```

Table 18-74 describes the fields in the preceding lines of output.

Table 18-74 show terminal Field Descriptions—Timeouts Fields

Field	Description
Idle EXEC	Interval that the EXEC command interpreter waits for user input before resuming the current connection; or if no connections exist, returning the terminal to the idle state and disconnecting the incoming session. This interval is set using the **exec-timeout** command.
Idle Session	Interval that the software waits for traffic before closing the connection to a remote computer and returning the terminal to an idle state. This interval is set using the **session-timeout** command.
Modem Answer Session	Not implemented.
Dispatch	Number of milliseconds the software waits after putting the first character into a packet buffer before sending the packet. This interval is set using the **dispatch-timeout** command.

The following lines of output indicate how various options were configured.

```
Session limit is not set.
Allowed transports are telnet rlogin. Preferred is telnet
No output characters are padded
```

show users

To display information about the active lines on the switch router, use the **show users** EXEC command.

show users [**all**]

Syntax Description

all	Specifies that all lines be displayed, regardless of whether anyone is using them.

Command Modes

EXEC

Command History

Release	Modification
11.2(5)	New command

Usage Guidelines

This command displays the line number, connection name, idle time, and terminal location.

Examples

In the following two examples, the asterisk (*) indicates the current terminal session.

The following example is sample output from the **show users** command.

```
Switch# show users
       Line            User             Host(s)         Idle Location
       0 con 0                          idle
*      2 vty 0         jim              idle             0   GRUMPY.CISCO.COM
```

Catalyst 8540 MSR

The following example is sample output from the **show users all** command.

```
Switch# show users all
     Line        User           Host(s)       Idle  Location
*    0 vty 0     jim            idle         0    GRUMPY.CISCO.COM
     1 vty 1
     2 con 0
     3 vty 2
```

Catalyst 8510 MSR and LightStream 1010

The following example is sample output from the **show users all** command.

```
Switch# show users all
     Line        User           Host(s)       Idle  Location
*    0 vty 0     jim            idle         0    GRUMPY.CISCO.COM
     1 vty 1
     2 con 0
     3 aux 0
     4 vty 2
```

Table 18-75 describes the significant fields shown in the displays.

Table 18-75 show users Field Descriptions

Field	Description
Line	The first subfield (0 in the example output) is the absolute line number and contains three subfields. The second subfield (vty) indicates the type of line. Possible values are: • con—Console • aux—Auxiliary port (Catalyst 8510 MSR and LightStream 1010) • tty—Asynchronous terminal port • vty—Virtual terminal • The third subfield (0 in the example output) indicates the relative line number within the type.
User	User using the line. If no user is listed in this field, the line is idle.
Host(s)	Host to which the user is connected (outgoing connection). A value of “idle” means that there is no outgoing connection to a host.
Idle	Interval (in minutes) since the user had an entry.
Location	Either the hard-wired location for the line or, if there is an incoming connection, the host from which the incoming connection came.

show vc

To display active virtual circuits (PVCs, SVCs, and soft VCs), use the **show vc** EXEC command.

Catalyst 8540 MSR

show vc [*interface* {**atm** *card/subcard/port* [*vpi vci*] | **serial** *card/subcard/port*[**.***channel#*] [*dlci*]}]

Catalyst 8510 MSR and LightStream 1010

show vc [*interface* {**atm** *card/subcard/port* [*vpi vci*]| **serial** *card/subcard/port*[**:***n*] [*dlci*]}]

Syntax Description

interface	Specifies an interface type, either **atm** or **serial**.
atm	Specifies an ATM interface.
card/subcard/port	Specifies the card, subcard, and port number for the serial interface. (Catalyst 8540 MSR)
vpi vci	Virtual path identifier and virtual channel identifier to display.
serial	Specifies a serial interface.
.*channel#*	Channel group identifier for the serial interface. (Catalyst 8540 MSR)
dlci	Specifies the data-link connection identifier.
:n	serial interface number. (Catalyst 8510 MSR and LightStream 1010)

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command can be used to display a summary of all VCs in the system or on an interface, or to display the details of a particular VC. The interface specified can either be an ATM or Frame Relay interface, and the VC specified can be an ATM or a Frame Relay VC.

Examples

The following example displays the details of a specific ATM VC.

```
Switch# show vc interface atm 1/1/0 0 99
Interface: ATM1/1/0, Type: ds3suni
VPI = 0  VCI = 99
Status: UP
Connection-type: PVC
Cast-type: point-to-point
Usage-Parameter-Control (UPC): pass
Packet-discard-option: disabled
Time-since-last-status-change: 00:02:54
Wrr weight: 32
```

```
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states:  Not-applicable
Cross-connect-interface: Serial3/0/0:1, Type: FRPAM-SERIAL
Cross-connect-DLCI = 99
Threshold Group: 3, Cells queued: 0
Rx cells: 0, Tx cells: 0
Tx Clp0:0,  Tx Clp1: 0
Rx Clp0:0,  Rx Clp1: 0
Rx Upc Violations:0, Rx cell drops:0
Rx Clp0 q full drops:0, Rx Clp1 qthresh drops:0
Rx connection-traffic-table-index: 100
Rx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)
Rx pcr-clp01: 81
Rx scr-clp0 : 81
Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx       mbs: 50
Tx connection-traffic-table-index: 100
Tx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)
Tx pcr-clp01: 81
Tx scr-clp0 : 81
Tx mcr-clp01: none
Tx      cdvt: none
Tx       mbs: 50
```

Examples

The following example shows the last explicit-path status for a soft VC along with the accumulated aggregate administrative weight for the full path.

```
Switch# show vc interface atm 0/1/3 0 42
Interface:ATM0/1/3, Type:oc3suni
VPI = 0  VCI = 42
Status:UP
Connection-type:SoftVC
Cast-type:point-to-point
Usage-Parameter-Control (UPC):pass
Packet-discard-option:disabled
Time-since-last-status-change:2d22h
 Soft vc location:Source
 Remote ATM address:47.0091.8100.0000.1060.705b.d900.4000.0c81.9000.00
 Remote VPI:0
 Remote VCI:42
 Soft vc call state:Active
 Number of soft vc re-try attempts:0
 First-retry-interval:5000 milliseconds
 Maximum-retry-interval:60000 milliseconds
 Aggregate admin weight:40080
 TIME STAMPS:
 Current Slot:4
  Outgoing Setup     March 30 13:44:28.543
  Incoming Release   March 30 13:44:28.999
  Outgoing Setup     March 30 13:44:33.999
  Incoming Connect   March 30 13:44:34.031

 Explicit-path 1:result=1  PNNI_SUCCESS  (chicago.path1)
 Only-explicit
Number of OAM-configured connections:0
OAM-configuration:disabled
OAM-states: Not-applicable
Cross-connect-interface:ATM0/0/3, Type:oc3suni
Cross-connect-VPI = 0
Cross-connect-VCI = 35
```

```
Cross-connect-UPC:pass
Cross-connect OAM-configuration:disabled
Cross-connect OAM-state: Not-applicable
Rx cells:0, Tx cells:0
Rx connection-traffic-table-index:1
Rx service-category:UBR (Unspecified Bit Rate)
Rx pcr-clp01:7113539
Rx scr-clp01:none
Rx mcr-clp01:none
Rx      cdvt:1024 (from default for interface)
Rx       mbs:none
Tx connection-traffic-table-index:1
Tx service-category:UBR (Unspecified Bit Rate)
Tx pcr-clp01:7113539
Tx scr-clp01:none
Tx mcr-clp01:none
Tx      cdvt:none
Tx       mbs:none
```

Examples

Catalyst 8540 MSR

The following example displays all the VCs in a system.

```
Switch# show vc
Interface      Conn-Id    Type   X-Interface     X-Conn-Id   Encap  Status
ATM0/0/0          0/5      PVC     ATM0              0/45     QSAAL    DOWN
ATM0/0/0          0/16     PVC     ATM0              0/35     ILMI     DOWN
ATM0/0/1          0/5      PVC     ATM0              0/46     QSAAL    DOWN
ATM0/0/1          0/16     PVC     ATM0              0/36     ILMI     DOWN
ATM0/0/2          0/5      PVC     ATM0              0/47     QSAAL    UP
ATM0/0/2          0/16     PVC     ATM0              0/37     ILMI     UP
ATM0/0/2          0/18     PVC     ATM0              0/54     PNNI     UP
ATM0/0/3          0/5      PVC     ATM0              0/48     QSAAL    DOWN
ATM0/0/3          0/16     PVC     ATM0              0/38     ILMI     DOWN
ATM0/1/0          0/5      PVC     ATM0              0/49     QSAAL    DOWN
ATM0/1/0          0/16     PVC     ATM0              0/39     ILMI     DOWN
ATM0/1/1          0/5      PVC     ATM0              0/50     QSAAL    DOWN
ATM0/1/1          0/16     PVC     ATM0              0/40     ILMI     DOWN
ATM0/1/2          0/5      PVC     ATM0              0/51     QSAAL    DOWN
ATM0/1/2          0/16     PVC     ATM0              0/41     ILMI     DOWN
ATM0/1/3          0/5      PVC     ATM0              0/52     QSAAL    DOWN
ATM0/1/3          0/16     PVC     ATM0              0/42     ILMI     DOWN
ATM0              0/35     PVC     ATM0/0/0          0/16     ILMI     DOWN
ATM0              0/36     PVC     ATM0/0/1          0/16     ILMI     DOWN
ATM0              0/37     PVC     ATM0/0/2          0/16     ILMI     UP
ATM0              0/38     PVC     ATM0/0/3          0/16     ILMI     DOWN
ATM0              0/39     PVC     ATM0/1/0          0/16     ILMI     DOWN
Interface      Conn-Id    Type   X-Interface     X-Conn-Id   Encap  Status
ATM0              0/40     PVC     ATM0/1/1          0/16     ILMI     DOWN
ATM0              0/41     PVC     ATM0/1/2          0/16     ILMI     DOWN
ATM0              0/42     PVC     ATM0/1/3          0/16     ILMI     DOWN
ATM0              0/43     PVC     ATM-SEC0          0/29     IPC      DOWN
ATM0              0/44     PVC     ATM-SEC0          0/16     ILMI     DOWN
ATM0              0/45     PVC     ATM0/0/0          0/5      QSAAL    DOWN
ATM0              0/46     PVC     ATM0/0/1          0/5      QSAAL    DOWN
ATM0              0/47     PVC     ATM0/0/2          0/5      QSAAL    UP
ATM0              0/48     PVC     ATM0/0/3          0/5      QSAAL    DOWN
ATM0              0/49     PVC     ATM0/1/0          0/5      QSAAL    DOWN
ATM0              0/50     PVC     ATM0/1/1          0/5      QSAAL    DOWN
ATM0              0/51     PVC     ATM0/1/2          0/5      QSAAL    DOWN
ATM0              0/52     PVC     ATM0/1/3          0/5      QSAAL    DOWN
ATM0              0/53     PVC     ATM-SEC0          0/5      QSAAL    DOWN
```

```
ATM0                0/54      PVC      ATM0/0/2            0/18      PNNI      UP
ATM-SEC0            0/5       PVC      ATM0                0/53      QSAAL     DOWN
ATM-SEC0            0/16      PVC      ATM0                0/44      ILMI      DOWN
ATM-SEC0            0/29      PVC      ATM0                0/43      IPC       DOWN
```

Examples

Catalyst 8510 MSR and LightStream 1010

The following example displays all the VCs in a system.

```
Switch1# show vc
Interface      Conn-Id    Type   X-Interface     X-Conn-Id   Encap  Status
ATM0/0/0          0/5      PVC     ATM2/0/0          0/49     QSAAL    DOWN
ATM0/0/0          0/16     PVC     ATM2/0/0          0/35     ILMI     DOWN
ATM0/0/0          0/18     PVC     ATM2/0/0          0/73     PNNI     DOWN
ATM0/0/1          0/5      PVC     ATM2/0/0          0/50     QSAAL    DOWN
ATM0/0/1          0/16     PVC     ATM2/0/0          0/36     ILMI     DOWN
ATM0/0/2          0/5      PVC     ATM2/0/0          0/51     QSAAL    DOWN
ATM0/0/2          0/16     PVC     ATM2/0/0          0/37     ILMI     DOWN
ATM0/0/3          0/5      PVC     ATM2/0/0          0/52     QSAAL    DOWN
ATM0/0/3          0/16     PVC     ATM2/0/0          0/38     ILMI     DOWN
ATM2/0/0          0/47     PVC     ATM1/1/0          0/16     ILMI     UP
ATM2/0/0          0/48     PVC     ATM1/1/1          0/16     ILMI     DOWN
ATM2/0/0          0/49     PVC     ATM0/0/0          0/5      QSAAL    DOWN
ATM2/0/0          0/61     PVC     ATM1/1/0          0/5      QSAAL    UP
ATM2/0/0          0/62     PVC     ATM1/1/1          0/5      QSAAL    DOWN
Interface      Conn-Id    Type   X-Interface     X-Conn-Id   Encap  Status
ATM2/0/0          0/63     PVC     ATM-P3/0/0        0/32     LSIPC    UP
ATM2/0/0          0/64     PVC     ATM-P3/0/0        0/39     LSIPC    UP
ATM2/0/0          0/65     PVC     ATM-P3/0/0        0/33     IWFLMI   UP
ATM2/0/0          0/66     PVC     ATM-P3/0/0        0/34     IWFLMI   UP
ATM2/0/0          0/67     PVC     ATM-P3/0/0        0/37     IWFLMI   UP
ATM2/0/0          0/68     PVC     ATM-P3/0/0        0/48     IWFLMI   UP
ATM2/0/0          0/69     PVC     ATM-P3/0/0        0/35     IWFLMI   UP
ATM2/0/0          0/70     PVC     ATM0/1/2          0/18     PNNI     UP
ATM2/0/0          0/71     PVC     ATM1/0/1          0/18     PNNI     UP
ATM2/0/0          0/72     PVC     ATM0/1/3          0/18     PNNI     UP
ATM2/0/0          0/73     PVC     ATM0/0/0          0/18     PNNI     DOWN
Serial3/0/0:1     44       SoftVC  Serial3/0/0:2      55              UP
```

The following example displays the summary of VCs on a serial interface.

```
Switch# show vc interface serial 3/0/0:1
Interface      Conn-Id    Type   X-Interface     X-Conn-Id   Encap  Status
Serial3/0/0:1     44       SoftVC  Serial3/0/0:2      55              UP
Serial3/0/0:1     66       SoftVC  ATM1/1/0          0/66             UP
Serial3/0/0:1     99       PVC     ATM1/1/0          0/99             UP
```

The following example displays the summary of VCs on an ATM interface

```
Switch1# show vc interface atm 1/1/0
Interface      Conn-Id    Type   X-Interface     X-Conn-Id   Encap  Status
ATM1/1/0          0/5      PVC     ATM2/0/0          0/61     QSAAL    UP
ATM1/1/0          0/16     PVC     ATM2/0/0          0/47     ILMI     UP
ATM1/1/0          0/66     SoftVC  Serial3/0/0:1      66              UP
ATM1/1/0          0/99     PVC     Serial3/0/0:1      99              UP
```

Examples

The following example displays the details of a particular Frame Relay VC.

```
Switch# show vc interface serial 3/0/0:1 44
Interface: Serial3/0/0:1, Type: FRPAM-SERIAL
DLCI = 44     Status : ACTIVE
Connection-type: SoftVC
Cast-type: point-to-point
Usage-Parameter-Control (UPC): tag-drop
pvc-create-time : 00:05:36      Time-since-last-status-change : 00:05:34
Interworking Function Type : network
de-bit Mapping : map-clp-or-de       clp-bit Mapping : map-de
Soft vc location: Source
Remote ATM address: 47.0091.8100.0000.00e0.1e79.8803.4000.0c81.8020.00
Remote DLCI : 55
Soft vc call state: Active
Number of soft vc re-try attempts: 0
Slow-retry-interval: 60 seconds
Aggregate admin weight: 0
ATM-P Interface: ATM-P3/0/0, Type: ATM-PSEUDO
ATM-P VPI = 18  ATM-P VCI = 12
ATM-P Connection Status: UP
Cross-connect-interface: Serial3/0/0:2, Type: FRPAM-SERIAL
Cross-connect-DLCI = 55
tx Frames : 0   Rx Frames : 0
tx Bytes : 0    Rx Bytes : 0
tx Frames Discarded : 0         Rx Frames Discarded : 0
tx Bytes Discarded  : 0         Rx Bytes Discarded  : 0
Rx connection-traffic-table-index: 100
Rx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)
Rx pir: 64000
Rx cir: 64000
Rx Bc : 32768
Rx Be : 32768
Tx connection-traffic-table-index: 100
Tx service-category: VBR-NRT (Non-Realtime Variable Bit Rate)
Tx pir: 64000
Tx cir: 64000
Tx Bc : 32768
Tx Be : 32768
```

Related Commands

Command	Description
atm pvcc	Used to create a PVC.
frame-relay pvc	Used to create a Frame Relay-to-ATM network interworking or to service interworking PVC or Frame-Relay- to-Frame Relay cross-connected PVC.
frame-relay soft-vc	Used to create Frame Relay soft PVCs on the switch.
show atm interface	Displays ATM-specific information about an ATM interface.
show atm status	Displays current information about ATM interfaces and the number of installed connections.
show atm vc	Displays the ATM layer connection information about the virtual connection.
show atm vc signalling	Shows the ATM VC signalling activity.

show version

To display the system hardware configuration, software version, and names and sources of configuration files and boot images, use the **show version** EXEC command.

show version

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification

Examples

The following example is sample output from the **show version** command.

```
Switch# show version
Cisco Internetwork Operating System Software
IOS (tm) XXXXXX WA4-x Software (XXXXXX-WP-M), Version x.x(x.x)WA4(x.x)
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Mon 19-Jan-98 02:41 by
Image text-base: 0x60010910, data-base: 0x605B8000

ROM: System Bootstrap, Version 11.2(1.4.WA3.0) [integ 1.4.WA3.0], RELEASE SOFTWARE

Switch uptime is 4 days, 20 hours, 38 minutes
System restarted by reload
System image file is "slot0:xxxxxx-wp-mz.113-0.8.TWA4.1.30", booted via slot0:

cisco xxx (R4600) processor with 65536K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
1 Ethernet/IEEE 802.3 interface(s)
22 ATM network interface(s)
123K bytes of non-volatile configuration memory.

8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x100
```

Table 18-76 describes the significant fields shown in the display.

Table 18-76 show version Field Descriptions

Field	Description
Software version 11.2	You should always specify the complete version number when reporting a possible software problem. In the example output, the version number is 11.2.
System Bootstrap, Version	Bootstrap version string.

Table 18-76 show version Field Descriptions (continued)

Field	Description
Current date and time Boot date and time Switch uptime is	Current date and time, the date and time the system was last booted, and *uptime*, or the length of time the system has been up and running.
System restarted by reload	Also displayed is a log of how the system was last booted, as a result of normal system startup or system error. For example, information can be displayed to indicate a bus error that is generally the result of an attempt to access a nonexistent address, as follows: "System restarted by bus error at PC 0xC4CA, address 0x210C0C0".
Running default software	If the software is booted over the network, the Internet address of the boot host is shown. If the software is loaded from onboard ROM, this line reads "running default software." The names and sources of the host and network configuration files are also shown.

The output of the **show version** EXEC command also provides certain messages, such as bus error messages. If such error messages appear, report the complete text of this message to your technical support specialist.

CHAPTER 19

T Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

tag-switching atm allocation-mode

To control the mode used for handling tag binding requests on TC ATM interfaces, use the **tag-switching atm allocation-mode** global configuration command. To set the allocation mode to its default, use the **no** form of this command.

tag-switching atm allocation-mode {**optimistic** | **conservative**}

no tag-switching atm allocation-mode {**optimistic** | **conservative**}

Syntax Description

optimistic	Tag binding is returned immediately and packets are discarded until the downstream setup is complete.
conservative	Waits until the tag VC is set up downstream before returning a tag binding.

Defaults

conservative

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)	New command

Examples

The following example sets the mode for handling binding requests to **optimistic** on TC ATM interfaces.

```
Switch# configure terminal
Switch(config)# tag-switching atm allocation-mode optimistic
```

tag-switching atm control-vc

To configure the VPI/VCI to be used for the initial link to the tag switching peer, use the **tag-switching atm control-vc** interface configuration command. This control VC is used to establish the TDP session and carry non-IP traffic. To set the control VPI/VCI to the default, use the **no** form of this command.

tag-switching atm control-vc *vpi vci*

no tag-switching atm control-vc *vpi vci*

Syntax Description

vpi	Virtual path identifier, in the range of 0 to 255.
vci	Virtual channel identifier, in the range of 1 to 65535.

Defaults

0/32

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

On a VP tunnel, the default VPI is the tunnel number and the default VCI is 32.

Examples

The following example shows how to select VPI 1 and VCI 34 as the control VC.

```
Switch# configure terminal
Switch(config)# interface atm 3/0/1
Switch(config-if)# tag-switching ip
Switch(config-if)# tag-switching atm control-vc 1 34
```

Related Commands

Command	Description
tag-switching ip (interface)	Enables tag switching of IPv4 packets on an interface.

tag-switching atm vc-merge

To control whether VC-merge (multipoint-to-point VCs) is supported for unicast tag VCs, use the **tag-switching atm vc-merge** global configuration command. To disable this feature, use the **no** form of this command.

tag-switching atm vc-merge

no tag-switching atm vc-merge

Syntax Description

This command has no keywords or arguments.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

This feature is enabled by default.

Examples

Because this feature is enabled by default, it is not necessary to issue the **tag-switching atm vc-merge** command. However, to disable VC merge, you must enter the **no** form of the command.

```
Switch# configure terminal
Switch(config)# no tag-switching atm vc-merge
```

Related Commands

Command	Description
show tag-switching atm-tdp bindings	Displays the requested entries from the ATM TDP tag binding database.
show tag-switching atm-tdp capability	Displays the ATM TDP tag capabilities for all interfaces.

tag-switching atm vpi

To configure the range of values to use in the VPI field for tag VCs, use the **tag-switching atm vpi** interface configuration command. To clear the interface configuration, use the **no** form of this command.

tag-switching atm vpi *vpi* [**-** *vpi*]

no tag-switching atm vpi

Syntax Description

vpi	Low end of the VPI range (0 to 255).
- *vpi*	High end of the VPI range (2 to 255).

Defaults

1 **-** 1

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

The value will be negotiated with its peer.

You cannot enter a VPI range on a VP tunnel; the VPI is the PVP number of the tunnel.

If the TDP neighbor is a router, the VPI range cannot be larger than 2; for example, from 5 to 6 (a range of 2), not 5 to 7 (a range of 3).

Examples

The following example shows you how to select a VPI range from 5 to 6.

```
Switch# configure terminal
Switch(config)# interface atm 3/0/1
Switch(config-if)# tag-switching ip
Switch(config-if)# tag-switching atm vpi 5 - 6
```

tag-switching ip (global)

To allow tag switching of IPv4 packets, use the **tag-switching ip** global configuration command. To disable IP tag switching across all interfaces, use the **no** form of this command.

tag-switching ip

no tag-switching ip

Syntax Description

This command has no keywords or arguments.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

Dynamic tag switching (that is, the distribution of tags based on routing protocols) is allowed by this optional command, but is not actually enabled until the interface-level **tag-switching ip** command is issued on at least one interface.

The **no** form of this command stops the distribution of dynamic tags and the sending of outgoing tagged packets on all interfaces. The sending of tagged packets on TSP tunnels is not affected by this command.

For TC ATM, the **no** form of this command prevents tag VCs beginning at, terminating at, or passing through the platform.

Examples

The following example shows how to enable the distribution of dynamic tags on all interfaces.

```
Switch# configure terminal
Switch(config)# tag-switching ip
```

Related Commands

Command	Description
tag-switching ip (interface)	Enables tag switching of IPv4 packets on an interface.

tag-switching ip (interface)

To enable tag switching of IPv4 packets on an interface, use the **tag-switching ip** interface configuration command. To disable IP tag switching on an interface, use the **no** form of this command.

tag-switching ip

no tag-switching ip

Syntax Description

This command has no keywords or arguments.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

The first time this command is issued on any interface, dynamic tag switching is enabled on the entire switch router. TDP Hellos are issued on this interface. When an outgoing tag for a destination routed out through this interface is received, packets sent to that destination are tagged as outgoing.

The **no** form of this command causes packets routed out through this interface to be sent as untagged, and outgoing TDP Hellos are no longer sent.

When the **no** form is issued on the only interface for which tag switching is enabled, dynamic tag switching is disabled on the entire switch router.

For TC ATM, the **no** form of this command prevents tag VCs beginning at, terminating at, or passing through the interface.

Examples

In the following example, tag switching is enabled on ATM interface 1/1/0.

```
Switch# configure terminal
Switch(config)# interface atm 1/1/0
Switch(config-if)# tag-switching ip
```

Related Commands

Command	Description
tag-switching atm allocation-mode	Controls the mode used for handling tag binding requests on TC ATM interfaces.
tag-switching ip (global)	Enables tag switching of IPv4 packets.

tag-switching tdp discovery

To configure the interval between transmission of TDP discovery Hello messages and the hold time for a TDP transport connection, use the **tag-switching tdp discovery** global configuration command. To set the interval and hold time to their defaults, use the **no** form of this command.

tag-switching tdp discovery {**hello** | **directed-hello**} {**holdtime** | **interval**} *seconds*

tag-switching tdp discovery {**hello** | **directed-hello**} {**holdtime** | **interval**}

Syntax Description

hello	Intervals and hold times for directly connected neighbors.
directed-hello	Intervals and hold times for neighbors that are not directly connected; for example, TDP sessions that run over a TSP tunnel.
holdtime	Interval for which a connection stays up if no Hello messages are received. The default is 15 seconds.
interval	Period between sending Hello messages. The default is 5 seconds.
seconds	Hold time or interval, in the range of 1 to 2147483647.

Defaults

See "Syntax Description."

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)	New command

Examples

In the following example, the interval for which a connection stays up if no Hello packets are received is set to 5 seconds.

```
Switch# configure terminal
Switch(config)# tag-switching tdp discovery hello holdtime 5
```

Related Commands

Command	Description
show tag-switching interfaces	Displays information about interfaces that have tag switching enabled.
show tag-switching atm-tdp summary	Displays summary information on ATM tag bindings.
show tag-switching tdp parameters	Displays available TDP parameters.

tag-switching tdp holdtime

To configure the hold time for a TDP session, use the **tag-switching tdp holdtime** global configuration command. To set the hold time to the default, use the **no** form of this command.

tag-switching tdp holdtime *seconds*

Syntax Description

seconds	The time, in seconds, that a TDP session is maintained in the absence of TDP messages from the session peer (1 to 2147483647).

Defaults

15 seconds

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

When a TDP session is initiated, the hold time is negotiated to the lower of the values configured at the two ends.

This command configures the hold time determined by this tag switch.

Examples

The following example configures the hold time of TDP sessions to 30 seconds.

```
Switch# configure terminal
Switch(config)# tag-switching tdp holdtime 30
```

Related Commands

Command	Description
show tag-switching tdp parameters	Displays available TDP parameters.

tag-switching tsp-tunnels

To enable support for TSP tunnel negotiation, use the **tag-switching tsp-tunnels** global configuration command or interface configuration command. To disable support for TSP tunnel negotiation, use the **no** form of this command.

tag-switching tsp-tunnels

no tag-switching tsp-tunnels

Syntax Description

This command has no keywords or arguments.

Defaults

Disabled

Command Modes

Global configuration
Interface configuration

Command History

Release	Modification
11.3(3a)	New command

Usage Guidelines

Enabling TSP tunnel negotiation using the **tag-switching tsp-tunnels** command in the interface configuration mode has no effect unless the command is also issued in the global configuration mode.

Examples

The following example shows how to enable TSP tunnel negotiation globally, then enable it at the interface.

```
Switch# configure terminal
Switch(config)# tag-switching tsp-tunnels
Switch(config)# interface atm 1/1/1
Switch(config-if)# tag-switching tsp-tunnels
```

Related Commands

Command	Description
show tag-switching tsp-tunnels	Displays TSP tunnel status and configuration.

tftp-server

To specify that the switch or Flash device operates as a TFTP server, use the **tftp-server** global configuration commands. To remove a previously defined filename, use the **no** form of this command with the appropriate filename.

tftp-server *device***:***filename* [**alias** *name*] [*ip-access-list*]

no tftp-server *device***:***filename* [**alias** *name*] [*ip-access-list*]

Syntax Description

*device***:**	Specifies TFTP service of a file on a memory device. The colon (**:**) is required. Valid devices include the following: • **bootflash:** This device is the internal Flash memory. • **slot0:** This device is the first PC slot on the route processor card. • **slot1:** This device is the second PC slot on the route processor card. • **nvram:** This device is nonvolatile random-access memory.
filename	Name of a file that the TFTP server uses in answering TFTP Read Requests.
alias	Specifies an alternate name for the file that the TFTP server uses in answering TFTP Read Requests.
ip-access-list	IP access list of requesting hosts.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

You can specify multiple filenames by repeating the **tftp-server** command. The system sends a copy of the system image contained in memory to any client that issues a TFTP Read Request with this filename.

If the specified *filename* exists in memory, a copy of the image is sent.

Images that run from ROM cannot be loaded over the network. Therefore, you should not use TFTP to offer the ROMs on these images.

The system sends a copy of the file to any client that issues a TFTP Read Request with its filename.

Examples

In the following example, the system uses TFTP to send a copy of the *version-11.1* file located in Flash memory in response to a TFTP Read Request for that file. The requesting host is checked against access list 22.

```
Switch# configure terminal
Switch(config)# tftp-server flash version-11.1 22
```

In the following example, the system uses TFTP to send a copy of the *version-11.1.4* file in response to a TFTP Read Request for that file. The file is located on the Flash memory card inserted in slot 0 of the route processor card.

```
Switch# configure terminal
Switch(config)# tftp-server flash slot0:version-11.1.4
```

Related Commands

Command	Description
access-list (extended)	Defines an extended IP access list. Currently, this command only supports the IP host.

timer

To configure the PNNI timers, use the **timer** PNNI node configuration command. To return to the default values, use the **no** form of this command.

timer [**ack delay** *tenths-of-seconds*] [**called-integrity** *seconds*] [**calling-integrity** *seconds*] [**hello-holddown** *tenths-of-seconds*] [**hello-interval** *seconds*] [**hrz-link-inactivity** *seconds*] [**inactivity-factor** *number*] [**retransmit-interval** *seconds*]

no timer [**ack delay**] [**called-integrity**] [**calling-integrity**] [**hello-holddown**] [**hello-interval**] [**hrz-link-inactivity**] [**inactivity-factor**] [**retransmit-interval**]

Syntax Description

ack-delay	Specifies the waiting period before sending an accumulated PTSE acknowledgment packet. The default is 1 second.
called-integrity	Specifies the value used to initialize the SVC integrity timer at the node that accepts an LGN-to-LGN SVC RCC originated by a neighbor node. The default is 50 seconds.
calling-integrity	Specifies the value used to initialize the SVC integrity timer at the node that initiates an LGN-to-LGN SVC RCC. The SVC integrity timer determines how long this node waits for an SVC-based RCC to reach the two-way inside state before releasing it. The default is 35 seconds.
hello-holddown	Specifies the hold-down period for event-triggered Hellos. This is mainly used for Hello packets between outside neighbors. The default is 1 second.
hello-interval	Specifies the frequency, in seconds, at which Hello packets are transmitted. The default is 15 seconds.
hrz-link-inactivity	Specifies the length of time that this node continues to advertise a horizontal link for which it has not received and processed an LGN horizontal link extension information group piggybacked onto an SVC-RCC Hello packet. The default is 120 seconds.
inactivity-factor	Specifies the dead-interval time (the period after which a neighbor is declared down if no Hello is received) as a factor of the Hello interval. The default is 5 seconds.
retransmit-interval	Specifies the waiting period before retransmitting a PTSE, PTSE request, or database summary packet. The default is 5 seconds.

Defaults

See "Syntax Description."

Command Modes

PNNI node configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Decreasing the **hello-interval** allows PNNI to detect neighbor nodes that have stopped functioning more quickly. The **inactivity-factor** is used as a multiplier of the **hello interval** in received Hello packets to determine the dead interval, the time after which the neighbor node is declared down if no Hello packets are received. The **inactivity-factor** can be increased on unreliable interfaces to avoid false alarms.

Decreasing the **retransmit-interval** causes retransmission to increase when a PNNI packet gets lost. However, this increases the risk of unnecessarily retransmitting PNNI packets that are delayed but actually reach the neighbor. Increasing **ack-delay** causes more PTSEs to be acknowledged in one **ack** packet. Lowering **hello-holddown** allows another Hello packet to be sent shortly after one was sent. To avoid an overload in switch processing, you should adjust these parameters carefully.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following script shows how to change the **hello-interval to 5 seconds.**

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)# timer hello-interval 5
```

Related Commands

Command	Description
show atm pnni local-node	Displays information about a PNNI logical node running on the switch.

traceroute (user)

To trace the IP routes the packets actually take when traveling from the switch to their destination, use the **traceroute** EXEC command.

traceroute [*protocol*] [*destination*]

Syntax Description

protocol	Protocol that can be used is **ip**.
destination	Destination address or host name on the command line. The default parameters for the appropriate protocol are assumed, and the tracing action begins.

Defaults

The *protocol* argument is based on the switch router's examination of the format of the *destination* argument. For example, if the switch router finds a destination in IP format, the protocol defaults to **ip**.

Command Modes

EXEC

Command History

Release	Modification
12.0(10)W5(18)	Re-introduced into this manual. (Was previously in the LightStream 1010 Command Reference only.)

Usage Guidelines

The **traceroute** command works by taking advantage of the error messages generated by switch routers when a datagram exceeds its TTL value.

The **traceroute** command starts by sending probe datagrams with a TTL value of 1. This causes the first switch router to discard the probe datagram and send back an error message. The **traceroute** command sends several probes at each TTL level and displays the round-trip time for each.

The **traceroute** command sends out one probe at a time. Each outgoing packet may result in one or two error messages. A "time exceeded" error message indicates that an intermediate switch router detected and discarded the probe. A "destination unreachable" error message indicates that the destination node received and discarded the probe because it could not deliver the packet. If the timer goes off before a response comes in, **traceroute** prints an asterisk(*).

The **traceroute** command terminates when the destination responds, when the maximum TTL is exceeded, or when the user interrupts the trace with the escape sequence. By default, to invoke the escape sequence, enter **^X**.

Common Trace Problems

Due to bugs in the IP implementation of various hosts and switches, the **IP trace** command may behave in unexpected ways.

Not all destinations respond correctly to a probe message by sending back an "ICMP port unreachable" message. A long sequence of TTL levels with only asterisks, terminating only when the maximum TTL is reached, may indicate this problem.

There is a known problem with the way some hosts handle an "ICMP TTL exceeded" message. Some hosts generate in ICMP message, but they reuse the TTL of the incoming packet. Since this is zero, the ICMP packets do not make it back. When you trace the path to such a host, you may see a set of TTL values with asterisks (*). Eventually, the TTL gets high enough that the "ICMP" message can get back. For example, if the host is 6 hops away, **traceroute** times out in responses 6 through 11.

Examples

The following example displays sample IP **traceroute** output when a destination host name is specified:

```
Switch# traceroute ip ABA.NYC.mil

Type escape sequence to abort.
Tracing the route to ABA.NYC.mil (26.0.0.73)
        1 DEBRIS.CISCO.COM (131.108.1.6) 1000 msec 8 msec 4 msec
        2 BARRNET-GW.CISCO.COM (131.108.16.2) 8 msec 8 msec 8 msec
        3 EXTERNAL-A-GATEWAY.STANFORD.EDU (192.42.110.225) 8 msec 4 msec 4 msec
        4 BB2.SU.BARRNET.NET (131.119.254.6) 8 msec 8 msec 8 msec
        5 SU.ARC.BARRNET.NET (131.119.3.8) 12 msec 12 msec 8 msec
        6 MOFFETT-FLD-MB.in.MIL (192.52.195.1) 216 msec 120 msec 132 msec
        7 ABA.NYC.mil (26.0.0.73) 412 msec 628 msec 664 msec
```

Table 19-1 describes the fields shown in the display.

Table 19-1 Trace Field Descriptions

Field	Description
1	Indicates the sequence number of the switch router in the path to the host.
DEBRIS.CISCO.COM	Host name of this switch router.
131.108.1.61	IP address of this switch router.
1000 msec 8 msec 4 mesc	Round-trip time for each of the three probes that are sent.

Table 19-2 describes the characters that can appear in **traceroute** output.

Table 19-2 IP Trace Text Characters

Character	Description
nn msec	For each node, the round-grip time in milliseconds for the specified number of probes.
*	The probe timed out.
?	Unknown packet type.
Q	Source quench.
P	Protocol unreachable.
N	Network unreachable.
U	Port unreachable.
H	Host unreachable.

Related Commands

Command	Description
traceroute (privileged)	See Appendix D.

transit-restricted

To indicate to the network that this node does not allow calls to transit through, use the **transit-restricted** PNNI node configuration command. To allow calls to transit through the node, use the **no** form of this command.

transit-restricted

no transit-restricted

Syntax Description

This command has no keywords or arguments.

Defaults

Enabled

Command Modes

PNNI node configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

This command enables the network administrator to prevent connections from transiting nodes that only originate or terminate connections, for example, low-end edge switches that do not have the capacity to support transit calls.

For more information, refer to the *ATM Switch Router Software Configuration Guide*.

Examples

The following script shows how to access the **transit-restricted** PNNI node configuration command.

```
Switch# configure terminal
Switch(config)# atm router pnni
Switch(config-atm-router)# node 1
Switch(config-pnni-node)# transit-restricted
```

Related Commands

Command	Description
show atm pnni local-node	Displays information about a PNNI logical node running on the switch.

t1 framing

To configure T1 framing mode, use the **t1 framing** controller configuration command.

t1 *line-number* **framing** {**esf** | **sf**}

Syntax Description

line-number	Specifies a T1 line, from 1 to 28.
esf	Specifies that extended super frame is used as the T1 framing type.
sf	Specifies that super frame is used as the T1 framing type.

Defaults

esf

Command Modes

Controller configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

Use the **t1 framing** controller configuration command to specify the framing mode used by the t1 line.

Examples

The following example sets the framing mode on the t1 interface on line 1 to **esf** and on line 2 to **sf**.

```
Switch# configure terminal
Switch(config)# controller t3 3/1/0
Switch(config-controller)# t1 1 framing esf
Switch(config-controller)# t1 2 framing sf
```

t1 yellow

To configure T1 autoalarm detection and generation, use the **t1 yellow** controller configuration command. To disable autoalarm detection and generation, use the **no** form of this command.

t1 *line-number* **yellow** {**generation** | **detection**}

Syntax Description

line-number	Specifies a T1 line, from 1 to 28.
generation	Generates yellow alarms.
detection	Detects yellow alarms.

Defaults

Yellow alarms are detected and generated on the T1 channel.

Command Modes

Controller configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

A yellow alarm indicates a loss of frame alignment at the remote end. Use the **t1 yellow** command to turn the generation or detection of yellow alarms on or off.

Note If you use the **t1 framing** command to select the **sf** framing mode, you should consider turning off alarm detection because the yellow alarms might be detected incorrectly with **sf** framing enabled.

Examples

The following example enables autoalarm detection.

```
Switch# configure terminal
Switch# (config)# controller t3 1/1/0
Switch# (config-controller)# t1 1 yellow detection
```

Related Commands

Command	Description
show controllers	Displays information about a physical port device.

CHAPTER 20

U Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

username

To establish a username-based authentication system at login, even though your network cannot support a TACACS service, use the **username** global configuration command.

username *name* [**access-class** *access-class-num*]
username *name* [**autocommand** *command*]
username *name* [**callback-dialstring** *dialstring*] [**callback-line** *line*] [**callback-rotary** *group*]

[**nocallback-verify**]
username *name* [**noescape**] [**nohangup**]
username *name* [**dnis**] [**nopassword** | **password** [*encryption-type*] *password*]
username *name* **privilege** *level*

Syntax Description

name	Specifies the username to which this command applies. The *name* argument can only be one word. White spaces and quotation marks are not allowed.
access-class-num	Specifies an outgoing access list that overrides the access list specified in the **access-class** line configuration command; used for the duration of that session.
command	Specifies a command to be issued automatically after the user logs in. When the command is complete, the session is terminated. Because the command can be any length and contain embedded spaces, commands using the **autocommand** keyword must be the last option on the line.
dialstring	Specifies a dialback string for connections initiated by the user.
line	Specifies a line to associate with this callback.
group	Specifies a rotary group to associate with this callback.
nocallback-verify	Does not require authentication after callback.
noescape	Prevents a user from using an escape character on the host where the user is connected.
nohangup	Prevents the communication server from disconnecting the user after an automatic command (set up with the **autocommand** keyword) is complete. Instead, the user gets another login prompt.
dnis	No password is required for this user when obtained via DNIS.
nopassword	No password is required for this user to log in. This is usually most useful in combination with the **autocommand** keyword.
encryption-type	A one-digit number that defines whether the text immediately following is encrypted, and what type of encryption is used. Currently defined encryption types are 0 (the text immediately following is not encrypted), and 7 (the text is encrypted using an encryption algorithm defined by Cisco).
password	A password can contain embedded spaces and must be the last option specified in the **username** command.
level	Sets the user privilege level.

Command Modes

Global configuration

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

The **username** command provides username/password authentication for login purposes only.

Note The **username** command does not provide username/password authentication for enable mode when the **enable use-tacacs** command is also used.)

Multiple **username** commands can be used to specify options for a single user.

Add a **username** entry for each remote system that the local switch communicates with and requires authentication from. The remote device must have a **username** entry for the local switch router. This entry must have the same password as the local switch's entry for that remote device.

This command can be useful for defining usernames that get special treatment, for example, an "info" username that does not require a password but connects the user to a general-purpose information service.

The **username** command is also required as part of the configuration for the CHAP. For each remote system that requires authentication from the local switch communicates, add a **username** entry.

Note To enable the local switch to respond to remote CHAP challenges, one **username** *name* entry must be the same as the **hostname** *name* entry that was already assigned to your switch.

If there is no *secret* specified and **debug serial-interface** is enabled, an error is displayed when an interface is established and the CHAP challenge is not implemented. Debugging information on CHAP is available using the **debug serial-interface** and **debug serial-packet** commands. For more information about **debug** commands, refer to the *Debug Command Reference* publication.

Examples

To implement a service similar to the UNIX **who** command, which can be entered at the login prompt and lists the current users of the switch, the **username** command takes the following form.

```
Switch# username who nopassword nohangup autocommand show users
```

To implement an information service that does not require a password, the command takes the following form.

```
Switch# username info nopassword noescape autocommand telnet nic.ddn.mil
```

To implement an ID that works even if all TACACS servers go down, the command takes the following form.

```
Switch# username superuser password superpassword
```

The following example configuration enables CHAP on interface serial 0. It also defines a password for local server *Adam* and remote server *Eve*.

```
Switch# configure terminal
Switch(config)# hostname Adam
Switch(config)# interface serial 0
Switch(config-if)# encapsulation ppp
Switch(config-if)# ppp authentication chap
Switch(config-if)# end
Switch(config)# username Adam password oursystem
Switch(config)# username Eve password theirsystem
```

When you look at your configuration file, the passwords are encrypted and the display looks similar to the following output.

```
Switch# configure terminal
Switch(config)# hostname Adam
Switch(config)# interface serial 0 encapsulation ppp
Switch(config-if)# ppp authentication chap
Switch(config-if)# end
Switch(config)# username Adam password 7 1514040356
Switch(config)# username Eve password 7 121F0A18
```

Related Commands

Command	Description
hostname	Cisco IOS command removed from this manual.

CHAPTER 21

V Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

verify

To verify the checksum of a file on a Flash device, use the **verify** EXEC command. This command replaces the **copy verify** and **copy verify flash** commands.

verify [*device***:**]*filename*

Syntax Description

device:	Device containing the file whose checksum is being verified. The colon (**:**) is required. Valid devices are as follows: • **bootflash:** This device is the internal Flash memory. • **sec-bootflash**: The secondary internal Flash memory on the redundant route processor. • **slot0:** The first PC slot on the route processor card and is the initial default device. • **sec-slot0:** The first PC slot on the redundant route processor card. (Catalyst 8540 MSR) • **slot1:** The second PC slot on the route processor card. • **sec-slot1:** The second PC slot on the redundant route processor card. (Catalyst 8540 MSR) When you omit this argument, the system verifies the checksum of the specified file on the current working device.
filename	Name of a file on the specified Flash device. The file can be of any type. The maximum filename length is 63 characters.

Defaults

The current working device is the default device.

Command Modes

EXEC

Command History

Release	Modification
11.1(4)	New command

Usage Guidelines

Use the **verify** command to verify the checksum of a file before using it. When you omit the *device***:** argument, the system verifies the checksum of the specified file on the current working device.

Examples

The following example shows how to get information and verify the *test-image* file using the **dir** and **verify** commands.

```
Switch# dir bootflash:
-#- -length- -----date/time------ name
1   1699295  Dec 25 1927 17:53:24 b.Z
2   1382     Dec 25 1927 17:54:33 test-file
3   1382     Dec 25 1927 17:55:28 test-file3
4   1385     Dec 25 1927 17:56:11 test-file4
5   2200823  Dec 25 1927 17:58:56 test-image
6   1382     Dec 26 1927 10:28:42 test-file2

3695748 bytes available (3906428 bytes used)

Switch# verify bootflash:test-image
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
File bootflash:test-image verified OK
```

Related Commands

Command	Description
cd	Cisco IOS command removed from this manual.
copy flash	Copies a file from Flash memory to another destination.
ip rcmd remote-username	Cisco IOS command removed from this manual.
purge	Cisco IOS command removed from this manual.
show flash	Displays the layout and contents of Flash memory.

CHAPTER 22

Y Commands

The commands shown in this chapter apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Where an entire command or certain attributes of a command have values specific to a particular switch or switch router, an exception is indicated by the following callouts:

- Catalyst 8540 MSR
- Catalyst 8510 MSR and LightStream 1010

Note Commands that are identical to those documented in the Cisco IOS software documentation have been removed from this chapter.

Note Commands that no longer function as expected in ATM environments have also been removed from this chapter.

Refer to Appendix D of this command reference for a detailed list of commands that have been removed, changed or replaced.

yellow (Catalyst 8510 MSR and LightStream 1010)

To enable the functionality of generation and detection of the yellow alarm in the system, use the **yellow** interface configuration command. To disable the functionality, use the **no** form of this command.

yellow {**generation** | **detection**}

no yellow {**generation** | **detection**}

Syntax Description

generation	If set, yellow alarm is generated in the event of frame loss.
detection	If set, yellow alarm is detected in the event of the remote end experiencing frame loss and transmitting yellow.

Defaults

Both generation and detection are enabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(3c)W5(9)	New command

Usage Guidelines

If the received signal has been lost the yellow alarm should be generated to indicate a frame loss event, thus ensuring that the alarm is sent to the remote end.

When the remote end is transmitting a yellow alarm indicating a frame loss event, the yellow alarm detection must be enabled to detect the alarm condition.

Disable the yellow alarm generation and detection depending upon the circumstances. Enabling yellow detection would be useless if the remote end has yellow generation disabled.

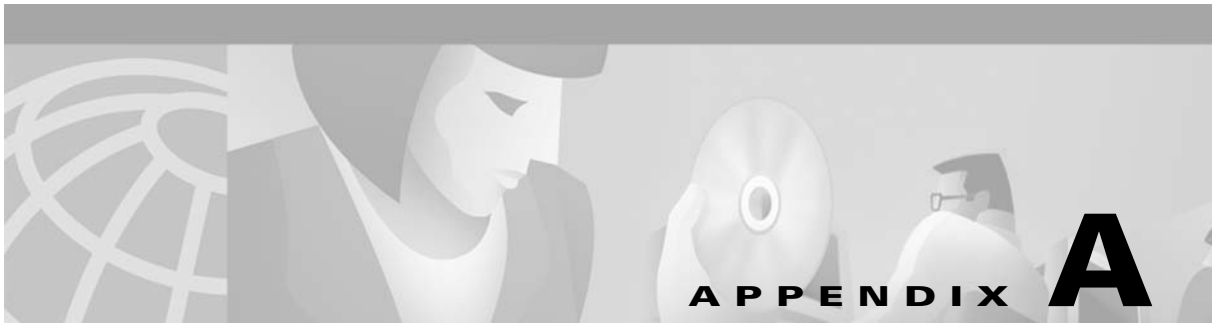
Examples

The following example shows how to enable the generation and detection of yellow alarm.

```
Switch(config)# interface atm 0/1/0
Switch(config-if)# yellow generation
Switch(config)# interface atm 0/1/0
Switch(config-if)# yellow detection
```

The following examples shows how to disable the generation and detection of yellow alarm.

```
Switch(config)# interface atm 0/1/0
Switch(config-if)# no yellow generation
Switch(config)# interface atm 0/1/0
Switch(config-if)# no yellow detection
```



APPENDIX A

Acronyms

The acronyms in this appendix apply to the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. Table A-1 lists the acronyms used in this publication, along with their definitions.

Table A-1 List of Acronyms

Acronym	Definition
AAA	authentication, authorization, and accounting
AAL	ATM adaptation layer
ABR	available bit rate
ACK	acknowledgment
ACO	audible cutoff
ACR	allowed cell rate
ADM	Add Drop Multiplexer
AESA	ATM End System Address
AESO	Auxiliary Extended Security Option
AFI	authority and format identifier
AGG	aggregate
AIS	alarm indication signal
AMI	alternate mark inversion
ANSI	American National Standards Institute
API	Application Programming Interface
ARAP	AppleTalk Remote Access Protocol
ARP	Address Resolution Protocol
ARPA	Advanced Research Projects Agency
ATD IE	ATM Traffic Descriptor Information Element
ATM	Asynchronous Transfer Mode
ATM-P	ATM Pseudo interface
B8ZS	binary 8-zero substitution
Bc	Committed Burst
BECN	backward explicit congestion notification
BER	bit error rate
BIP	bit interleaved parity
BISDN	Broadband Integrated Services Digital Network

Table A-1 List of Acronyms (continued)

Acronym	Definition
BITS	building integrated timing supply
BOOTP	Bootstrap Protocol
CAC	connection admission control
CAS	channel associated signalling
CBR	constant bit rate
CD	Carrier Detect
CDP	Cisco Discovery Protocol
CDS3	channelized digital signal level 3
CDV	cell delay variation
CDVT	cell delay variation tolerance
CE1	channelized E1
CES	circuit emulation service
CES-IWF	CES interworking function
CHAP	Challenge Handshake Authentication Protocol
CIR	committed information rate
CLNS	Connectionless Network Service
CLP	cell loss priority
CLR	cell loss ratio
CPU	Central Processing Unit
CRC	cyclic redundancy check
CTC	common transmit clocking
CTD	cell transfer delay
CTT	Connection Traffic Table
CUG	closed user group
DCA	Defense Communications Agency
DCC	Data Country Code
DCE	data communications equipment
DE	discard eligible
DFI	Domain Specific Part Format Identifier
DLCI	data-link connection identifier
DNIS	Distributed Network Information Services
DNS	Domain Name System
DTL	designated transit list
EFCI	Explicit Forward Congestion Indication
EPD	early packet discard
ESI	end system identifier or end-station identifier
ESO	Extended Security Option
FC-PCQ	feature card per-connection queueing (Catalyst 8510 MSR and LightStream 1010)
FC-PFQ	feature card per-flow queueing (Catalyst 8510 MSR and LightStream 1010)
FDL	facility data link
FEBE	far-end block errors
FECN	forward explicit congestion notification
FPGA	field-programmable gate array
FRC	frame redundancy check

Table A-1 List of Acronyms (continued)

Acronym	Definition
GCRA	generic cell rate algorithm
HDB3	line code type used on E1 circuits
ICD	International Code Designator
ICMP	Internet Control Message Protocol
ICP	IMA Control Protocol
IE	information element
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IGRP	Interior Gateway Routing Protocol
IISP	Interim-Interswitch Signalling Protocol
ILMI	Interim Local Management Interface (UNI 3.1) *or* Integrated Local Management Interface (UNI 4.0)
IMA	inverse multiplexing over ATM
IME	interface management entity
IP	Internet Protocol
IPSO	IP Security Option
ITC	independent transmit clocking
ITU-T	International Telecommunications Union Telecommunication Standardization Sector
LANE	LAN Emulation
LEC	LAN Emulation Client
LECS	LAN Emulation Configuration Server
LGN	logical group node
LLC2	Logical Link Control, type 2
LMI	Local Management Interface
MAC	Media Access Control
MBS	maximum burst size
MCR	minimum cell rate
MDL	maintenance data link
MIB	Management Information Base
MMF	multimode fiber
MOP	Maintenance Operation Protocol
MSC	modular switch controller
MSR	multiservice ATM switch router
MTU	maximum transmission unit
mux	multiplexing device
NCDP	Network Clock Distribution Protocol
NCP	Network Control Protocol or Network Control Program
NLESO	Network Level Extended Security Option
NNI	Network-to-Network Interface
NSAP	network service access point
NTP	Network Time Protocol
NVRAM	nonvolatile random-access memory
OAM	Operation, Administration, and Maintenance
OIR	online insertion and removal
OSF	oversubscription factor

Table A-1 List of Acronyms (continued)

Acronym	Definition
PCI	protocol control information
PCR	peak cell rate
PDU	protocol data unit
PGL	peer group leader
PIE	protocol information element
PIF	port interface
ping	packet internet groper
PLCP	physical layer convergence procedure
PLD	programmable logic device
PNNI	Private Network-Network Interface or Private Network Node Interface
POS	packet over SONET
PPP	Point-to-Point Protocol
PRI	Primary Rate Interface
PSTN DDR	Public Switched Telephone Network dial-on-demand routing
PTSE	PNNI topology state element
PTSP	PNNI topology state packet
PVC	permanent virtual circuit
PVCC	permanent virtual channel connection
PVCL	permanent virtual channel link
PVP	permanent virtual path
PVPC	permanent virtual path connection
PVPL	permanent virtual path link
QOS	quality of service
QSAAL	Q.2931 protocol over signalling ATM adaptation layer
RARP	Reverse Address Resolution Protocol
RCC	routing control channels
rcp	remote copy protocol
RDI	remote defect indication
RIF	Routing Information Field
RM	resource management
RMON	Remote Monitoring
ROM	read-only memory
rsh	remote shell protocol
RST	reset
RSVP	Resource Reservation Protocol
SAP	service access point
SCR	sustainable cell rate
SCRMF	Sustained Cell Rate Margin Factor
SD	sequential data
SDU	service data unit
SGCP	Simple Gateway Control Protocol
SLIP	Serial Line Internet Protocol
SNAP	Subnetwork Access Protocol
SNMP	Simple Network Management Protocol

Table A-1 List of Acronyms (continued)

Acronym	Definition
SONET	Synchronous Optical Network
SPE	synchronous payload envelope
SPVC	soft permanent virtual circuit
SPVP	soft permanent virtual path
SSCOP	Service Specific Connection Oriented Protocol
SSE	silicon switching engine
SSRP	Simple Server Redundancy Protocol
SVC	switched virtual circuit
SVCC	switched virtual circuit connection
SVP	switched virtual path
SVPC	switched virtual path connection
TACACS	Terminal Access Controller Access Control System
TBR	tag bit rate
TC	tag-controlled
TCA	threshold crossing alarm
TCP	Transmission Control Protocol
TDP	Tag Distribution Protocol
TFIB	Tag Forwarding Information Base
TFTP	Trivial File Transfer Protocol
ToS	type of service
TSP	tag-switched path *or* topology state packet
TTL	Time To Live
TVC	tag VC
UART	Universal Asynchronous Receiver/Transmitter
UBR	unspecified bit rate
UDP	User Datagram Protocol
UNI	User-Network Interface
UPC	usage parameter control
UTC	Coordinated Universal Time
VBR	variable bit rate
VBR-NRT	variable bit rate non-real time
VBR-RT	variable bit rate-real time
VC	virtual channel
VCC	virtual channel connection
VCD	virtual circuit descriptor
VCI	virtual channel identifier
VCL	virtual channel link
VLAN	virtual LAN
VP	virtual path
VPC	virtual path connection
VPI	virtual path identifier
VPL	virtual path link
WDM	wave division multiplexing
WRR	weighted round-robin

APPENDIX **B**

References and Recommended Reading

This appendix contains the following lists of publications related to networks and networking:

- Books and periodicals
- Technical publications and standards
- RFCs supported by Cisco

Books and Periodicals

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Cisco-Supported RFCs

Table B-1 lists the RFCs supported by the Cisco Internetwork Operating System (Cisco IOS) software as of Cisco IOS Release 11.0, in descending numerical order. RFCs that have been superseded or replaced are identified, as are RFCs that are partially supported or supported only from Software Release 9.21 forward.

Table B-1 Cisco-Supported Requests for Comments

Standard Number		Standard Title
RFC 1695		AToM MIB
RFC 1661		PPP (Point-to-Point Protocol)
RFC 1654		A Border Gateway Protocol (BGP-4)
RFC 1634	Supersedes 1362 and 1551	Novell Routing over Various WAN Media (IPXWAN)
RFC 1583		OSPF Version 2
RFC 1552		The PPP Internetwork Packet Exchange Control Protocol (IPXCP)
RFC 1549		PPP in HDLC Framing
RFC 1548		The Point-to-Point Protocol (PPP)
RFC 1541		Dynamic Host Configuration Protocol
RFC 1519		Classless Inter-Domain Routing(CIDR): an Address Assignment and Aggregation Strategy
RFC 1492		Access Control Protocol or TACACS
RFC 1490		Multiprotocol Interconnect over Frame Relay
RFC 1483 [1]		Multiprotocol Encapsulation over ATM Adaptation Layer 5
RFC 1450		MIB for SNMP Version 2
RFC 1403		BGP OSPF Interaction
RFC 1397		Default Route Advertisement in BGP2 and BGP3
RFC 1395		BootP Extensions
RFC 1390		Transmission of IP and ARP over FDDI Networks
RFC 1382 [1, 2]		SNMP MIB Extension for X.25 Packet Layer
RFC 1381 [1, 2]		SNMP MIB Extension for X.25 LAPB
RFC 1378 [1]		PPP AppleTalk Control Protocol (ATCP)
RFC 1377		PPP OSI Network Layer Control Protocol (OSINLCP)

Table B-1 Cisco-Supported Requests for Comments (continued)

Standard Number		Standard Title
RFC 1376		PPP DECnet Phase IV Control Protocol (DNCP)
RFC 1356		Multiprotocol Interconnect on X.25 and ISDN in the Packet Mode
RFC 1350		TFTP Version 2
RFC 1348		DNS NSAP RRs
RFC 1334		PPP Authentication Protocols
RFC 1333		PPP Link Quality Monitoring
RFC 1332		PPP Internet Protocol Control Protocol (IPCP)
RFC 1331	Replaced by RFC 1548	PPP for the Transmission of Multi-protocol Datagrams over Point-to-Point Links
RFC 1315 [1,2]		MIB for Frame Relay DTEs
RFC 1305		Network Time Protocol (NTP) Version 3
RFC 1294 [2]	Replaced by RFC1490	Multiprotocol Interconnect over Frame Relay
RFC 1293		Inverse ARP
RFC 1286		Definitions of Managed Objects for Bridges
RFC 1285 [1]		FDDI MIB
RFC 1269 [1]		Definitions of Managed Objects for the Border Gateway Protocol (Version 3)
RFC 1268		Application of BGP in the Internet
RFC 1267		BGP-3
RFC 1256		ICMP Router Discovery Messages
RFC 1253		MIB for OSPF Version 2
RFC 1247	Replaced by RFC 1583	OSPF Version 2
RFC 1236		IP-to-X.121 Address Mapping for DDN
RFC 1231 [1]		IEEE 802.5 Token Ring MIB
RFC 1220		Point-to-Point Protocol (PPP) Extensions for Bridging
RFC 1215		Convention for Defining Traps for Use with SNMP
RFC 1213		Management Information Base for Network Management of TCP/IP-based Internets: MIB-II
RFC 1212		Concise MIB Definitions
RFC 1209		Transmission of IP Datagrams over SMDS Service
RFC 1196		Finger User Information Protocol
RFC 1195 [2]		Use of OSI IS-IS for Routing in TCP/IP in Dual Environments
RFC 1191		Path MTU Discovery
RFC 1188	Replaced by RFC 1390	Proposed Standard for the Transmission of IP Datagrams over FDDI Networks
RFC 1172		PPP Initial Configuration Options

Table B-1 Cisco-Supported Requests for Comments (continued)

Standard Number		Standard Title
RFC 1171	Replaced by RFC 1331	Point-to-Point Protocol for the Transmission of Multi-Protocol Datagrams over Point-to-Point links
RFC 1166		Internet Numbers
RFC 1164		Application of the BGP in the Internet
RFC 1163		Border Gateway Protocol (BGP)
RFC 1157		Simple Network Management Protocol (SNMP)
RFC 1156	Replaced by RFC 1213	MIB for TCP/IP
RFC 1155	Replaced by RFC 1212	Structure and Identification of Management Information for TCP/IP-Based Internets
RFC 1144		Compressing TCP/IP Headers for Low-Speed Serial Links
RFC 1141		Incremental Updating of the Internet Checksum
RFC 1139		Echo Function for ISO 8473 (PING)
RFC 1136		Administrative Domains and Routing Domains: A Model for Routing in the Internet
RFC 1122		Requirements for Internet Hosts—Communication Layers
RFC 1108	DCA Draft	IP Security Option (IPSO)
RFC 1101		DNS Encoding of Network Names and Other Types
RFC 1091		Telnet Terminal-Type Option
RFC 1084		BootP Extensions
RFC 1080		Telnet Remote Flow Control Option
RFC 1079		Telnet Terminal Speed Option
RFC 1069		Guidelines for the Use of Internet-IP Addresses in the ISO Connectionless-Mode Network Protocol
RFC 1060		Assigned Numbers
RFC 1058		Routing Information Protocol (RIP)
RFC 1055		Standard for the Transmission of IP Datagrams Over Serial Lines: SLIP
RFC 1042		Standard for the Transmission of IP Datagrams Over IEEE 802 Networks
RFC 1035		Domain Names—Implementation and Specification
RFC 1034		Domain Names—Concepts and Facilities
RFC 1027		Using ARP to Implement Transparent Subnet Gateways (Proxy ARP)
RFC 1009		Requirements for Internet Gateways
RFC 995	Replaced by ISO 9542	ES-to-IS Routing Exchange Protocol for Use in Conjunction with ISO 8473
RFC 994	Replaced by ISO 8473	Protocol for Providing the Connectionless-Mode Network Service

Table B-1 Cisco-Supported Requests for Comments (continued)

Standard Number		Standard Title
RFC 982		Guidelines for the Specification of the Top of the Structure of the Domain Specific Part (DSP) of the ISO Standard NSAP Address
RFC 951		Bootstrap Protocol (BootP)
RFC 950		Internet Standard Subnetting Procedure
RFC 925		Multi-LAN Address Resolution (PROXY ARP)
RFC 922		Broadcasting Internet Datagrams in the Presence of Subnets (IP_BROAD)
RFC 919		Broadcasting Internet Datagrams
RFC 906		Bootstrap Loading Using TFTP
RFC 904		Exterior Gateway Protocol (EGP) Formal Specification
RFC 903		Reverse Address Resolution Protocol (RARP)
RFC 896		Congestion Control in TCP/IP Internetworks
RFC 894		Standard for the Transmission of IP Datagrams over Ethernet
RFC 891		Hello Protocol
RFC 879		The TCP Maximum Segment Size and Related Topics
RFC 877		Standard for the Transmission of IP Datagrams Over Public Data Networks
RFC 874		Telnet Protocol Specification
RFC 863		Discard Service (TCP discard)
RFC 862		Echo Service (TCP echo)
RFC 860		Telnet Timing Mark Option
RFC 858		Telnet Suppress Go Ahead Option
RFC 857		Telnet Echo Option
RFC 856		Telnet Binary Transmission
RFC 855		Telnet Option Specification
RFC 854	MIL STD 1782	Telnet Protocol Specification
RFC 827		Exterior Gateway Protocol (EGP)
RFC 826		Address Resolution Protocol (ARP)
RFC 815		IP Datagram Reassembly Algorithms
RFC 813		Window and Acknowledgment Strategy in TCP/IP
RFC 793	MIL STD 1778	Transmission Control Protocol (TCP)
RFC 792		Internet Control Message Protocol (ICMP)
RFC 791	MIL STD 1777	Internetwork Protocol (IP)
RFC 783		Trivial File Transfer Protocol (TFTP) (version 2)
RFC 779		Telnet Send-Location Option
RFC 768		User Datagram Protocol (UDP)

1. This RFC is only partially supported by the Cisco IOS.
2. This RFC is supported from Software Release 9.21 forward.

Where to Obtain RFCs

RFCs are maintained by Government Systems, Inc. (GSI). Both electronic and printed copies can be obtained. GSI can be contacted in the following ways:

- By mail:

  Government Systems, Inc.
  Attn: Network Information Center
  14200 Park Meadow Drive, Suite 200
  Chantilly, Virgina 22021

- By telephone:

  1–800–365–3642
  1–703–802–8376
  1–703–802–8376 (FAX)

- By electronic mail:

  NIC@NIC.DDN.MIL
  Network address: 192.112.36.5

APPENDIX C

Regular Expressions

This appendix explains regular expressions and how to use them in ATM switch router configurations. (Refer to the *ATM Switch Router Software Configuration Guide* for more information.) It also provides details for composing regular expressions. This appendix has the following sections:

- Understanding General Concepts
- Using Regular Expressions
- Creating Regular Expressions
- Working with Practical Examples

Understanding General Concepts

A regular expression is a pattern to match against an input string. You specify the pattern that a string must match when you compose a regular expression. Matching a string to the specified pattern is called "pattern matching." Pattern matching either succeeds or fails.

For example, you can specify in an X.25 routing table that incoming packets with destination addresses beginning with 3107 are routed to serial interface 0. In this example, the pattern to match is the *3107* specified in the X.25 routing table. The string is the initial portion of the destination address of any incoming X.25 packet. When the destination address string matches the *3107* pattern, pattern matching succeeds and the Cisco IOS software routes the packet to serial interface 0. When the initial portion of the destination address does not match *3107*, then pattern matching fails and the software does not route the packet to serial interface 0.

If a regular expression can match two different parts of an input string, it will match the earliest part first.

Using Regular Expressions

Cisco ATM switch router configurations use several implementations of regular expressions. Generally, you use regular expressions in the following ways:

- To specify chat scripts for asynchronous lines in the dial-on-demand routing (DDR) feature
- To specify routes in a routing table for the X.25 switching feature
- To filter packets and routing information in DECnet and Border Gateway Protocol (BGP)

Specifying Chat Scripts

On asynchronous lines, chat scripts send commands for modem dialing and logging in to remote systems. You use a regular expression in the **modem chat-script** command to specify the name of the chat script that the Cisco IOS software is to execute on a particular asynchronous line. You can also use regular expressions in the **dialer map** command to specify a "modem" script or "system" script to be used for a connection to one or multiple sites on an asynchronous interface.

For configuration information on chat scripts, refer to the "Configuring DDR" chapter in the *Router Products Configuration Guide*. For details on the **modem chat-script** and **dialer map** commands, refer to the "Asynchronous DDR Preparation Commands" chapter of the *Dial Solutions Command Reference*.

Specifying Routes in a Routing Table

As described in the "Understanding General Concepts" section, you can use regular expressions to help specify routes in an X.25 routing table. When you create entries in an X.25 routing table, you can use regular expressions in the **x25 route** command to help specify routes for incoming calls. When an ATM switch router receives an incoming call that should be forwarded to its destination, the Cisco IOS software consults the X.25 routing table to determine the route. The software compares the X.121 network interface address (or destination address) field and the Call User Data (CUD) field of the incoming packet with the routing table to determine the route. When the destination address and the CUD of the incoming packet match the X.121 and CUD regular expressions you specified in the routing table, the ATM switch router forwards the call.

For details on creating an X.25 routing table, refer to the "Configuring X.25 and LAPB" chapter in the *Router Products Configuration Guide*. Also, see the **x25 route** command in the "X.25 and LAPB Commands" chapter of the *Wide-Area Networking Command Reference.*

Filtering Packets and Routing Information

You can use regular expressions in access lists for both DECnet and BGP. In DECnet, you can use regular expressions in the **access-list** command to filter *connect initiate* packets. With these packets, you can filter packets by DECnet object type, such as MAIL. In BGP, you use regular expressions in the **ip as-path access-list** command for path filtering by neighbor. Using regular expressions, you specify an access list filter on both incoming and outbound updates based on the BGP autonomous system paths.

For configuration information on filtering connect initiate packets and path filtering by neighbor, refer to the "Configuring DECnet" and "Configuring IP Routing Protocols" chapters in the *Router Products Configuration Guide*.

For detailed information on the **access-list** and **ip as-path access-list** commands, refer to the "DECnet Commands" and "IP Routing Protocols" chapters of the *Network Protocol Command Reference*.

Creating Regular Expressions

A regular expression can be a single-character pattern or a multiple-character pattern. That is, a regular expression can be a single character that matches the same single character in the input string, or multiple characters that match the same multiple characters in the input string. This section describes

creating both single-character patterns and multiple-character patterns. It also discusses creating more complex regular expressions using multipliers, alternation, anchoring, and parentheses.

Single-Character Patterns

The simplest regular expression is a single character that matches itself in the input string. For example, the single-character regular expression **3** matches a corresponding *3* in the input string. You can use any letter (A–Z, a–z) or number (0–9) as a single-character pattern. The following examples are single-character regular expression patterns:

A

k

5

You can use a keyboard character other than a letter or a number—such as an exclamation point (!) or a tilde (~)—as a single-character pattern, but certain keyboard characters have special meaning when used in regular expressions. Table C-1 lists the keyboard characters with special meaning.

Table C-1 Characters with Special Meaning

Character		Special Meaning
period	.	Matches any single character, including white space.
asterisk	*	Matches 0 or more sequences of the pattern.
plus sign	+	Matches 1 or more sequences of the pattern.
question mark	?	Matches 0 or 1 occurrences of the pattern.
caret	^	Matches the beginning of the input string.
dollar sign	$	Matches the end of the input string.
underscore	_	Matches a comma (,), left brace ({), right brace (}), left parenthesis, right parenthesis, the beginning of the input string, the end of the input string, or a space.
brackets	[]	Designates a range of single-character patterns.
hyphen	-	Separates the end points of a range.

To use these special characters as single-character patterns, remove the special meaning by preceding each character with a backslash (\). The following examples are single-character patterns matching a dollar sign, an underscore, and a plus sign, respectively:

\$

_

\+

You can specify a range of single-character patterns to match against a string. For example, you can create a regular expression that matches a string containing one of the following letters: *a*, *e*, *i*, *o*, and *u*. One and only one of these characters must exist in the string for pattern matching to succeed. To specify a range of single-character patterns, enclose the single-character patterns in square brackets ([ ]). The order of characters within the brackets is not important. For example, **[aeiou]** matches any one of the five vowels of the lowercase alphabet, while **[abcdABCD]** matches any one of the first four letters of the lowercase or uppercase alphabet.

You can simplify ranges by entering only the end points of the range, separated by a dash (-). Simplify the previous range as follows:

[a-dA-D]

To add a hyphen as a single-character pattern in your range, include another hyphen and precede it with a backslash:

[a-dA-D\-]

You can also include a right square bracket (]) as a single-character pattern in your range. To do so, enter the following:

[a-dA-D\-\]]

The previous example matches any one of the first four letters of the lowercase or uppercase alphabet, a hyphen, or a right square bracket.

You can reverse the matching of the range by including a caret (^) at the start of the range. The following example matches any letter *except* the ones listed:

[^a-dqsv]

The following example matches anything except a right square bracket (]) or the letter *d*:

[^\]d]

Multiple-Character Patterns

When creating regular expressions, you can also specify a pattern containing multiple characters. You create multiple-character regular expressions by joining letters, numbers, or keyboard characters that do not have special meaning. For example, **a4%** is a multiple-character regular expression. Precede keyboard characters that have special meaning with a backslash (\)when you want to remove their special meaning.

With multiple-character patterns, order is important. The regular expression **a4%** matches the character *a* followed by the number *4* followed by a percent *(%)* sign. If the input string does not have *a4%* in that order, pattern matching fails. The multiple-character regular expression **a.** uses the special meaning of the period character (.) to match the letter *a* followed by any single character. With this example, the strings *ab*, *a!*, or *a2* are all valid matches for the regular expression.

You can remove the special meaning of the period character by preceding it with a backslash. In the expression **a\.** only the string *a.* matches the regular expression.

You can create a multiple-character regular expressions containing all letters, all digits, all special keyboard characters, or a combination of letters, digits, and other keyboard characters. The following examples are all valid regular expressions:

telebit

3107

v32bis

Multipliers

You can create more complex regular expressions that instruct the Cisco IOS software to match multiple occurrences of a specified regular expression. To do so, you use some special characters with your single- and multiple-character patterns. Table C-2 lists the special characters that specify "multiples" of a regular expression.

Table C-2 Special Characters Used as Multipliers

Character	Description
*	Matches 0 or more single- or multiple-character patterns.
+	Matches 1 or more single- or multiple-character patterns.
?	Matches 0 or 1 occurrences of the single- or multiple-character pattern.

The following example matches any number of occurrences of the letter *a*, including none:

a*

The following pattern requires that at least one letter *a* be present in the string to be matched:

a+

The following pattern matches the string *bb* or *bab*:

ba?b

The following string matches any number of asterisks (*):

******

To use multipliers with multiple-character patterns, enclose the pattern in parentheses. In the following example, the pattern matches any number of the multiple-character string *ab*:

(ab)*

As a more complex example, the following pattern matches one or more instances of alphanumeric pairs (but not none; that is, an *empty string* is not a match):

([A-Za-z][0-9])+

The order for matches using multipliers (*, +, or ?) is longest construct first. Nested constructs are matched from outside to inside. Concatenated constructs are matched beginning at the left side of the construct. Thus, the regular expression matches *A9b3*, but not *9Ab3* because the letter appears first in the construct.

Alternation

Alternation allows you to specify alternative patterns to match against a string. You separate the alternative patterns with a vertical bar (|). Exactly one of the alternatives can match the input string. For example, the regular expression **codex|telebit** matches the string *codex* or the string *telebit*, but not both *codex* and *telebit*.

Anchoring

You can instruct the Cisco IOS software to match a regular expression pattern against the beginning or the end of the input string. That is, you can specify that the beginning or end of an input string contain a specific pattern. You "anchor" these regular expressions to a portion of the input string using the special characters shown in Table C-3.

Table C-3 Special Characters Used for Anchoring

Character	Description
^	Matches the beginning of the input string.
$	Matches the end of the input string.

Note another use for the ^ symbol. As an example, the following regular expression matches an input string only if the string starts with *abcd*:

^abcd

Whereas the following expression is a range that matches any single letter, as long as it is not the letters *a*, *b*, *c*, or *d*:

[^abcd]

With the following example, the regular expression matches an input string that ends with *.12*:

$\.12

Contrast these anchoring characters with the special character underscore (_). Underscore matches the beginning of a string (^), the end of a string ($), parentheses (( )), space ( ), braces ({ }), comma (,), or underscore (_). With the underscore character, you can specify that a pattern exist anywhere in the input string. For example, **_1300_** matches any string that has *1300* somewhere in the string. The string's *1300* can be preceded by or end with a space, brace, comma, or underscore. So*{1300_* matches the regular expression, but *21300* and *13000* do not.

Using the underscore character, you can replace long regular expression lists. For example, you can replace the following list of regular expressions with simply **_1300_**:

^1300$

^1300(space)

(space)1300

{1300,

,1300,

{1300}

,1300,

(1300

Parentheses for Recall

As shown in the "Multipliers" section, you use parentheses with multiple-character regular expressions to multiply the occurrence of a pattern. You can also use parentheses around a single- or multiple-character pattern to instruct the IOS software to remember a pattern for use elsewhere in the regular expression.

To create a regular expression that recalls a previous pattern, you use parentheses to instruct memory of a specific pattern and a backslash (\) followed by an integer to reuse the remembered pattern. The integer specifies the occurrence of a parentheses in the regular expression pattern. If you have more than one remembered pattern in your regular expression, then \1 uses the first remembered pattern and \2 uses the second remembered pattern, and so on.

The following regular expression uses parentheses for recall:

a(.)bc(.)\1\2

This regular expression matches the letter *a* followed by any character (call it character #1) followed by *bc*, followed by any character (character #2), followed by character #1 again, followed by character #2 again. In this way, the regular expression can match *aZbcTZT*. The software identifies character #1 as *Z* and character #2 as *T* and then uses *Z* and *T* again later in the regular expression.

The parentheses do not change the pattern; they only instruct the software to recall that part of the matched string. The regular expression **(a)b** still matches the input string *ab*, and **(^3107)** still matches a string beginning with *3107*, but now the Cisco IOS software can recall the *a* of the *ab* string and the starting *3107* of another string for use later.

Working with Practical Examples

This section shows you practical examples of regular expressions. The examples correspond with the various ways you can use regular expressions in your configurations.

Specifying Chat Scripts Example

The following example uses regular expressions in the **modem chat-script** command to specify chat scripts for lines connected to Telebit and U.S. Robotics modems. The regular expressions are **telebit.*** and **usr.***. When the chat script name (the string) matches the regular expression (the pattern specified in the command), then the Cisco IOS software uses that chat script for the specified lines. For lines 1

and 6, the Cisco IOS software uses the chat script named *telebit* followed by any number of occurrences (*) of any character (.). For lines 7 and 12, the software uses the chat script named *usr* followed by any number of occurrences (*) of any character (.).

```
! Some lines have Telebit modems
line 1 6
modem chat-script telebit.*
! Some lines have US Robotics modems
line 7 12
modem chat-script usr.*
```

X.25 Switching Feature Example

In the following X.25 switching feature example, the **x25 route** command causes all X.25 calls to addresses whose first four Data Network Identification Code (DNIC) digits are 1111 to be routed to serial interface 3. Note that the first four digits (^1111) are followed by a regular expression pattern that the Cisco IOS software is to remember for use later. The \1 in the rewrite pattern recalls the portion of the original address matched by the digits following the 1111 but changes the first four digits (1111) to 2222.

```
x25 route ^1111(.*) substitute-dest 2222\1 interface serial 3
```

DECnet Access List Example

In the following DECnet example, the regular expression is **^SYSTEM$**. The access list permits access to all connect initiate packets that match the access identification of SYSTEM.

```
access-list 300 permit 0.0 63.1023 eq id ^SYSTEM$
```

BGP IP Access Example

The following BGP example contains the regular expression **^123.***. The example specifies that BGP neighbor with IP address 128.125.1.1 is not sent advertisements about any path through or from the adjacent autonomous system 123.

```
ip as-path access-list 1 deny ^123 .*

router bgp 109
network 131.108.0.0
neighbor 129.140.6.6 remote-as 123
neighbor 128.125.1.1 remote-as 47
neighbor 18.125.1.1 filter-list 1 out
```

APPENDIX D

Removed and Changed Commands

This appendix contains tables that list commands that have been removed from this manual and those that have changed name, as follows:

- Table D-1, "Cisco IOS Commands Removed from This Manual"
- Table D-2, "Cisco Configuration Commands with Name Changes"
- Table D-3, "System Image and Microcode Commands with Name Changes"
- Table D-4, "Router Memory Commands with Name Changes"
- Table D-5, "Commands That No Longer Function as Expected in ATM Environments"

Refer to the following publications for descriptions of the Cisco IOS commands that are no longer contained in this manual:

- *Configuration Fundamentals Command Reference*
- *Wide-Area Networking Command Reference*
- *Network Protocols Command Reference*, parts 1 and 2

Table D-1 Cisco IOS Commands Removed from This Manual

Command Name
aaa acounting
aaa authentication enable default
aaa authentication local-override
aaa authentication login
aaa authentication ppp
aaa new-model
access-class
access-enable
access-list (standard)
age-timer
arp timeout
async-bootp
autocommand
banner exec

Table D-1 Cisco IOS Commands Removed from This Manual (continued)

Command Name
banner incoming
banner motd
boot
boot bootldr
boot buffersize
boot host
boot network
buffers
buffers huge size
calendar set
callback
cd
cdp enable
cdp holdtime
cdp run
cdp timer
chat-script
clear access-list counters
clear access-template
clear arp-cache
clear cdp counters
clear cdp table
clear ip route
clock read-calendar
clock set
clock summer-time
clock timezone
clock update-calendar
configure
config-register
connect
cont
databits
data-character-bits
debug ports
default-name

Table D-1 Cisco IOS Commands Removed from This Manual (continued)

Command Name
default-value exec-character-bits
default-value special-character-bits
delete
description
dir
dis
disconnect
editing
enable (EXEC)
enable last-resort
enable password
enable use-tacacs
end
escape-character
exec
exec-banner
exec-character-bits
exec-timeout
exit
flowcontrol
full-help
help
history
hostname
ip default-gateway
ip domain-list
ip domain-lookup
ip domain-name
ip host
ip host-routing
ip mask-reply
ip name-server
ip netmask-format
ip rcmd domain-lookup
ip rcmd rcp-enable
ip rcmd remote-host

Table D-1 Cisco IOS Commands Removed from This Manual (continued)

Command Name
ip rcmd remote-username
ip rcmd rsh-enable
ip security eso-info
ip source-route
ip subnet-zero
ip tcp async-mobility
ip tcp selective-ack
ip tcp timestamp
ip tcp window-size
lane database
length
line
list
location
lock
logging
logging buffered
logging console
logging facility
logging monitor
logging on
logging synchronous
logging trap
login
login authentication
logout
modem answer-timeout
modem callin
modem cts-required
modem dialin
modem dtr-active
modem inout
monitor
multilink
notify
ntp access-group

Table D-1 Cisco IOS Commands Removed from This Manual (continued)

Command Name
ntp authenticate
ntp authentication-key
ntp broadcast
ntp broadcast client
ntp broadcastdelay
ntp clock-period
ntp disable
ntp master
ntp max-associations
ntp peer
ntp server
ntp source
ntp trusted-key
ntp update-calendar
padding
parity
password
ping
ppp authentication
ppp use-tacacs
purge
pwd
random-detect
refuse-message
reload
rmon alarm
rmon event
script activation
script connection
script reset
script startup
send
service compress-config
service config
service exec-wait
service finger

Table D-1 Cisco IOS Commands Removed from This Manual (continued)

Command Name
service linenumber
service nagle
service password-encryption
service tcp-keepalives
service telnet-zeroidle
service timestamps
session-timeout
show bootvar
shutdown (controller)
shutdown (interface)
snmp-server community
snmp-server contact
snmp-server host
snmp-server location
snmp-server packetsize
snmp-server queue-length
snmp-server system-shutdown
snmp-server tftp-server-list
snmp-server trap-source
snmp-server trap-timeout
snmp-server trap-timeout
special-character-bits
speed
squeeze
sscop cc-timer
sscop idle-timer
sscop keepalive-timer
sscop max-cc
sscop noresponse-timer
sscop poll-timer
sscop receive-window
sscop send-window
start-character
start-chat
stopbits
stop-character

Table D-1 Cisco IOS Commands Removed from This Manual (continued)

Command Name
systat
tacacs-server attempts
tacacs-server directed-request
tacacs dns-alias-lookup
tacacs-server extended
tacacs-server host
tacacs-server key
tacacs-server last-resort
tacacs-server optional-passwords
tacacs-server retransmit
tacacs-server timeout
telnet
terminal
terminal-type
test
traceroute
transport
txspeed
undebug
undelete
vacant-message
where
width

Table D-2 Cisco Configuration Commands with Name Changes

Previous Name	New Name
configure network	copy ftp: system:running-config
configure overwrite-network	copy ftp: nvram:startup-config
copy rcp running-config	copy rcp: system:running-config
copy rcp startup-config	copy rcp: nvram:startup-config
copy running-config rcp	copy system:running-config rcp:
copy running-config startup-config	copy system:running-config nvram:startup-config
copy running-config tftp	copy system:running-config tftp:
copy tftp running-config	copy tftp:system:running-config
copy tftp startup-config	copy tftp: nvram:startup-config

Table D-2 Cisco Configuration Commands with Name Changes (continued)

Previous Name	New Name
erase startup-config	erase nvram:
show configuration	show startup-config
show file	more
show running-config	more system:running-config
show startup-config	more nvram:startup-config
write erase	erase
write memory	copy system:running-config nvram:startup-config
write network	copy system:running-config ftp:
write terminal	more system:running-config

Table D-3 System Image and Microcode Commands with Name Changes

Previous Name	New Name
copy erase flash	erase flash: (Class B Flash file systems only) format (Class A and C Flash file systems only)
copy verify	verify
copy verify bootflash	verify bootflash:
copy verify flash	verify flash:
verify bootflash	verify bootflash:
verify flash	verify flash:

Table D-4 Router Memory Commands with Name Changes

Previous Name	New Name
copy erase flash	erase flash: (Class B Flash file systems only) format (Class A and C Flash file systems only)
copy verify	verify flash:
copy verify bootflash	verify bootflash:
copy verify flash	verify flash:
verify bootflash	verify bootflash:
verify flash	verify

Table D-5 Commands That No Longer Function as Expected in ATM Environments

aaa authentication arap
aaa authorization
alias

Table D-5 Commands That No Longer Function as Expected in ATM Environments (continued)

autoselect
bandwidth
clear dialer
custom-queue-list
delay
dialer-list list
dnsix-dmdp retries
dnsix-nat authorized-redirection
dnsix-nat primary
dnsix-nat secondary
dnsix-nat source
ip access-group
ip accounting
ip accounting-list
ip accounting-threshold
ip accounting-transits
ip classless
ip domain-lookup nsap
ip forward-protocol
ip gdp
ip helper-address
ip redirects
ip route-cache
ip tcp path-mtu-discovery
name-conn
priority-group
route-map
router
rotary
snmp-server chassis-id
show dialer
show dnsix
show ip cache
show ip irdp
show ip local pool
show ip rpotocols

Table D-5 Commands That No Longer Function as Expected in ATM Environments (continued)

show ip route
show ipc
show queue
show queueing
show route map
show standby
traceroute (privileged)
transmit-interface
tunnel
tx-queue-limit