Troubleshooting and Fault Management Commands

Cisco IOS Release 12.2

This chapter describes the commands used to troubleshoot a routing device. To troubleshoot, you need to discover, isolate, and resolve the system problems. You can discover problems with the system monitoring commands, isolate problems with the system test commands (including **debug** commands), and resolve problems by reconfiguring your system with the suite of Cisco IOS software commands.

This chapter describes general fault management commands. For detailed troubleshooting procedures and a variety of scenarios, see the *Cisco IOS Internetwork Troubleshooting Guide* publication. For complete details on all **debug** commands, see the *Cisco IOS Debug Command Reference*.

For troubleshooting tasks and examples, refer to the "Troubleshooting and Fault Management" chapter in the Release 12.2 *Cisco IOS Configuration Fundamentals Configuration Guide*.

For documentation of commands in Cisco IOS Release 12.2T or 12.3 mainline, see the *Cisco IOS Configuration Fundamentals and Network Management Command Reference, Release 12.3*.

attach

To connect to a specific line card for the purpose of executing monitoring and maintenance commands on that line card only, use the **attach** privileged EXEC command. To exit from the Cisco IOS software image on the line card and return to the Cisco IOS image on the GRP card, use the **exit** command.

attach *slot-number*

Syntax Description

slot-number	Slot number of the line card you want to connect to. Slot numbers range from 0 to 11 for the Cisco 12012 router and 0 to 7 for the Cisco 12008 router. If the slot number is omitted, you are prompted for the slot number.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was added to support the Cisco 12000 series Gigabit Switch Routers.

Usage Guidelines

You must first use the **attach** privileged EXEC command to access the Cisco IOS software image on a line card before using line card-specific **show** EXEC commands. Alternatively, you can use the **execute-on** privileged EXEC command to execute a **show** command on a specific line card.

After you connect to the Cisco IOS image on the line card using the **attach** command, the prompt changes to `LC-Slotx#`, where *x* is the slot number of the line card.

The commands executed on the line card use the Cisco IOS image on that line card.

You can also use the **execute-on slot** privileged EXEC command to execute commands on one or all line cards.

Note Do not execute the **config** EXEC command from the Cisco IOS software image on the line card.

Examples

In the following example, the user connects to the Cisco IOS image running on the line card in slot 9, gets a list of valid **show** commands, and returns the Cisco IOS image running on the GRP:

```
Router# attach 9

Entering Console for 4 Port Packet Over SONET OC-3c/STM-1 in Slot: 9
Type exit to end this session

Press RETURN to get started!

LC-Slot9# show ?
```

```
  cef       Cisco Express Forwarding
  clock     Display the system clock
  context   Show context information about recent crash(s)
  history   Display the session command history
  hosts     IP domain-name, lookup style, nameservers, and host table
  ipc       Interprocess communications commands
  location  Display the system location
  sessions  Information about Telnet connections
  terminal  Display terminal configuration parameters
  users     Display information about terminal lines
  version   System hardware and software status

LC-Slot9# exit

Disconnecting from slot 9.
Connection Duration: 00:01:04
Router#
```

Note Because not all statistics are maintained on the line cards, the output from some of the **show** commands might not be consistent.

Related Commands

Command	Description
attach shelf	Connects you to a specific (managed) shelf for the purpose of remotely executing commands on that shelf only.
execute-on slot	Executes commands remotely on a specific line card, or on all line cards simultaneously.

clear logging

To clear messages from the logging buffer, use the **clear logging** privileged EXEC command.

clear logging

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.

Examples

In the following example, the logging buffer is cleared:

```
Router# clear logging

Clear logging buffer [confirm]
Router#
```

Related Commands

Command	Description
logging buffered	Logs messages to an internal buffer.
show logging	Displays the state of logging (syslog).

diag

To perform field diagnostics on a line card, on the Gigabit Route Processor (GRP), on the Switch Fabric Cards (SFCs), and on the Clock Scheduler Card (CSC) in Cisco 12000 series Gigabit Switch Routers (GSRs), use the **diag** privileged EXEC command. To disable field diagnostics on a line card, use the **no** form of this command.

diag *slot-number* [**halt** | **previous** | **post** | **verbose** [**wait**] | **wait**]

no diag *slot-number*

Syntax Description

slot-number	Slot number of the line card you want to test. Slot numbers range from 0 to 11 for the Cisco 12012 and 0 to 7 for the Cisco 12008 router. Slot numbers for the CSC are 16 and 17, and for the FSC are 18, 19, and 20.
halt	(Optional) Stops the field diagnostic testing on the line card.
previous	(Optional) Displays previous test results (if any) for the line card.
post	(Optional) Initiates an EPROM-based extended power-on self-test (EPOST) only. The EPOST test suite is not as comprehensive as the field diagnostics, and a pass/fail message is the only message displayed on the console.
verbose [**wait**]	(Optional) Enables the maximum status messages to be displayed on the console. By default, only the minimum status messages are displayed on the console. If you specify the optional **wait** keyword, the Cisco IOS software is not automatically reloaded on the line card after the test completes.
wait	(Optional) Stops the automatic reloading of the Cisco IOS software on the line card after the completion of the field diagnostic testing. If you use this keyword, you must use the **microcode reload** *slot* global configuration command, or manually remove and insert the line card (to power it up) in the slot so that the GRP will recognize the line card and download the Cisco IOS software image to the line card.

Defaults

No field diagnostics tests are performed on the line card.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was added to support the Cisco 12000 series GSR.

Usage Guidelines

The **diag** command must be executed from the GRP main console port.

Perform diagnostics on the CSC only if a redundant CSC is in the router.

Diagnostics will stop and ask you for confirmation before altering the router's configuration. For example, running diagnostics on a SFC or CSC will cause the fabric to go from full bandwidth to one-fourth bandwidth. Bandwidth is not affected by GRP or line card diagnostics.

The field diagnostic software image is bundled with the Cisco IOS software and is downloaded automatically from the GRP to the target line card prior to testing.

Caution Performing field diagnostics on a line card stops all activity on the line card. Before the **diag** EXEC command begins running diagnostics, you are prompted to confirm the request to perform field diagnostics on the line card.

In normal mode, if a test fails, the title of the failed test is displayed on the console. However, not all tests that are performed are displayed. To view all the tests that are performed, use the **verbose** keyword.

After all diagnostic tests are completed on the line card, a PASSED or TEST FAILURE message is displayed. If the line card sends a PASSED message, the Cisco IOS software image on the line card is automatically reloaded unless the **wait** keyword is specified. If the line card sends a TEST FAILURE message, the Cisco IOS software image on the line card is not automatically reloaded.

If you want to reload the line card after it fails diagnostic testing, use the **microcode reload** *slot* global configuration command.

Note When you stop the field diagnostic test, the line card remains down (that is, in an unbooted state). In most cases, you stopped the testing because you need to remove the line card or replace the line card. If that is not the case, and you want to bring the line card back up (that is, online), you must use the **microcode reload** global configuration command or power cycle the line card.

If the line card fails the test, the line card is defective and should be replaced. In future releases this might not be the case because DRAM and SDRAM SIMM modules might be field replaceable units. For example, if the DRAM test failed you might only need to replace the DRAM on the line card.

For more information, refer to the Cisco 12000 series installation and configuration guides.

Examples

In the following example, a user is shown the output when field diagnostics are performed on the line card in slot 3. After the line card passes all field diagnostic tests, the Cisco IOS software is automatically reloaded on the card. Before starting the diagnostic tests, you must confirm the request to perform these tests on the line card because all activity on the line card is halted. The total/indiv. timeout set to 600/220 sec. message indicates that 600 seconds are allowed to perform all field diagnostics tests, and that no single test should exceed 220 seconds to complete.

```
Router# diag 3

Running Diags will halt ALL activity on the requested slot. [confirm]
Router#
Launching a Field Diagnostic for slot 3
Running DIAG config check
RUNNING DIAG download to slot 3 (timeout set to 400 sec.)
sending cmd FDIAG-DO ALL to fdiag in slot 3
(total/indiv. timeout set to 600/220 sec.)
Field Diagnostic ****PASSED**** for slot 3
```

```
Field Diag eeprom values: run 159 fial mode 0 (PASS) slot 3
   last test failed was 0, error code 0
sending SHUTDOWN FDIAG_QUIT to fdiag in slot 3

Board will reload
.
.
.
Router#
```

In the following example, a user is shown the output when field diagnostics are performed on the line card in slot 3 in verbose mode:

```
Router# diag 3 verbose

Running Diags will halt ALL activity on the requested slot. [confirm]
Router#
Launching a Field Diagnostic for slot 3
Running DIAG config check
RUNNING DIAG download to slot 3 (timeout set to 400 sec.)
sending cmd FDIAG-DO ALL to fdiag in slot 3
(total/indiv. timeout set to 600/220 sec.)
FDIAG_STAT_IN_PROGRESS: test #1 R5K Internal Cache
FDIAG_STAT_PASS test_num 1
FDIAG_STAT_IN_PROGRESS: test #2 Sunblock Ordering
FDIAG_STAT_PASS test_num 2
FDIAG_STAT_IN_PROGRESS: test #3 Dram Datapins
FDIAG_STAT_PASS test_num 3
.
.
.
Field Diags: FDIAG_STAT_DONE
Field Diagnostic ****PASSED**** for slot 3
Field Diag eeprom values: run 159 fial mode 0 (PASS) slot 3
   last test failed was 0, error code 0
sending SHUTDOWN FDIAG_QUIT to fdiag in slot 3

Board will reload
.
.
.
Router#
```

Related Commands

Command	Description
microcode reload	Reloads the Cisco IOS image on a line card on the Cisco 7000 series with RSP7000, Cisco 7500 series, or Cisco 12000 series routers after all microcode configuration commands have been entered.

exception core-file

To specify the name of the core dump file, use the **exception core-file** global configuration command. To return to the default core filename, use the **no** form of this command.

exception core-file *file-name*

no exception core-file

Syntax Description

file-name	Name of the core dump file saved on the server.

Defaults

The core file is named *hostname*-core, where *hostname* is the name of the router.

Command Modes

Global configuration (config)

Command History

Release	Modification
10.2	This command was introduced.

Usage Guidelines

Caution Use the **exception** commands only under the direction of a technical support representative. Creating a core dump while the router is functioning in a network can disrupt network operation. The resulting binary file, which is very large, must be transferred to a TFTP, File Transfer Protocol (FTP), or remote copy protocol (rcp) server and subsequently interpreted by technical personnel that have access to source code and detailed memory maps.

If you use TFTP to dump the core file to a server, the router will only dump the first 16 MB of the core file. If the router's memory is larger than 16 MB, the whole core file will not be copied to the server. Therefore, use rcp or FTP to dump the core file.

Examples

In the following example, a user configures a router to use FTP to dump a core file named dumpfile to the FTP server at 172.17.92.2 when it crashes:

```
ip ftp username red
ip ftp password blue
exception protocol ftp
exception dump 172.17.92.2
exception core-file dumpfile
```

Related Commands

Command	Description
exception dump	Causes the router to dump a core file to a particular server when the router crashes.
exception memory	Causes the router to create a core dump and reboot when certain memory size parameters are violated.
exception spurious-interrupt	Causes the router to create a core dump and reload after a specified number of spurious interrupts.
exception protocol	Configures the protocol used for core dumps.
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp username	Configures the username for FTP connections.

exception dump

To configure the router to dump a core file to a particular server when the router crashes, use the **exception dump** global configuration command. To disable core dumps, use the **no** form of this command.

exception dump *ip-address*

no exception dump

Syntax Description

ip-address	IP address of the server that stores the core dump file.

Defaults

Disabled

Command Modes

Global configuration (config)

Command History

Release	Modification
10.3	This command was introduced.

Usage Guidelines

Caution Use the **exception** commands only under the direction of a technical support representative. Creating a core dump while the router is functioning in a network can disrupt network operation. The resulting binary file, which is very large, must be transferred to a TFTP, File Transfer Protocol (FTP), or remote copy protocol (rcp) server and subsequently interpreted by technical personnel that have access to source code and detailed memory maps.

If you use TFTP to dump the core file to a server, the router will only dump the first 16 MB of the core file. If the router's memory is larger than 16 MB, the whole core file will not be copied to the server. Therefore, use rcp or FTP to dump the core file.

The core dump is written to a file named *hostname*-core on your server, where *hostname* is the name of the router. You can change the name of the core file by configuring the **exception core-file** command.

This procedure can fail for certain types of system crashes. However, if successful, the core dump file will be the size of the memory available on the processor (for example, 16 MB for a CSC/4).

Examples

In the following example, a user configures a router to use FTP to dump a core file to the FTP server at 172.17.92.2 when it crashes:

```
ip ftp username red
ip ftp password blue
exception protocol ftp
exception dump 172.17.92.2
```

Related Commands

Command	Description
exception core-file	Specifies the name of the core dump file.
exception memory	Causes the router to create a core dump and reboot when certain memory size parameters are violated.
exception spurious-interrupt	Causes the router to create a core dump and reload after a specified number of spurious interrupts.
exception protocol	Configures the protocol used for core dumps.
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp username	Configures the username for FTP connections.
ip rcmd remote-username	Configures the remote username to be used when requesting a remote copy using rcp.

exception linecard

To enable storing of crash information for a line card and optionally specify the type and amount of information stored, use the **exception linecard** global configuration command. To disable the storing of crash information for the line card, use the **no** form of this command.

exception linecard {**all** | **slot** *slot-number*} [**corefile** *filename* | **main-memory** *size* [**k** | **m**] | **queue-ram** *size* [**k** | **m**] | **rx-buffer** *size* [**k** | **m**] | **sqe-register-rx** | **sqe-register-tx** | **tx-buffer** *size* [**k** | **m**]]

no exception linecard

Syntax Description

all	Stores crash information for all line cards.
slot *slot- number*	Stores crash information for the line card in the specified slot. Slot numbers range from 0 to 11 for the Cisco 12012 and 0 to 7 for the Cisco 12008 router.
corefile *filename*	(Optional) Stores the crash information in the specified file in NVRAM. The default filename is *hostname*-**core**-*slot-number* (for example, c12012-core-8).
main-memory *size*	(Optional) Stores the crash information for the main memory on the line card and specifies the size of the crash information. Size of the memory to store is 0 to 268435456.
queue-ram *size*	(Optional) Stores the crash information for the queue RAM memory on the line card and specifies the size of the crash information. Size of the memory to store can be from 0 to 1048576.
rx-buffer *size* **tx-buffer** *size*	(Optional) Stores the crash information for the receive and transmit buffer on the line card and specifies the size of the crash information. Size of the memory to store can be from 0 to 67108864.
sqe-register-rx **sqe-register-tx**	(Optional) Stores crash information for the receive or transmit silicon queueing engine registers on the line card.
k **m**	(Optional) The **k** option multiplies the specified *size* by 1K (1024), and the **m** option multiplies the specified *size* by 1M (1024*1024).

Defaults

No crash information is stored for the line card.

If enabled with no options, the default is to store 256 MB of main memory.

Command Modes

Global configuration (config)

Command History

Release	Modification
11.2 GS	This command was introduced.

Usage Guidelines

This command is currently supported only on Cisco 12000 series Gigabit Switch Routers (GSRs).

Use the **exception linecard** global configuration command only when directed by a technical support representative. Only enable options that the technical support representative requests you to enable. Technical support representatives need to be able to look at the crash information from the line card to troubleshoot serious problems on the line card. The crash information contains all the line card memory information including the main memory and transmit and receive buffer information.

Caution Use caution when enabling the **exception linecard** global configuration command. Enabling all options could cause a large amount (150 to 250 MB) of crash information to be sent to the server.

Examples

In the following example, the user enables the storing of crash information for line card 8. By default, 256 MB of main memory is stored.

```
12000(config)# exception linecard slot 8
```

exception memory

To cause the router to create a core dump and reboot when certain memory size parameters are violated, use the **exception memory** global configuration command. To disable the rebooting and core dump, use the **no** form of this command.

exception memory {**fragment** *size* | **minimum** *size*}

no exception memory {**fragment** | **minimum**}

Syntax Description

fragment *size*	The minimum contiguous block of memory in the free pool, in bytes.
minimum *size*	The minimum size of the free memory pool, in bytes.

Defaults

Disabled

Command Modes

Global configuration (config)

Command History

Release	Modification
10.3	This command was introduced.

Usage Guidelines

Caution Use the **exception** commands only under the direction of a technical support representative. Creating a core dump while the router is functioning in a network can disrupt network operation. The resulting binary file, which is very large, must be transferred to a TFTP, File Transfer Protocol (FTP), or remote copy protocol (rcp) server and subsequently interpreted by technical personnel that have access to source code and detailed memory maps.

This command is useful to troubleshoot memory leaks.

The size is checked every 60 seconds. If you enter a size that is greater than the free memory, a core dump and router reload is generated after 60 seconds.

The **exception dump** command must be configured in order to generate a core dump file. If the **exception dump** command is not configured, the router reloads without generating a core dump.

Examples

In the following example, the user configures the router to monitor the free memory. If the amount of free memory falls below 250,000 bytes, the router will dump the core file and reload.

```
exception dump 131.108.92.2
exception core-file memory.overrun
exception memory minimum 250000
```

Related Commands

Command	Description
exception core-file	Specifies the name of the core dump file.
exception dump	Configures the router to dump a core file to a particular server when the router crashes.
exception protocol	Configures the protocol used for core dumps.
exception region-size	Specifies the size of the region for the exception-time memory pool.
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp username	Configures the username for FTP connections.

exception protocol

To configure the protocol used for core dumps, use the **exception protocol** global configuration command. To configure the router to use the default protocol, use the **no** form of this command.

exception protocol {**ftp** | **rcp** | **tftp**}

no exception protocol

Syntax Description

ftp	Uses File Transfer Protocol (FTP) for core dumps.
rcp	Uses remote copy protocol (rcp) for core dumps.
tftp	Uses TFTP for core dumps. This is the default.

Defaults

TFTP

Command Modes

Global configuration (config)

Command History

Release	Modification
10.3	This command was introduced.

Usage Guidelines

Caution Use the **exception** commands only under the direction of a technical support representative. Creating a core dump while the router is functioning in a network can disrupt network operation. The resulting binary file, which is very large, must be transferred to a TFTP, File Transfer Protocol (FTP), or remote copy protocol (rcp) server and subsequently interpreted by technical personnel that have access to source code and detailed memory maps.

If you use TFTP to dump the core file to a server, the router will only dump the first 16 MB of the core file. If the router's memory is larger than 16 MB, the whole core file will not be copied to the server. Therefore, use rcp or FTP to dump the core file.

Examples

In the following example, the user configures a router to use FTP to dump a core file to the FTP server at 172.17.92.2 when it crashes:

```
ip ftp username red
ip ftp password blue
exception protocol ftp
exception dump 172.17.92.2
```

Related Commands

Command	Description
exception core-file	Specifies the name of the core dump file.
exception dump	Causes the router to dump a core file to a particular server when the router crashes.
exception memory	Causes the router to create a core dump and reboot when certain memory size parameters are violated.
exception spurious-interrupt	Causes the router to create a core dump and reload after a specified number of spurious interrupts.
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp username	Configures the username for FTP connections.

exception region-size

To specify the size of the region for the exception-time memory pool, use the **exception region-size** global configuration command. To use the default region size, use the **no** form of this command.

exception region-size *size*

no exception region-size

Syntax Description

size	The size of the region for the exception-time memory pool.

Defaults

16,384 bytes

Command Modes

Global configuration (config)

Command History

Release	Modification
10.3	This command was introduced.

Usage Guidelines

Caution Use the **exception** commands only under the direction of a technical support representative. Creating a core dump while the router is functioning in a network can disrupt network operation. The resulting binary file, which is very large, must be transferred to a TFTP, File Transfer Protocol (FTP), or remote copy protocol (rcp) server and subsequently interpreted by technical personnel that have access to source code and detailed memory maps.

The **exception region-size** command is used to define a small amount of memory to serve as a fallback pool when the processor memory pool is marked corrupt. The **exception memory** command must be used to allocate memory to perform a core dump.

Examples

In the following example, the region size is set at 1024:

```
Router# exception region-size 1024
```

Related Commands

Command	Description
exception core-file	Specifies the name of the core dump file.
exception dump	Configures the router to dump a core file to a particular server when the router crashes.

Command	Description
exception memory	Causes the router to create a core dump and reboot when certain memory size parameters are violated.
exception protocol	Configures the protocol used for core dumps.
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp username	Configures the username for FTP connections.

exception spurious-interrupt

To configure the router to create a core dump and reload after a specified number of spurious interrupts, use the **exception spurious-interrupt** command global configuration command. To disable the core dump and reload, use the **no** form of this command.

exception spurious-interrupt [*number*]

no exception spurious-interrupt

Syntax Description

number	(Optional) A number from 1 to 4294967295 that indicates the maximum number of spurious interrupts to include in the core dump before reloading.

Defaults

Disabled

Command Modes

Global configuration (config)

CommandHistory

Release	Modification
10.3	This command was introduced.

Usage Guidelines

Caution Use the **exception** commands only under the direction of a technical support representative. Creating a core dump while the router is functioning in a network can disrupt network operation. The resulting binary file, which is very large, must be transferred to a TFTP, File Transfer Protocol (FTP), or remote copy protocol (rcp) server and subsequently interpreted by technical personnel that have access to source code and detailed memory maps.

If you use TFTP to dump the core dump file to a server, the router will only dump the first 16 MB of the file. If the router's memory is larger than 16 MB, the whole core file will not be copied to the server. Therefore, use rcp or FTP to dump the core file.

Examples

In the following example, the user configures a router to create a core dump with a limit of two spurious interrupts:

```
Router# exception spurious-interrupt 2
```

Related Commands

Command	Description
exception core-file	Specifies the name of the core dump file.
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp username	Configures the user name for FTP connections.

execute-on

To execute commands on a line card, use the **execute-on** privileged EXEC command.

execute-on {**slot** *slot-number* | **all** | **master**} *command*

Syntax Description

slot *slot-number*	Executes the command on the line card in the specified slot. Slot numbers can be chosen from the following ranges: • Cisco 12012 router: 0 to 11 • Cisco 12008 access server: 0 to 7 • Cisco AS5800 access server: 0 to 13
all	Executes the command on all line cards.
master	(AS5800 only) Executes the designated command on a Dial Shelf Controller (DSC). Do not use this option; it is used for technical support troubleshooting only.
command	Cisco IOS command to remotely execute on the line card.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was introduced to support Cisco 12000 series Gigabit Switch Routers.
11.3(2)AA	Support for this command was added to the Cisco AS5800 universal access server.

Usage Guidelines

Use this command to execute a command on one or all line cards to monitor and maintain information on one or more line cards (for example, a line card in a specified slot on a dial shelf). This allows you to issue commands remotely; that is, to issue commands without needing to log in to the line card directly. The **all** form of the command allows you to issue commands to all the line cards without having to log in to each in turn.

Though this command does not have a **no** form, note that it is possible to use the **no** form of the remotely executed commands used in this command.

Tip This command is useful when used with **show** EXEC commands (such as **show version**), because you can verify and troubleshoot the features found only on a specific line card. Please note, however, that because not all statistics are maintained on the line cards, the output from some of the **show** commands might not be consistent.

Cisco 12000 GSR Guidelines and Restrictions

You can use the **execute-on** privileged EXEC command only from Cisco IOS software running on the GRP card.

Timesaver Though you can use the **attach** privileged EXEC command to execute commands on a specific line card, using the **execute-on slot** command saves you some steps. For example, first you must use the **attach** command to connect to the Cisco IOS software running on the line card. Next you must issue the command. Finally you must disconnect from the line card to return to the Cisco IOS software running on the GRP card. With the **execute-on slot** command, you can perform three steps with one command. In addition, the **execute-on all** command allows you to perform the same command on all line cards simultaneously.

Cisco AS5800 Guidelines and Restrictions

The purpose of the command is to conveniently enable certain commands to be remotely executed on the dial shelf cards from the router without connecting to each line card. This is the recommended procedure, because it avoids the possibility of adversely affecting a good configuration of a line card in the process. The **execute-on** command does not give access to every Cisco IOS command available on the Cisco AS5800 access server. In general, the purpose of the **execute-on** command is to provide access to statistical reports from line cards without directly connecting to the dial shelf line cards.

Warning **Do not use this command to change configurations on dial shelf cards, because such changes will not be reflected in the router shelf.**

Using this command makes it possible to accumulate inputs for inclusion in the **show tech-support** command.

The **master** form of the command can run a designated command remotely on the router from the DSC card. However, using the console on the DSC is *not* recommended. It is used for technical support troubleshooting only.

The **show tech-support** command for each dial shelf card is bundled into the router shelf's **show tech-support** command via the **execute-on** facility.

The **execute-on** command also support interactive commands such as the following:

```
router: execute-on slave slot slot ping
```

The **execute-on** command has the same limitations and restrictions as a **vty telnet** client has; that is, it cannot reload DSC using the following command:

```
router: execute-on slave slot slot reload
```

You can use the **execute-on** command to enable remote execution of the commands included in the following partial list:

- **debug dsc clock**
- **show context**
- **show diag**
- **show environment**
- **show dsc clock**
- **show dsi**
- **show dsip**
- **show tech-support**

Examples

In the following example, the user executes the **show controllers** command on the line card in slot 4 of a Cisco 12000 series GSR:

```
Router# execute-on slot 4 show controllers

========= Line Card (Slot 4) =======

Interface POS0
Hardware is BFLC POS
lcpos_instance struct   6033A6E0
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000400
SUNI rsop intr status   00
CRC16 enabled, HDLC enc, int clock
no loop

Interface POS1
Hardware is BFLC POS
lcpos_instance struct   6033CEC0
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000600
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, int clock
no loop

Interface POS2
Hardware is BFLC POS
lcpos_instance struct   6033F6A0
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000800
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, int clock
no loop

Interface POS3
Hardware is BFLC POS
lcpos_instance struct   60341E80
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000A00
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, ext clock
no loop
Router#
```

Related Commands

Command	Description
attach	Connects you to a specific line card for the purpose of executing commands using the Cisco IOS software image on that line card.

logging

To log messages to a syslog server host, use the **logging** global configuration command. To delete the syslog server with the specified address from the list of syslogs, use the **no** form of this command.

logging *host-name*

no logging *host-name*

Syntax Description

host-name	Name or IP address of the host to be used as a syslog server.

Defaults

No messages are logged to a syslog server host.

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command identifies a syslog server host to receive logging messages. By issuing this command more than once, you build a list of syslog servers that receive logging messages.

Examples

In the following example, messages are logged to a host named john:

```
logging john
```

Related Commands

Command	Description
logging trap	Limits messages logged to the syslog servers based on severity and limits the logging of system messages sent to syslog servers to only those messages at the specified level.

logging buffered

To limit messages logged to an internal buffer based on severity, use the **logging buffered** global configuration command. To cancel the use of the buffer, use the **no** form of this command. The **default** form of this command returns the buffer size to the default size.

logging buffered [*buffer-size* | *level*]

no logging buffered

default logging buffered

Syntax Description

buffer-size	(Optional) Size of the buffer from 4096 to 4,294,967,295 bytes. The default size varies by platform.
level	(Optional) Limits the logging of messages to the buffer to a specified level. You can enter the level name or level number. See Table 55 for a list of the accepatable level name or level number keywords.

Defaults

For most platforms, the Cisco IOS software logs messages to the internal buffer.

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.
11.1(17)T	The command syntax was changed to include the *level* argument.

Usage Guidelines

This command copies logging messages to an internal buffer. The buffer is circular in nature, so newer messages overwrite older messages after the buffer is filled.

Specifying a level causes messages at that level and numerically lower levels to be logged in an internal buffer. See Table 55 for a list of level arguments.

Do not make the buffer size too large because the router could run out of memory for other tasks. You can use the **show memory** EXEC command to view the free processor memory on the router; however, this is the maximum available and should not be approached. The **default logging buffered** command resets the buffer size to the default for the platform.

To display the messages that are logged in the buffer, use the **show logging** EXEC command. The first message displayed is the oldest message in the buffer.

The **show logging** EXEC command displays the addresses and levels associated with the current logging setup, and any other logging statistics.

Table 55 System Message Logging Priorities and Corresponding Level Names/Numbers

Level Name	Level Number	Description	Syslog Definition
emergencies	0	System unusable	LOG_EMERG
alerts	1	Immediate action needed	LOG_ALERT
critical	2	Critical conditions	LOG_CRIT
errors	3	Error conditions	LOG_ERR
warnings	4	Warning conditions	LOG_WARNING
notifications	5	Normal but significant condition	LOG_NOTICE
informational	6	Informational messages only	LOG_INFO
debugging	7	Debugging messages	LOG_DEBUG

Examples

In the following example, the user enables logging to an internal buffer:

```
logging buffered
```

Related Commands

Command	Description
clear logging	Clears messages from the logging buffer.
show logging	Displays the state of logging (syslog).

logging console

To limit messages logged to the console based on severity, use the **logging console** global configuration command. To disable logging to the console terminal, use the **no** form of this command.

logging console *level*

no logging console

Syntax Description

level	Limits the logging of messages displayed on the console terminal to a specified level. You can enter the level number or level name. See Table 56 for a list of the level arguments.

Defaults

debugging

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Specifying a level causes messages at that level and numerically lower levels to be displayed at the console terminal.

The **show logging** EXEC command displays the addresses and levels associated with the current logging setup, and any other logging statistics. See Table 56.

Table 56 System Message Logging Priorities and Corresponding Level Names/Numbers

Level Arguments	Level	Description	Syslog Definition
emergencies	0	System unusable	LOG_EMERG
alerts	1	Immediate action needed	LOG_ALERT
critical	2	Critical conditions	LOG_CRIT
errors	3	Error conditions	LOG_ERR
warnings	4	Warning conditions	LOG_WARNING
notifications	5	Normal but significant condition	LOG_NOTICE
informational	6	Informational messages only	LOG_INFO
debugging	7	Debugging messages	LOG_DEBUG

The effect of the **log** keyword with the IP **access list** (extended) interface configuration command depends on the setting of the **logging console** command. The **log** keyword takes effect only if the logging console level is set to 6 or 7. If you change the default to a level lower than 6 and specify the **log** keyword with the IP **access list** (extended) command, no information is logged or displayed.

Examples

In the following example, the user changes the level of messages displayed to the console terminal to **alerts**, which means alerts and emergencies are displayed:

```
logging console alerts
```

Related Commands

Command	Description
access-list (extended)	Defines an extended XNS access list.
logging facility	Configures the syslog facility in which system messages are sent.

logging facility

To configure the syslog facility in which system messages are sent, use the **logging facility** global configuration command. To revert to the default of **local7**, use the **no** form of this command.

logging facility *facility-type*

no logging facility

Syntax Description

facility-type	Syslog facility. See the Usage Guidelines section of this command reference entry for descriptions of acceptable keywords.

Defaults

local7

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Table 57 describes the acceptable keywords for the *facility-type* argument.

Table 57 logging facility facility-type Argument

Facility-type keyword	Description
auth	Authorization system
cron	Cron facility
daemon	System daemon
kern	Kernel
local0–7	Reserved for locally defined messages
lpr	Line printer system
mail	Mail system
news	USENET news
sys9	System use
sys10	System use
sys11	System use
sys12	System use
sys13	System use
sys14	System use
syslog	System log

Table 57 logging facility facility-type Argument (continued)

Facility-type keyword	Description
user	User process
uucp	UNIX-to-UNIX copy system

Examples

In the following example, the user configures the syslog facility to the kernel facility type:

```
logging facility kern
```

Related Commands

Command	Description
logging console	Limits messages logged to the console based on severity.

logging history

To limit syslog messages sent to the router's history table and the Simple Network Management Protocol (SNMP) network management station based on severity, use the **logging history** global configuration command. To return the logging of syslog messages to the default level, use the **no** form of this command with the previously configured severity level argument.

logging history [*severity-level-name* | *severity-level-number*]

no logging history [*severity-level-name* | *severity-level-number*]

Syntax Description

severity-level-name	Name of the severity level. Specifies the lowest severity level for system error messag logging. See the Usage Guidelines section of this command for available keywords.
severity-level-number	Number of the severity level. Specifies the lowest severity level for system error messag logging. See the Usage Guidelines section of this command for available keywords.

Defaults

Logging of system messages of severity levels 0 through 4 (emergency, alert, critical, error, and warning levels); in other words, "saving level warnings or higher"

Command Modes

Global configuration (config)

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

Sending syslog messages to the SNMP network management station occurs when you enable syslog traps with the **snmp-server enable traps** global configuration command. Because SNMP traps are inherently unreliable and much too important to lose, at least one syslog message, the most recent message, is stored in a history table on the router. The history table, which contains table size, message status, and message text data, can be viewed using the **show logging history** command. The number of messages stored in the table is governed by the **logging history size** EXEC command.

Severity levels are numbered 0 through 7, with 0 being the highest severity level and 7 being the lowest severity level (that is, the lower the number, the more critical the message). Specifying a *level* causes messages at that severity level and numerically lower levels to be stored in the router's history table and sent to the SNMP network management station. For example, specifying the level **critical** causes messages as the critical (3), alert (2), and emergency (1) levles to be saved to the logging history table.

Table 58 provides a description of logging severity levels, listed from higest severity to lowest severity, and the arguments used inthe **logging history** command syntax. Note that you can use the level name or the level number as the *level* argument in this command.

Table 58 System Logging Message Severity Levels

Severity Level Name	Severity Level Number	Description	Syslog Definition
emergencies	**0**	System unusable	LOG_EMERG
alerts	**1**	Immediate action needed	LOG_ALERT
critical	**2**	Critical conditions	LOG_CRIT
errors	**3**	Error conditions	LOG_ERR
warnings	**4**	Warning conditions	LOG_WARNING
notifications	**5**	Normal but significant condition	LOG_NOTICE
informational	**6**	Informational messages only	LOG_INFO
debugging	**7**	Debugging messages	LOG_DEBUG

Examples

In the following example, the system is initially configured to the default of saving severity level 4 or higher. The **logging history1** command is used to configure the system to save only level 1 (alert) and level 0 (emergency) messages to the logging history table. The configuration is then confirmed using the show logging history command.

```
Router#show logging history
Syslog History Table:10 maximum table entries,
! The following line shows that system-error-message-logging is set to the
! default level of "warnings" (4).
saving level warnings or higher
 23 messages ignored, 0 dropped, 0 recursion drops
 1 table entries flushed
 SNMP notifications not enabled
   entry number 2 : LINK-3-UPDOWN
    Interface FastEthernet0, changed state to up
    timestamp: 2766
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#logging history 1
Router(config)#end
Router#
4w0d: %SYS-5-CONFIG_I: Configured from console by console
Router#show logging history
Syslog History Table:1 maximum table entries,
! The following line indicates that 'logging history level 1' is configured.
saving level alerts or higher
 18 messages ignored, 0 dropped, 0 recursion drops
 1 table entries flushed
 SNMP notifications not enabled
   entry number 2 : LINK-3-UPDOWN
    Interface FastEthernet0, changed state to up
    timestamp: 2766
Router#
```

Related Commands

Command	Description
logging on	Controls (enables or disables) the logging of system messages.
logging history size	Changes the number of syslog messages stored in the router's history table.
show logging	Displays the state of logging (syslog).
show logging history	Displays the state of logging history.
snmp-server host	Specifies the recipient of an SNMP notification operation.

logging history size

To change the number of syslog messages stored in the router's history table, use the **logging history size** global configuration command. To return the number of messages to the default value, use the **no** form of this command.

logging history size *number*

no logging history size

Syntax Description

number	Number from 1 to 500 that indicates the maximum number of messages stored in the history table.

Defaults

One message

Command Modes

Global configuration (config)

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

When the history table is full (that is, it contains the maximum number of message entries specified with the **logging history size** command), the oldest message entry is deleted from the table to allow the new message entry to be stored.

Examples

In the following example, the user sets the number of messages stored in the history table to 20:

```
logging history size 20
```

Related Commands

Command	Description
logging history	Limits syslog messages sent to the router's history table and the SNMP network management station based on severity.
show logging	Displays the state of logging (syslog).

logging linecard

To log messages to an internal buffer on a line card, use the **logging linecard** global configuration command. To cancel the use of the internal buffer on the line cards, use the **no** form of this command.

logging linecard [*size* | *level*]

no logging linecard

Syntax Description

size	(Optional) Size of the buffer used for each line card. The range is from 4096 to 65,536 bytes. The default is 8 KB.
level	(Optional) Limits the logging of messages displayed on the console terminal to a specified level. The message level can be one of the following: • **alerts**—Immediate action needed • **critical**—Critical conditions • **debugging**—Debugging messages • **emergencies**—System is unusable • **errors**—Error conditions • **informational**—Informational messages • **notifications**—Normal but significant conditions • **warnings**—Warning conditions

Defaults

The Cisco IOS software logs messages to the internal buffer on the GRP card.

Command Modes

Global configuration (config)

Command History

Release	Modification
11.2 GS	This command was added to support the Cisco 12000 series Gigabit Switch Routers.

Usage Guidelines

Specifying a message level causes messages at that level and numerically lower levels to be stored in the internal buffer on the line cards.

Table 59 lists the message levels and associated numerical level. For example, if you specify a message level of critical, all critical, alert, and emergency messages will be logged.

Table 59 Message Levels

Level Keyword	Level
emergencies	0
alerts	1
critical	2
errors	3
warnings	4
notifications	5
informational	6
debugging	7

To display the messages that are logged in the buffer, use the **show logging slot** EXEC command. The first message displayed is the oldest message in the buffer.

Do not make the buffer size too large because the router could run out of memory for other tasks. You can use the **show memory** EXEC command to view the free processor memory on the router; however, this is the maximum available and should not be approached.

Examples

The following example enables logging to an internal buffer on the line cards using the default buffer size and logging warning, error, critical, alert, and emergency messages:

```
(config)# logging linecard warnings
```

Related Commands

Command	Description
clear logging	Clears messages from the logging buffer.
show logging	Displays the state of logging (syslog).

logging monitor

To limit messages logged to the terminal lines (monitors) based on severity, use the **logging monitor** global configuration command. This command limits the logging messages displayed on terminal lines other than the console line to messages with a level at or above the *level* argument. To disable logging to terminal lines other than the console line, use the **no** form of this command.

logging monitor *severity-level*

no logging monitor

Syntax Description

severity-level	Limits the logging of messages logged to the terminal lines (monitors) to a specified level. You can enter the level number or level name. See the Usage Guidelines section for a list of acceptable severity-level keywords.

Defaults

debugging (severity-level 7)

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Specifying a *level* causes messages at that level and numerically lower levels to be displayed to the monitor.

Table 60 logging monitor System Message Logging Priorities

Level Name	Level Number	Description	Syslog Definition
emergencies	0	System unusable	LOG_EMERG
alerts	1	Immediate action needed	LOG_ALERT
critical	2	Critical conditions	LOG_CRIT
errors	3	Error conditions	LOG_ERR
warnings	4	Warning conditions	LOG_WARNING
notifications	5	Normal but significant conditions	LOG_NOTICE
informational	6	Informational messages only	LOG_INFO
debugging	7	Debugging messages	LOG_DEBUG

Examples

In the following example, the user specifies that only messages of the levels **errors**, **critical**, **alerts**, and **emergencies** be displayed on terminals:

```
logging monitor 3
```

Related Commands

Command	Description
terminal monitor	Enables the display of system messages to the terminal connection.

logging on

To control logging of system messages (including error messages or debugging messages), use the **logging on** global configuration command. This command sends system messages to a logging process, which logs messages to designated locations asynchronously to the processes that generated the messages. To disable the logging process, use the **no** form of this command.

logging on

no logging on

Syntax Description

This command has no arguments or keywords.

Defaults

The Cisco IOS software sends messages to the asynchronous logging process.

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The logging process controls the distribution of logging messages to the various destinations, such as the logging buffer, terminal lines, or syslog server. You can turn logging on and off for these destinations individually using the **logging buffered**, **logging monitor**, and **logging** global configuration commands. However, if the **logging on** command is disabled, no messages will be sent to these destinations. Only the console will receive messages.

Additionally, the logging process logs messages to the console and the various destinations after the processes that generated them have completed. When the logging process is disabled, messages are displayed on the console as soon as they are produced, often appearing in the middle of command output.

Caution Disabling the **logging on** command will substantially slow down the router. Any process generating system messages will wait until the messages have been displayed on the console before continuing.

The **logging synchronous** line configuration command also affects the displaying of messages to the console. When the **logging synchronous** command is enabled, messages will appear only after the user types a carriage return.

Examples

The following example shows command output and message output when logging is enabled. The ping process finishes before any of the logging information is printed to the console (or any other destination).

```
Router(config)# logging on
Router(config)# end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

```
Router# ping dirt

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.129, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/5/8 ms
Router#
IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sending
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1
IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sending
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1
IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sending
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1
IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sending
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1
IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sending
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1
```

In the following example, logging is disabled. The message output is displayed as messages are generated, causing the debug messages to be interspersed with the message "Type escape sequence to abort."

```
Router(config)# no logging on
Router(config)# end

%SYS-5-CONFIG_I: Configured from console by console
Router#
Router# ping dirt

IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sendingTyp
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1e
IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sending esc
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1
IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sendingape
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1
IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sendingse
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1
IP: s=172.21.96.41 (local), d=172.16.1.129 (Ethernet1/0), len 100, sendingquen
IP: s=171.69.1.129 (Ethernet1/0), d=172.21.96.41, len 114, rcvd 1ce to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.129, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 152/152/156 ms
Router#
```

Related Commands

Command	Description
logging	Logs messages to a syslog server host.
logging buffered	Logs messages to an internal buffer.
logging monitor	Limits messages logged to the terminal lines (monitors) based on severity.
logging synchronous	Synchronizes unsolicited messages and debug output with solicited Cisco IOS software output and prompts for a specific console port line, auxiliary port line, or vty.

logging rate-limit

To limit the rate of messages logged per second, use the **logging rate-limit** command in global configuration mode. To disable the limit, use the **no** form of this command.

logging rate-limit {*number* | **all** *number* | **console** {*number* | **all** *number*}} [**except** *severity*]

no logging rate-limit

Syntax Description

number	Maximum number of messages logged per second. The valid values are from 1 to 10000.
all	Sets the rate limit for all error and debug messages displayed at the console and printer.
console	Sets the rate limit for error and debug messages displayed at the console.
except	(Optional) Excludes messages of this severity level or lower. Severity decreases as the number increases. So, severity level 1 is a more serious problem than severity level 3.
severity	(Optional) Sets the logging severity level. The valid levels are from 0 to 7.

Command Default

The default for this command is 10 messages logged per second and exclusion of messages of the errors level or lower.

Command Modes

Global configuration

Command History

Release	Modification
12.1(3)T	This command was introduced.
12.2	This command was integrated in Cisco IOS Release 12.2.
12.3	This command was integrated in Cisco IOS Release 12.3.
12.3T	This command was integrated in Cisco IOS Release 12.3T.
12.4	This command was integrated in Cisco IOS Release 12.4.
12.4T	This command was integrated in Cisco IOS Release 12.4T.

Usage Guidelines

The **logging rate-limit** command controls the output of messages from the system. Use this command if you want to avoid a flood of output messages. You can select the severity of the output messages and output rate by using the **logging rate-limit** command. You can use the **logging rate-limit** command anytime; it will not negatively impact the performance of your system and may improve the system performance by specifying the severities and rates of output messages.

You can use this command with or without the **logging synchronous** line configuration command. For example, if you want to see all severity 0, 1, and 2 messages, use the **no logging synchronous** command and specify **logging rate-limit 10 except 2**. By using the two commands together, you cause all messages of 0, 1, and 2 severity to print and limit the less severe ones (lower than 2) to only 10 per second.

Table 61 compares the error message logging numeric severity level with its equivalent word description.

Table 61 Error Message Logging Severity Level and Equivalent Word Descriptions

Numeric Severity Level	Equivalent Word	Description
0	**emergencies**	System unusable
1	**alerts**	Immediate action needed
2	**critical**	Critical conditions
3	**errors**	Error conditions
4	**warnings**	Warning conditions
5	**notifications**	Normal but significant condition
6	**informational**	Informational messages only
7	**debugging**	Debugging messages

Examples

In the following example, the **logging rate-limit** configuration mode command limits message output to 200 per second:

```
Router(config)# logging rate-limit 200
```

Related Commands

Command	Description
logging synchronous	Synchronizes unsolicited messages and debug output with solicited Cisco IOS software output and prompts for a specific console port line, auxiliary port line, or vty.

logging source-interface

To specify the source IP address of syslog packets, use the **logging source-interface** global configuration command. To remove the source designation, use the **no** form of this command.

logging source-interface *interface-type interface-number*

no logging source-interface

Syntax Description

interface-type	Interface type.
interface-number	Interface number.

Defaults

No interface is specified.

Command Modes

Global configuration (config)

Command History

Release	Modification
11.2	This command was introduced.

Normally, a syslog message contains the IP address of the interface it uses to leave the router. The **logging source-interface** command specifies that syslog packets contain the IP address of a particular interface, regardless of which interface the packet uses to exit the router.

Examples

In the following example, the user specifies that the IP address for Ethernet interface 0 is the source IP address for all syslog messages:

```
logging source-interface ethernet 0
```

The following example specifies that the IP address for Ethernet interface 2/1 on a Cisco 7000 series router is the source IP address for all syslog messages:

```
logging source-interface ethernet 2/1
```

Related Commands

Command	Description
logging	Logs messages to a syslog server host.

logging synchronous

To synchronize unsolicited messages and debug output with solicited Cisco IOS software output and prompts for a specific console port line, auxiliary port line, or vty, use the **logging synchronous** line configuration command. To disable synchronization of unsolicited messages and debug output, use the **no** form of this command.

logging synchronous [**level** *severity-level* | **all**] [**limit** *number-of-buffers*]

no logging synchronous [**level** *severity-level* | **all**] [**limit** *number-of-buffers*]

Syntax Description

level *severity-level*	(Optional) Specifies the message severity level. Messages with a severity level equal to or higher than this value are printed asynchronously. Low numbers indicate greater severity and high numbers indicate lesser severity. The default value is 2.
all	(Optional) Specifies that all messages are printed asynchronously, regardless of the severity level.
limit *number-of-buffers*	(Optional) Specifies the number of buffers to be queued for the terminal after which new messages are dropped. The default value is 20.

Defaults

This feature is turned off by default.

If you do not specify a severity level, the default value of 2 is assumed.

If you do not specify the maximum number of buffers to be queued, the default value of 20 is assumed.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

When synchronous logging of unsolicited messages and debug output is turned on, unsolicited Cisco IOS software output is displayed on the console or printed after solicited Cisco IOS software output is displayed or printed. Unsolicited messages and debug output is displayed on the console after the prompt for user input is returned. To keep unsolicited messages and debug output from being interspersed with solicited software output and prompts. After the unsolicited messages are displayed, the console displays the user prompt again.

When specifying a severity level number, consider that for the logging system, low numbers indicate greater severity and high numbers indicate lesser severity.

When a message queue limit of a terminal line is reached, new messages are dropped from the line, although these messages might be displayed on other lines. If messages are dropped, the notice "%SYS-3-MSGLOST *number-of-messages* due to overflow" follows any messages that are displayed. This notice is displayed only on the terminal that lost the messages. It is not sent to any other lines, any logging servers, or the logging buffer.

Caution By configuring abnormally large message queue limits and setting the terminal to "terminal monitor" on a terminal that is accessible to intruders, you expose yourself to "denial of service" attacks. An intruder could carry out the attack by putting the terminal in synchronous output mode, making a Telnet connection to a remote host, and leaving the connection idle. This could cause large numbers of messages to be generated and queued, and these messages would unlikely consume all available RAM. You should guard against this type of attack through proper configuration.

Examples

In the following example, line 4 is identified and synchronous logging for line 4 is enabled with a severity level of 6. Then another line, line 2, is identified and the synchronous logging for line 2 is enabled with a severity level of 7 and is specified with a maximum number of buffers to be 70,000.

```
line 4
logging synchronous level 6
line 2
logging synchronous level 7 limit 70000
```

Related Commands

Command	Description
line	Identifies a specific line for configuration and starts the line configuration command collection mode.
logging on	Controls logging of system messages and sends debug or error messages to a logging process, which logs messages to designated locations asynchronously to the processes that generated the messages.

logging trap

To limit messages logged to the syslog servers based on severity, use the **logging trap** global configuration command. The command limits the logging of system messages sent to syslog servers to only those messages at the specified level. To disable logging to syslog servers, use the **no** form of this command.

logging trap *level*

no logging trap

Syntax Description

level	Limits the logging of messages to the syslog servers to a specified level. You can enter the level number or level name. See the Usage Guidelines section for a list of acceptable *level* keywords.

Defaults

informational (level 6)

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The **show logging** EXEC command displays the addresses and levels associated with the current logging setup. The command output also includes ancillary statistics.

Table 1 lists the syslog definitions that correspond to the debugging message levels. Additionally, four categories of messages are generated by the software, as follows:

- Error messages about software or hardware malfunctions at the LOG_ERR level.
- Output for the debug commands at the LOG_WARNING level.
- Interface up/down transitions and system restarts at the LOG_NOTICE level.
- Reload requests and low process stacks at the LOG_INFO level.

Use the **logging** and **logging trap** commands to send messages to a UNIX syslog server.

Table 62 logging trap System Message Logging Priorities

Level Arguments	Level	Description	Syslog Definition
emergencies	0	System unusable	LOG_EMERG
alerts	1	Immediate action needed	LOG_ALERT
critical	2	Critical conditions	LOG_CRIT
errors	3	Error conditions	LOG_ERR
warnings	4	Warning conditions	LOG_WARNING

Table 62 logging trap System Message Logging Priorities (continued)

Level Arguments	Level	Description	Syslog Definition
notifications	5	Normal but significant condition	LOG_NOTICE
informational	6	Informational messages only	LOG_INFO
debugging	7	Debugging messages	LOG_DEBUG

Examples

In the following example, the messages to a host named john is logged:

```
logging john
logging trap notifications
```

Related Commands

Command	Description
logging	Logs messages to a syslog server host.

ping (privileged)

To diagnose basic network connectivity on Apollo, AppleTalk, Connectionless Network Service (CLNS), DECnet, IP, Novell IPX, VINES, or XNS networks, use the **ping** privileged EXEC command.

ping [*protocol* | **tag**] {*host-name* | *system-address*} [**data** [*hex-data-pattern*] | **df-bit** | **repeat** [*repeat-count*] | **size** [*datagram-size*] | **source** [*source-address* | **async** | **bvi** | **ctunnel** | **dialer** | **ethernet** | **fastEthernet** | **lex** | **loopback** | **multilink** | **null** | **port-channel** | **tunnel** | **vif** | **virtual-template** | **virtual-tokenring** | **xtagatm**] | **timeout** [*seconds*] | **validate**]

Syntax Description

protocol	(Optional) Protocol keyword, one of **apollo**, **appletalk**, **clns**, **decnet**, **ip**, **ipx**, **srb**, **vines**, or **xns**.
tag	(Optional) Specifies a tag encapsulated IP ping.
host-name	Host name of the system to ping.
system-address	Address of the system to ping.
data	(Optional) Specifies the data pattern.
hex-data-pattern	(Optional) Range is from 0 to FFFF.
df-bit	(Optional) Enables the “do-not-fragment” bit in the IP header.
repeat	(Optional) Specifies the number of pings sent. The default is 5.
repeat-count	(Optional) Range is from 1 to 2147483647.
size	(Optional) Specifies the datagram size. Datagram size is the number of bytes in each ping.
datagram-size	(Optional) Range is from 40 to 18024.
source	(Optional) Specifies the source address or name.
source-address	(Optional)Source address or name.
async	(Optional) Asynchronous interface.
bvi	(Optional) Bridge-Group Virtual Interface.
ctunnel	(Optional) CTunnel interface.
dialer	(Optional) Dialer interface.
ethernet	(Optional) Ethernet IEEE 802.3.
fastEthernet	(Optional) FastEthernet IEEE 802.3.
lex	(Optional) Lex interface.
loopback	(Optional) Loopback interface.
multilink	(Optional) Multilink-group interface.
null	(Optional) Null interface.
port-channel	(Optional) Ethernet channel of interfaces.
tunnel	(Optional) Tunnel interface.
vif	(Optional) PGM Multicast Host interface.
virtual-template	(Optional) Virtual Template interface.
virtual-tokenring	(Optional) Virtual TokenRing.
xtagatm	(Optional) Extended Tag ATM interface.
timeout	(Optional) Specifies the timeout interval in seconds. The default is 2 seconds.

seconds	(Optional) Range is from 0 to 3600.
validate	(Optional) Validates the reply data.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.0	The **data**, **df-bit**, **repeat**, **size**, **source**, **timeout**, and **validate** keywords were added.

Usage Guidelines

The **ping** (packet internet groper) command sends ISO CLNS echo packets to test the reachability of a remote router over a connectionless Open System Interconnection (OSI) network.

The **ping** command sends an echo request packet to an address, then awaits a reply. Ping output can help you evaluate path-to-host reliability, delays over the path, and whether the host can be reached or is functioning.

To abnormally terminate a ping session, type the escape sequence—by default, **Ctrl-^ X**. You type the default by simultaneously pressing and releasing the **Ctrl**, **Shift**, and **6** keys, and then pressing the **X** key.

Table 63 describes the test characters that the ping facility sends.

Table 63 ping Test Characters

Character	Description
!	Each exclamation point indicates receipt of a reply.
.	Each period indicates that the network server timed out while waiting for a reply.
U	A destination unreachable error protocol data unit (PDU) was received.
C	A congestion experienced packet was received.
I	User interrupted test.
?	Unknown packet type.
&	Packet lifetime exceeded.

Note Not all protocols require hosts to support pings. For some protocols, the pings are Cisco-defined and are only answered by another Cisco router.

Examples

After you enter the **ping** command in privileged mode, the system prompts for one of the following keywords: **apollo**, **appletalk**, **clns**, **decnet**, **ip**, **novell**, **vines**, or **xns**. The default protocol is IP.

If you enter a host name or address on the same line as the **ping** command, the default action is taken as appropriate for the protocol type of that name or address.

The optional **data**, **df-bit**, **repeat**, **size**, **source**, **timeout**, and **validate** keywords can be used to avoid extended **ping** command output. You can use as many of these keywords as you need, and you can use them in any order after the *host-name* or *system-address* arguments.

Although the precise dialog varies somewhat from protocol to protocol, all are similar to the ping session using default values shown in the following output:

```
Router# ping

Protocol [ip]:
Target IP address: 192.168.7.27
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 192.168.7.27, timeout is 2 seconds:
!!!!!
Success rate is 100 percent, round-trip min/avg/max = 1/2/4 ms
```

Table 64 describes the default **ping** fields shown in the display.

Table 64 ping Field Descriptions

Field	Description
Protocol [ip]:	Prompts for a supported protocol. Enter **appletalk**, **clns**, **ip**, **novell**, **apollo**, **vines**, **decnet**, or **xns**. The default is 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. The default is none.
Repeat count [5]:	Prompts for the number of ping packets that will be sent to the destination address. The default is 5 packets.
Datagram size [100]:	Prompts for the size of the ping packet (in bytes). The default is 100 bytes.
Timeout in seconds [2]:	Prompts for the timeout interval. The default is 2 seconds.
Extended commands [n]:	Specifies whether a series of additional commands appears.
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 that the network server timed out while waiting for a reply. Other characters may appear in the ping output display, depending on the protocol type.
Success rate is 100 percent	Indicates the percentage of packets successfully echoed back to the router. Anything less than 80 percent is usually considered problematic.
round-trip min/avg/max = 1/2/4 ms	Indicates the round-trip travel time intervals for the protocol echo packets, including minimum/average/maximum (in milliseconds).

Related Commands

Command	Description
ping (user)	Tests the connection to a remote host on the network.
ping vrf	Tests the connection to a remote device in a VPN.

ping (user)

To diagnose basic network connectivity on AppleTalk, Connection Network Service (CLNS), IP, Novell, Apollo, VINES, DECnet, or XNS networks, use the **ping** (packet internet groper) user EXEC command.

ping [*protocol*] {*host-name* | *system-address*}

Syntax Description

protocol	(Optional) Protocol keyword, one of **apollo**, **appletalk**, **clns**, **decnet**, **ip**, **ipx**, **vines**, or **xns**.
host-name	Host name of the system to ping.
system-address	Address of the system to ping.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The user-level ping feature provides a basic ping facility for users that do not have system privileges. This feature allows the Cisco IOS software to perform the simple default ping functionality for a number of protocols. Only the terse form of the **ping** command is supported for user-level pings.

If the system cannot map an address for a host name, it returns an "%Unrecognized host or address" error message.

To abnormally terminate a ping session, type the escape sequence—by default, **Ctrl-^ X**. You type the default by simultaneously pressing and releasing the **Ctrl**, **Shift**, and **6** keys, and then pressing the **X** key.

Table 65 describes the test characters that the ping facility sends.

Table 65 ping Test Characters

Character	Description
!	Each exclamation point indicates receipt of a reply.
.	Each period indicates that the network server timed out while waiting for a reply.
U	A destination unreachable error protocol data unit (PDU) was received.
C	A congestion experienced packet was received.
I	User interrupted test.
?	Unknown packet type.
&	Packet lifetime exceeded.

Examples

The following display shows sample ping output when you ping the IP host named donald:

```
Router> ping donald
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.7.27, timeout is 2 seconds:
!!!!!
Success rate is 100 percent, round-trip min/avg/max = 1/3/4 ms
```

Related Commands

Command	Description
ping (privileged)	Checks host reachability and network connectivity.

service slave-log

To allow slave Versatile Interface Processor (VIP) cards to log important system messages to the console, use the **service slave-log** global configuration command. To disable slave logging, use the **no** form of this command.

service slave-log

no service slave-log

Syntax Description

This command has no arguments or keywords.

Defaults

This command is enabled by default.

Command Modes

Global configuration (config)

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This command allows slave slots to log system messages of level 2 or higher (critical, alerts, and emergencies).

Examples

In the following example, important messages from the slave cards to the console are logged:

```
service slave-log
```

In the following example sample output is illustrated when this command is enabled:

```
%IPC-5-SLAVELOG: VIP-SLOT2:
 IPC-2-NOMEM: No memory available for IPC system initialization
```

The first line indicates which slot sent the message. The second line contains the system message.

service tcp-keepalives-in

To generate keepalive packets on idle incoming network connections (initiated by the remote host), use the **service tcp-keepalives-in** global configuration command. To disable the keepalives, use the **no** form of this command.

service tcp-keepalives-in

no service tcp-keepalives-in

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.

Examples

In the following example, keepalives on incoming TCP connections are generated:

```
service tcp-keepalives-in
```

Related Commands

Command	Description
service tcp-keepalives-out	Generates keepalive packets on idle outgoing network connections (initiated by a user).

service tcp-keepalives-out

To generate keepalive packets on idle outgoing network connections (initiated by a user), use the **service tcp-keepalives-out** global configuration command. To disable the keepalives, use the **no** form of this command.

service tcp-keepalives-out

no service tcp-keepalives-out

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.

Examples

In the following example, keepalives on outgoing TCP connections are generated:

```
service tcp-keepalives-out
```

Related Commands

Command	Description
service tcp-keepalives-in	Generates keepalive packets on idle incoming network connections (initiated by the remote host).

service timestamps

To configure the system to time-stamp debugging or logging messages, use one of the **service timestamps** global configuration commands. To disable this service, use the **no** form of this command.

service timestamps [**debug** | **log**] [**uptime** | **datetime** [**msec**] [**localtime**] [**show-timezone**]]

no service timestamps [**debug** | **log**]

Syntax Description

debug	Indicates timestamping for debugging messages.
log	Indicates timestamping for system logging messages.
uptime	(Optional) Specifies that the time stamp should consist of the time since the system was last rebooted. For example "4w6d" (time since last reboot is 4 weeks and 6 days). • This is the default timestamp format for both debugging messages and logging messages. • The format for uptime varies depending on how much time has elapsed: – *HHHH*:*MM*:*SS* (*HHHH* hours: *MM* minutes: *SS* seconds) for the first 24 hours – *D*d*HH*h (*D* days *HH* hours) after the first day – *W*w*D*d (*W* weeks *D* days) after the first week
datetime	(Optional) Specifies that the time stamp should consist of the date and time. • The time stamp format for datetime is MMM DD HH:MM:SS, where MMM is the month, DD is the date, HH is the hour (in 24-hour notation), MM is the minute, and SS is the second. • If the datetime keyword is specified, you can optionally add the **msec** **localtime**, or **show-timezone** keywords. • If the **service timestamps datetime** command is used without addtional keywords, timestamps will be shown using UTC, without the year, without milliseconds, and without a time zone name.
msec	(Optional) Includes milliseconds in the time stamp, in the format *HH***:***DD***:***MM***:***SS***.***mmm*, where *.mmm* is milliseconds
localtime	(Optional) Time stamp relative to the local time zone.
show-timezone	(Optional) Include the time zone name in the time stamp. **Note** If the localtime keyword option is not used (or if the local time zone has not been configured using the **clock timezone** command), time will be displayed in Universal Coordinated Time (UTC).

Defaults

No time-stamping.

If the **service timestamps** command is specified with no arguments or keywords, the default is **service timestamps debug uptime**.

The default for the **service timestamps** *type* **datetime** command is to format the time in Coordinated Universal Time (UTC), with no milliseconds and no time zone name.

The **no service timestamps** command by itself disables time stamps for both debug and log messages.

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Time stamps can be added to either debugging or logging messages independently. The **uptime** form of the command adds time stamps in the format HHHH:MM:SS, indicating the time since the system was rebooted. The **datetime** form of the command adds time stamps in the format MMM DD HH:MM:SS, indicating the date and time according to the system clock. If the system clock has not been set, the date and time are preceded by an asterisk (*) to indicate that the date and time are probably not correct.

Examples

In the following example, the user enables time stamps on debugging messages, showing the time since reboot:

```
service timestamps debug uptime
```

In the following example, the user enables time stamps on logging messages, showing the current time and date relative to the local time zone, with the time zone name included:

```
service timestamps log datetime localtime show-timezone
```

Related Commands

Command	Description
clock set	Manually sets the system clock.
ntp	Controls access to the system's NTP services.

show c2600 (2600)

To display information for troubleshooting the Cisco 2600 series router, use the **show c2600** EXEC command.

show c2600

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.3 XA	This command was introduced.

Usage Guidelines

The **show c2600** command provides complex troubleshooting information that pertains to the platform's shared references rather than to a specific interface.

Examples

In the following example, sample output is shown for the **show c2600** EXEC command. See Table 66 for a description of the output display fields.

```
router# show c2600

C2600 Platform Information:
Interrupts:

 Assigned Handlers...
  Vect  Handler   # of Ints   Name
    00  801F224C   00000000   Xilinx bridge error interrupt
    01  801DE768   0D3EE155   MPC860 TIMER INTERRUPT
    02  801E94E0   0000119E   16552 Con/Aux Interrupt
    04  801F0D94   00000000   PA Network Management Int Handler
    05  801E6C34   00000000   Timebase Reference Interrupt
    06  801F0DE4   00002C1A   PA Network IO Int Handler
    07  801F0EA0   0000015D   MPC860 CPM INTERRUPT
    14  801F224C   00000000   Xilinx bridge error interrupt

 IOS Priority Masks...
  Level 00 = [ EF020000 ]
  Level 01 = [ EC020000 ]
  Level 02 = [ E8020000 ]
  Level 03 = [ E0020000 ]
  Level 04 = [ E0020000 ]
  Level 05 = [ E0020000 ]
  Level 06 = [ C0020000 ]
  Level 07 = [ 00000000 ]

 SIU_IRQ_MASK  = FFFFFFFF  SIEN   = EF02xxxx   Current Level = 00
 Spurious IRQs = 00000000  SIPEND = 0000xxxx

 Interrupt Throttling:
```

```
  Throttle Count = 00000000   Timer Count      = 00000000
  Netint usec    = 00000000   Netint Mask usec = 000003E8
  Active         =        0   Configured       =        0
  Longest IRQ    = 00000000

IDMA Status:
 Requests = 00000349      Drops                = 00000000
 Complete = 00000349      Post Coalesce Frames = 00000349
 Giant    = 00000000
 Available Blocks = 256/256

ISP Status:
 Version string burned in chip: "A986122997"
 New version after next program operation: "B018020998"
 ISP family type: "2096"
 ISP chip ID: 0x0013
 Device is  programmable
```

Table 66 show c2600 Field Descriptions

Field	Description
Interrupts	Denotes that the next section describes the status of the interrupt services.
Assigned Handlers	Denotes a subsection of the Interrupt section that displays data about the interrupt handlers.
Vect	The processor vector number.
Handler	The execution address of the handler assigned to this vector.
# of Ints	The number of times this handler has been called.
Name	The name of the handler assigned to this vector.
IOS Priority Masks	Denotes the subsection of the Interrupt section that displays internal Cisco IOS priorities. Each item in this subsection indicates a Cisco IOS interrupt level and the bit mask used to mask out interrupt sources when that Cisco IOS level is being processed. Used exclusively for debugging.
SIU_IRQ_MASK	For engineering level debug only.
Spurious IRQs	For engineering level debug only.
Interrupt Throttling:	This subsection describes the behavior of the Interrupt Throttling mechanism on the platform.
Throttle Count	Number of times throttle has become active.
Timer Count	Number of times throttle has deactivated because the maximum masked out time for network interrupt level has been reached.
Netint usec	Maximum time network level is allowed to run (in microseconds).
Netint Mask usec	Maximum time network level interrupt is masked out to allow process level code to run (in microseconds).
Active	Indicates that the network level interrupt is masked or that the router is in interrupt throttle state.
Configured	Indicates that throttling is enabled or configured when set to 1.
Longest IRQ	Duration of longest network level interrupt (in microseconds).

Table 66 show c2600 Field Descriptions (continued)

Field	Description
IDMA Status	Monitors the activity of the Internal Direct Memory Access (IDMA) hardware and software. Used to coalesce packets (turn particalized packets into non particalized packets) for transfer to the process level switching mechanism.
Requests	Number of times the IDMA engine is asked to coalesce a packet.
Drops	Number of times the coalescing operation was aborted.
Complete	Number of times the operation was successful.
Post Coalesce Frames	Number of Frames completed post coalesce processing.
Giant	Number of packets too large to coalesce.
Available Blocks	Indicates the status of the request queue, in the format N/M where N is the number of empty slots in queue and M is the total number of slots; for example, 2/256 indicates that the queue has 256 entries and can accept two more requests before it is full.
ISP Status	Provides status of In-System-Programmable (ISP) hardware.
Version string burned in chip	Current version of ISP hardware.
New version after next program operation	Version of ISP hardware after next ISP programming operation.
ISP family type	Device family number of ISP hardware.
ISP chip ID	Internal ID of ISP hardware as designated by the chip manufacturer.
Device is programmable	"Yes" or "No." Indicates if an ISP operation is possible on this board.

Related Commands

Command	Description
show context	Displays information stored in NVRAM when the router crashes.

show c7200 (7200)

To display information about the CPU and midplane for Cisco 7200 series routers, use the **show c7200** EXEC command.

show c7200

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

You can use the output of this command to determine whether the hardware version level and upgrade is current. The information is generally useful for diagnostic tasks performed by technical support only.

Examples

The following is sample output from the **show c7200** command:

```
Router# show c7200

C7200 Network IO Interrupt Throttling:
 throttle count=0, timer count=0
 active=0, configured=0
 netint usec=3999, netint mask usec=200

C7200 Midplane EEPROM:
        Hardware revision 1.2           Board revision A0
        Serial number     2863311530    Part number    170-43690-170
        Test history      0xAA          RMA number     170-170-170
        MAC=0060.3e28.ee00, MAC Size=1024
        EEPROM format version 1, Model=0x6
        EEPROM contents (hex):
          0x20: 01 06 01 02 AA AA AA AA AA AA AA AA 00 60 3E 28
          0x30: EE 00 04 00 AA AA AA AA AA AA AA 50 AA AA AA AA

C7200 CPU EEPROM:
        Hardware revision 2.0           Board revision A0
        Serial number     3509953       Part number     73-1536-02
        Test history      0x0           RMA number      00-00-00
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 15 02 00 00 35 8E C1 49 06 00 02 00 00 00 00
          0x30: 50 00 00 00 FF FF FF FF FF FF FF FF FF FF FF FF
```

show cls

To display the current status of all Cisco link services (CLS) sessions on the router, use the **show cls** EXEC command.

show cls [**brief**]

Syntax Description

brief	(Optional) Displays a brief version of the output.

Defaults

Without the **brief** argument, displays complete output.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced in a release prior to Cisco IOS Release11.0.

Usage Guidelines

The Cisco link service CLS is used as the interface between data link users (DLUs), such as DLSw, LAN Network Manager (LNM), downstream physical unit (DSPU), and SNASw, and their corresponding data link circuits (DLCs) such as Logic Link Control (LLC), VDLC, and Qualified Logic Link Control (QLLC). Each DLU registers a particular service access point (SAP) with CLS, and establishes circuits through CLS over the DLC.

The **show cls** command displays the SAP values associated with the DLU and the circuits established through CLS.

Examples

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

```
IBD-4500B# show cls

DLU user:SNASW
   SSap:0x04  VDLC VDLC650
    DTE:1234.4000.0001 1234.4000.0002 04 04
    T1 timer:0   T2 timer:0  Inact timer:0
    max out:0    max in:0    retry count:10
    XID retry:10 XID timer:5000  I-Frame:0
    flow:0       DataIndQ:0   DataReqQ:0
DLU user:DLSWDLUPEER
DLU user:DLSWDLU
   Bridging  VDLC VDLC1000
   Bridging  VDLC VDLC650
```

The following is sample output from the **show cls brief** command:

```
IBD-4500B# show cls brief

DLU user:SNASW
   SSap:0x04  VDLC VDLC650
    DTE:1234.4000.0001 1234.4000.0002 04 04
```

```
DLU user:DLSWDLUPEER
DLU user:DLSWDLU
   Bridging  VDLC VDLC1000
   Bridging  VDLC VDLC650
```

The examples show two DLUs—SNASw and DLSw—active in the router. SNASw uses a SAP value of 0x04, and the associated DLC port is VDLC650. SNASw has a circuit established between MAC addresses 1234.4000.0001 and 1234.4000.0002 using source and destination SAPs 04 and 04. DLSw is a bridging protocol and uses VDLC1000 and VDLC650 ports. There are no circuits in place at this time.

In the output from the **show cls** command (without the **brief** argument), the values of timers and counters applicable to this circuit are displayed.

show context (2600)

To display information stored in NVRAM when an exception occurs, use the **show context** EXEC command.

show context

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.3	This command was introduced.

Usage Guidelines

Context information is specific to processors and architectures, whereas software version and uptime information is not specific to architectures. Context information for the Cisco 2600 series router differs from that for other router types because the Cisco 2600 runs with an M860 processor. The display from the **show context** command includes the following information:

- Reason for the system reboot
- Stack trace
- Software version
- The signal number, code, and router uptime information
- All the register contents at the time of the crash

This information is useful only to your technical support representative for analyzing crashes in the field. Use this information when you read the displayed statistics to an engineer over the phone.

Examples

The following is sample output from the **show context** command following a system failure on a Cisco 2600 series router. See Table 67 for a description of the fields in this output.

```
router# show context

S/W Version: Cisco Internetwork Operating System Software
IOS (tm) c2600 Software (c2600-JS-M), Released Version 11.3(19980115:184921]
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Thu 15-Jan-98 13:49 by mmagno
Exception occurred at: 00:02:26 UTC Mon Mar 1 1993
Exception type: Data TLB Miss (0x1200)
CPU Register Context:
PC  = 0x80109964  MSR = 0x00009030  CR  = 0x55FFFD35  LR    = 0x80109958
CTR = 0x800154E4  XER = 0xC000BB6F  DAR = 0x00000088  DSISR = 0x00000249
DEC = 0x7FFFDFCA  TBU = 0x00000000  TBL = 0x15433FCF  IMMR  = 0x68010020
R0  = 0x80000000  R1  = 0x80E80BD0  R2  = 0x80000000  R3    = 0x00000000
R4  = 0x80E80BC0  R5  = 0x40800000  R6  = 0x00000001  R7    = 0x68010000
R8  = 0x00000000  R9  = 0x00000060  R10 = 0x00001030  R11   = 0xFFFFFFFF
R12 = 0x00007CE6  R13 = 0xFFF379E8  R14 = 0x80D50000  R15   = 0x00000000
```

```
R16 = 0x00000000  R17 = 0x00000000  R18 = 0x00000000  R19   = 0x00000000
R20 = 0x00000000  R21 = 0x00000001  R22 = 0x00000010  R23   = 0x00000000
R24 = 0x00000000  R25 = 0x80E91348  R26 = 0x01936010  R27   = 0x80E92A80
R28 = 0x00000001  R29 = 0x019BA920  R30 = 0x00000000  R31   = 0x00000018
Stack trace:
Frame 00: SP = 0x80E80BD0    PC = 0x80109958
Frame 01: SP = 0x80E80C28    PC = 0x8010A720
Frame 02: SP = 0x80E80C40    PC = 0x80271010
Frame 03: SP = 0x80E80C50    PC = 0x8025EE64
Frame 04: SP = 0x80DEE548    PC = 0x8026702C
Frame 05: SP = 0x80DEE558    PC = 0x8026702C
```

Table 67 show context Field Descriptions

Field	Description
S/W Version	Standard Cisco IOS version string as displayed.
Exception occurred at	Router real time when exception occurred. The router must have the clock time properly configured for this to be accurate.
Exception type	Technical reason for exception. For engineering analysis.
CPU Register Context	Technical processor state information. For engineering analysis.
Stack trace	Technical processor state information. For engineering analysis.

Related Commands

Command	Description
show processes	Displays information about the active processes.
show stacks	Monitors the stack usage of processes and interrupt routines.

show context

To display information stored in NVRAM when the router crashes, use the **show context** EXEC command.

show context summary

show context {**all** | **slot** *slot-number* [*crash-index*] [**all**] [**debug**]}

Syntax Description

summary	Displays a summary of all the crashes recorded.
all	Displays all crashes for all the slots. When optionally used with the **slot** keyword, displays crash information for the specified slot.
slot *slot-number* [*crash-index*]	Displays information for a particular line card. Slot numbers range from 0 to 11 for the Cisco 12012 router and from 0 to 7 for the Cisco 12008. The index number allows you to look at previous crash contexts. Contexts from the last 24 line card crashes are saved on the GRP card. If the GRP reloads, the last 24 line card crash contexts are lost. For example, **show context slot 3 2** shows the second most recent crash for line card in slot 3. Index numbers are displayed by the **show context summary** command.
debug	(Optional) Displays crash information as a hex record dump in addition to one of the options listed.

Command Modes

EXEC

Command History

Release	Modification
11.2 GS	This command was modified to add the **all**, **debug**, **slot**, and **summary** keywords.

Usage Guidelines

The display from the **show context** command includes the following information:

- Reason for the system reboot
- Stack trace
- Software version
- The signal number, code, and router uptime information
- All the register contents at the time of the crash

Note This information is of use only to technical support representatives in analyzing crashes in the field. It is included here in case you need to read the displayed statistics to an engineer over the phone.

Examples

The following is sample output from the **show context** command following a system failure:

```
Router> show context

System was restarted by error - a Software forced crash, PC 0x60189354
GS Software (RSP-PV-M), Experimental Version 11.1(2033) [ganesh 111]
Compiled Mon 31-Mar-97 13:21 by ganesh
Image text-base: 0x60010900, data-base: 0x6073E000
Stack trace from system failure:
FP: 0x60AEA798, RA: 0x60189354
FP: 0x60AEA798, RA: 0x601853CC
FP: 0x60AEA7C0, RA: 0x6015E98C
FP: 0x60AEA7F8, RA: 0x6011AB3C
FP: 0x60AEA828, RA: 0x601706CC
FP: 0x60AEA878, RA: 0x60116340
FP: 0x60AEA890, RA: 0x6011632C
Fault History Buffer:
GS Software (RSP-PV-M), Experimental Version 11.1(2033) [ganesh 111]
Compiled Mon 31-Mar-97 13:21 by ganesh
Signal = 23, Code = 0x24, Uptime 00:04:19
$0 : 00000000, AT : 60930120, v0 : 00000032, v1 : 00000120
a0 : 60170110, a1 : 6097F22C, a2 : 00000000, a3 : 00000000
t0 : 60AE02A0, t1 : 8000FD80, t2 : 34008F00, t3 : FFFF00FF
t4 : 00000083, t5 : 3E840024, t6 : 00000000, t7 : 11010132
s0 : 00000006, s1 : 607A25F8, s2 : 00000001, s3 : 00000000
s4 : 00000000, s5 : 00000000, s6 : 00000000, s7 : 6097F755
t8 : 600FABBC, t9 : 00000000, k0 : 30408401, k1 : 30410000
gp : 608B9860, sp : 60AEA798, s8 : 00000000, ra : 601853CC
EPC : 60189354, SREG : 3400EF03, Cause : 00000024
Router>
```

The following is sample output from the **show context summary** command on a Cisco 12012 router. The **show context summary** command displays a summary of all the crashes recorded.

```
Router# show context summary

CRASH INFO SUMMARY
  Slot 0 : 0 crashes
  Slot 1 : 0 crashes
  Slot 2 : 0 crashes
  Slot 3 : 0 crashes
  Slot 4 : 0 crashes
  Slot 5 : 0 crashes
  Slot 6 : 0 crashes
  Slot 7 : 2 crashes
    1 - crash at 18:06:41 UTC Tue Nov 5 1996
    2 - crash at 12:14:55 UTC Mon Nov 4 1996
  Slot 8 : 0 crashes
  Slot 9 : 0 crashes
  Slot 10: 0 crashes
  Slot 11: 0 crashes
Router#
```

Related Commands

Command	Description
show processes	Displays information about the active processes.
show stacks	Monitors the stack usage of processes and interrupt routines.

show controllers (GRP image)

To display information that is specific to the hardware, use the **show controllers** privileged EXEC command.

show controllers [**atm** *slot-number* | **clock** | **csar** [**register**] | **csc-fpga** | **dp83800** | **fab-clk** | **fia** [**register**] | **pos** [*slot-number*] [**details**] | **queues** [*slot-number*] | **sca** | **xbar**]

Syntax Description

atm *slot-number*	(Optional) Displays the ATM controllers. Number is slot-number/port-number (for example, 4/0). Slot numbers range from 0 to 11 for the Cisco 12012 router and from 0 to 7 for the Cisco 12008 router.
clock	(Optional) Displays the clock card configuration.
csar [**register**]	(Optional) Displays the Cisco Cell Segmentation and Reassembly (CSAR) information. CSAR is the name of the chip on the card that handles traffic between the GRP and the switch fabric interface ASICs.
csc-fpga	(Optional) Displays the clock and scheduler card register information in the field programmable gate array (FPGA).
dp83800	(Optional) Displays the Ethernet information on the GRP card.
fab-clk	(Optional) Display the switch fabric clock register information. The switch fabric clock FPGA is a chip that monitors the incoming fabric clock generated by the switch fabric. This clock is needed by each card connecting to the switch fabric to properly communicate with it. Two switch fabric clocks arrive at each card; only one can be used. The FPGA monitors both clocks and selects which one to use if only one of them is running.
fia [**register**]	(Optional) Displays the fabric interface ASIC information and optionally displays the register information.
pos [slot-*number*] [**details**]	(Optional) Displays the POS framer state and optionally displays all the details for the interface. Number is slot-number/port-number (for example, 4/0). Slot numbers range from 0 to 11 for the Cisco 12012 router and from 0 to 7 for the Cisco 12008 router.
queues [*slot-number*]	(Optional) Displays the SDRAM buffer carve information and optionally displays the information for a specific line card. The SDRAM buffer carve information displayed is suggested carve information from the GRP card to the line card. Line cards might change the shown percentages based on SDRAM available. Slot numbers range from 0 to 11 for the Cisco 12012 router and from 0 to 7 for the Cisco 12008.
sca	(Optional) Displays the SCA register information. The SCA is an ASIC that arbitrates among the line cards requests to use the switch fabric.
xbar	(Optional) Displays the crossbar register information. The XBAR is an ASIC that switches the data as it passes through the switch fabric.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was added to support the Cisco 12000 series Internet Routers.

Usage Guidelines

This information provided by this command is intended for use only by technical support representatives in analyzing system failures in the field.

Examples

The following is sample output from the **show controllers pos** command for a Cisco 12012:

```
Router# show controllers pos 7/0

POS7/0
SECTION
  LOF = 2          LOS = 0                            BIP(B1) = 5889
  Active Alarms: None
LINE
  AIS = 2          RDI = 2          FEBE = 146        BIP(B2) = 2106453
  Active Alarms: None
PATH
  AIS = 2          RDI = 4          FEBE = 63         BIP(B3) = 3216
  LOP = 0          PSE = 8          NSE = 3           NEWPTR = 2
  Active Alarms: None
APS
  COAPS = 3          PSBF = 2
  State: PSBF_state = False
  Rx(K1/K2): F0/15  Tx(K1/K2): 00/00
  S1S0 = 00, C2 = 64
PATH TRACE BUFFER : STABLE
  Remote hostname : GSR-C
  Remote interface: POS10/0
  Remote IP addr  : 10.201.101.2
  Remote Rx(K1/K2): F0/15  Tx(K1/K2): 00/00
Router#
```

Related Commands

Command	Description
clear controllers	Resets the T1 or E1 controller.
show controllers (line card image)	Displays information that is specific to the hardware on a line card.

show controllers (line card image)

To display information that is specific to the hardware on a line card, use the **attach** privileged EXEC command to connect to the line card and then use the **show controllers** privileged EXEC command or the **execute-on** privileged EXEC command.

show controllers atm [[*port-number*] [**all** | **sar** | **summary**]]

show controllers fia [**register**]

show controllers {**frfab** | **tofab**} {**bma** {**microcode** | **ms-inst** | **register**} | **qelem** *start-queue-element* [*end-queue-element*] | **qnum** *start-queue-number* [*end-queue-number*] | **queues** | **statistics**}

show controllers io

show controllers l3

show controllers pos {**framers** | **queues** | **registers** | **rxsram** *port-number queue-start-address* [*queue-length*] | **txsram** *port-number queue-start-address* [*queue-length*]}

Syntax Description

atm	Displays the ATM controller information.
port-number	(Optional) Displays request for the physical interface on the ATM card. The range of choices is from 0 to 3.
all	(Optional) Lists all details.
sar	(Optional) Lists SAR interactive command.
summary	(Optional) Lists SAR status summary.
fia	Displays the fabric interface ASIC information.
register	(Optional) Displays the register information.
frfab	(Optional) Displays the "from" (transmit) fabric information.
tofab	(Optional) Displays the "to" (receive) fabric information.
bma	For the **frfab** or **tofab** keywords, displays microcode, micro sequencer, or register information for the silicon queuing engine (SQE), also known as the buffer management ASIC (BMA).
microcode	Displays SQE information for the microcode bundled in the line card and currently running version.
mis-inst	Displays SQE information for the micro sequencer instruction.
register	Displays silicon queuing engine (SQE) information for the register.
qelem	For the **frfab** or **tofab** keywords, displays the SDRAM buffer pool queue element summary information.
start-queue-element	Specifies the start queue element number from 0 to 65535.
end-queue-element	(Optional) Specifies the end queue element number from 0 to 65535).
qnum	For the **frfab** or **tofab** keywords, displays the SDRAM buffer pool queue detail information.

start-queue-number	Specifies the start free queue number (from 0 to 127).
end-queue-number	(Optional) Specifies the end free queue number (from 0 to 127).
queues	For the **frfab** or **tofab** keywords, displays the SDRAM buffer pool information.
statistics	For the **frfab** or **tofab** keywords, displays the BMA counters.
io	Displays input/output registers.
l3	Displays Layer 3 ASIC information.
pos	Displays packet-over-sonic (POS) information for framer registers, framer queues, and ASIC registers.
framers	Displays the POS framer registers.
queues	Displays the POS framer queue information.
registers	Displays the ASIC registers.
rxsram	Displays the receive queue SRAM.
port-number	Specifies a port number (valid range is from 0 to 3).
queue-start-address	Specifies the queue SRAM logical starting address.
queue-length	(Optional) Specifies the queue SRAM length.
txsram	Displays the transmit queue SRAM.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was added to support the Cisco 12000 series Gigabit Switch Routers.

Usage Guidelines

This command is intended for use by Cisco technical support.

Note This information provided by this command is of use only to technical support representatives in analyzing crashes in the field.

Examples

Because you are executing this command on the line card, you must use the **execute-on** command to use the **show** command, or you must connect to the card using the **attach** command. All examples in this section use the **execute-on** command

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

```
Router# execute-on slot 4 show controllers atm 0

TX SAR (Beta 1.0.0) is Operational;
RX SAR (Beta 1.0.0) is Operational;

Interface Configuration Mode:
```

```
        STS-12c

Active Maker Channels: total # 6
VCID  ChnnlID  Type  OutputInfo    InPkts   InOAMs  MacString
   1    0888    UBR    0C010010         0        0  08882000AAAA030000000800
   2    0988    VBR    04010020         0        0  09882000
   3    8BC8    UBR    0C010030         0        0  8BC82000AAAA030000000800
   4    0E08    UBR    0C010040         0        0  0E082000AAAA030000000800
  10    1288    VBR    040100A0         0        0  12882000
  11    8BE8    VBR    0C0100B0         0        0  8BE82000AAAA030000000800

SAR Total Counters:
total_tx_idle_cells 215267  total_tx_paks 0  total_tx_abort_paks 0
total_rx_paks 0  total_rx_drop_paks 0  total_rx_discard_cells 15

Switching Code Counters:
total_rx_crc_err_paks 0  total_rx_giant_paks 0
total_rx_abort_paks 0  total_rx_crc10_cells 0
total_rx_tmout_paks 0  total_rx_unknown_paks 0
total_rx_out_buf_paks 0  total_rx_unknown_vc_paks 0
BATMAN Asic Register Values:
hi_addr_reg 0x8000, lo_addr_reg 0x000C, boot_msk_addr 0x0780,
rmcell_msk_addr 0x0724, rmcnt__msk_addr 0x07C2, txbuf_msk_addr 0x070C,
.
.
.
CM622 SAR Boot Configuration:
txind_q_addr 0x14000 txcmd_q_addr 0x20000
.
.
.
SUNI-622 Framer Register Values:
Master Rst and Ident/Load Meters Reg (#0x0): 0x10
Master Configuration Reg (#0x1): 0x1F
Master Interrupt Status Reg (#0x2): 0x00
PISO Interrupt Reg (#0x3): 0x04
Master Auto Alarm Reg (#0x4): 0x03
Master Auto Alarm Reg (#0x5): 0x07
Parallel Output Port Reg (#0x6): 0x02
.
.
.
BERM Line BIP Threshold LSB Reg (#0x74): 0x00
BERM Line BIP Threshold MSB Reg (#0x75): 0x00
Router#
```

The following is partial sample output from the **show controllers** command:

```
Router# execute-on slot 6 show controllers

Interface POS0
Hardware is BFLC POS
lcpos_instance struct   60311B40
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000400
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, int clock
no loop

Interface POS1
Hardware is BFLC POS
lcpos_instance struct   603142E0
RX POS ASIC addr space  12000000
```

```
TX POS ASIC addr space  12000100
SUNI framer addr space  12000600
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, int clock
no loop
.
.
.
Router#
```

The following is partial sample output from the **show controllers pos framers** command:

```
Router# execute-on slot 6 show controllers pos framers

Framer 0, addr=0x12000400:
master reset            C0
master config           1F        rrate sts3c trate sts3c fixptr
master control          00
clock rcv cntrl         D0
RACP control            84
RACP gfc control        0F
TACP control status     04        hcsadd
RACP intr enable        04
RSOP cntrl intr enable  00
RSOP intr status        00
TPOP path sig lbl (c2)  13
SPTB control            04        tnull
SPTB status             00

Framer 1, addr=0x12000600:
master reset            C0
master config           1F        rrate sts3c trate sts3c fixptr
master control          00
clock rcv cntrl         D0
RACP control            84
RACP gfc control        0F
TACP control status     04        hcsadd
RACP intr enable        04
RSOP cntrl intr enable  00
RSOP intr status        00
TPOP path sig lbl (c2)  13
SPTB control            04        tnull
SPTB status             00

Framer 2, addr=0x12000800:
master reset            C0
master config           1F        rrate sts3c trate sts3c fixptr
master control          00
clock rcv cntrl         D0
RACP control            84
RACP gfc control        0F
TACP control status     04        hcsadd
RACP intr enable        04
RSOP cntrl intr enable  00
RSOP intr status        00
TPOP path sig lbl (c2)  13
SPTB control            04        tnull
SPTB status             00
.
.
.
Router#
```

The following is partial sample output from the **show controllers fia** command:

```
Router# execute-on slot 7 show controllers fia

========= Line Card (Slot 7) =======

Fabric configuration: Full bandwidth redundant
Master Scheduler: Slot 17

From Fabric FIA Errors
----------------------
redund fifo parity 0          redund overflow 0          cell drops 0
crc32 lkup parity  0          cell parity     0          crc32      0
          0          1          2          3          4
       --------   --------   --------   --------   --------
los    0          0          0          0          0
crc16  0          0          0          0          0

To Fabric FIA Errors
----------------------
sca not pres 0          req error     0          uni fifo overflow 0
grant parity 0          multi req     0          uni fifo undrflow 0
cntrl parity 0          uni req       0          crc32 lkup parity 0
multi fifo   0          empty dst req 0          handshake error   0
```

Related Commands

Command	Description
clear controllers	Resets the T1 or E1 controller.

show controllers logging

To display logging information about a Versatile Interface Processor (VIP) card, use the **show controllers logging** privileged EXEC command.

show controllers vip *slot-number* **logging**

Syntax Description

vip *slot-number*	VIP slot number.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

This command displays the state of syslog error and event logging, including host addresses, and whether console logging is enabled.

Examples

The following is sample output from the **show controllers logging** command:

```
Router# show controllers vip 4 logging

Syslog logging: enabled
     Console logging: disabled
     Monitor logging: level debugging, 266 messages logged.
     Trap logging: level informational, 266 messages logged.
     Logging to 192.180.2.238
```

Table 68 describes the significant fields shown in the display.

Table 68 show controllers 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.

Related Commands

Command	Description
show logging	Displays the state of system logging (syslog).

show controllers tech-support

To display general information about a Versatile Interface Processor (VIP) card when reporting a problem, use the **show controllers tech-support** privileged EXEC command.

show controllers vip *slot-number* **tech-support**

Syntax Description

vip *slot-number*	VIP slot number.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

Use this command to help collect general information about a VIP card when you are reporting a problem. This command displays the equivalent of the following **show** commands for the VIP card:

- **more system:running-config**
- **show buffers**
- **show controllers**
- **show interfaces**
- **show processes cpu**
- **show processes memory**
- **show stacks**
- **show version**

For a sample display of the **show controllers tech-support** command output, refer to these **show** commands.

Related Commands

Command	Description
more system:running-config	Displays the running configuration.
show buffers	Displays statistics for the buffer pools on the network server.
show controllers	Displays information that is specific to the hardware.
show interfaces	Uses the **show interfaces** EXEC command to display ALC information.
show processes	Displays information about the active processes.
show processes memory	Displays memory used.
show stacks	Monitors the stack usage of processes and interrupt routines.

Command	Description
show tech-support	Displays general information about the router when reporting a problem.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

show debugging

To display information about the types of debugging that are enabled for your router, use the **show debugging** privileged EXEC command.

show debugging

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show debugging** command. In this example, three types of CDP debugging are enabled.

```
Router# show debugging

CDP:
  CDP packet info debugging is on
  CDP events debugging is on
  CDP neighbor info debugging is on
```

Related Commands

Command	Description
debug <feature>	Begin message logging for the specified **debug** command

show diag

To display hardware information including DRAM and static RAM (SRAM) on line cards, use the **show diag** command in privileged EXEC mode.

show diag [*slot-number*] [**details**] [**summary**]

Syntax Description

slot-number	(Optional) Slot number of the interface.
details	(Optional) Displays more details than the normal **show diag** output.
summary	(Optional) Displays a summary (one line per slot) of the chassis.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1 CA	This command was introduced.
11.2	This command was introduced.
11.2 P	This command was modified to show information for PA-12E/2FE, PA-E3, and PA-T3 port adapters.
11.2 GS	This command was made available on Cisco 12000 series Gigabit Switch Routers (GSRs).
11.3 XA	This command was integrated in Cisco IOS Release 11.3 XA.
12.0(5)XQ	This command was enhanced and made available on Cisco 1750 routers.
12.0(7)T	This command was integrated in Cisco IOS Release 12.0T.

Usage Guidelines

Use this command to determine the type of hardware installed in your router. This command applies line cards in Cisco Universal Access Servers; Cisco 1750, 7200, and 7500 series routers; and Cisco 12000 series GSRs.

Note The enhancement to display the field replaceable unit (FRU) number in **show diag** command output is not available in all Cisco IOS releases and not all Cisco devices and Cisco network modules will display their FRU numbers.

Examples of output showing the FRU number are included in the Examples section.

Cisco 7304 Router Usage Guidelines

For the Cisco 7304 router, this command applies to NSEs, line cards, MSCs, and SPAs.

- To display hardware information for an NSE, line card, or MSC in the specified slot, use the *slot-number* argument. For MSCs, information about the MSC and each of its installed SPAs is displayed.
- To display hardware information about the backplane, power supplies, and fan modules, use the **chassis** keyword.

Shared Port Adapter Usage Guidelines

- To display hardware information for an MSC or SIP only in a specified slot, use the *slot-number* argument.
- To display hardware information for a SPA only, use the **show diag subslot** *slot*/*subslot* version of this command.

Examples

Example for a 1-Port T3 Serial Port Adapter on the Cisco 7200 Series Router

The following is sample output from the **show diag** command for a 1-port T3 serial port adapter in chassis slot 1 on a Cisco 7200 series router:

```
Router# show diag 1

Slot 1:
        Physical slot 1, ~physical slot 0xE, logical slot 1, CBus 0
        Microcode Status 0x4
        Master Enable, LED, WCS Loaded
        Board is analyzed
        Pending I/O Status: None
        EEPROM format version 1
        VIP2 controller, HW rev 2.4, board revision D0
        Serial number: 04372053  Part number: 73-1684-03
        Test history: 0x00        RMA number: 00-00-00
        Flags: cisco 7000 board; 7500 compatible

        EEPROM contents (hex):
          0x20: 01 15 02 04 00 42 B6 55 49 06 94 03 00 00 00 00
          0x30: 68 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

        Slot database information:
        Flags: 0x4      Insertion time: 0x14A8 (5d02h ago)

        Controller Memory Size: 16 MBytes DRAM, 1024 KBytes SRAM

        PA Bay 0 Information:
                T3 Serial PA, 1 ports
                EEPROM format version 1
                HW rev FF.FF, Board revision UNKNOWN
                Serial number: 4294967295  Part number: 255-65535-255
```

Example Output from a Cisco 7200 Showing the FRU Number

The following is sample output from the **show diag** command on a Cisco 7200 series router showing the FRU number:

```
Router# show diag
Slot 0:
        Dual FastEthernet (RJ-45) I/O Card Port adapter, 2 ports
        Port adapter is analyzed
        Port adapter insertion time 6d02h ago
        EEPROM contents at hardware discovery:
        Hardware Revision        : 2.1
        Top Assy. Part Number    : 800-07114-06
        Part Number              : 73-5003-06
        Board Revision           : B0
        PCB Serial Number        : 31558694
        RMA History              : 00
        Fab Version              : 03
        Fab Part Number          : 28-3455-03
        Product (FRU) Number     : C7200-I/O-2FE/E
        Deviation Number         : 0-0
```

```
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 02 15 41 02 01 C0 46 03 20 00 1B CA 06
          0x10: 82 49 13 8B 06 42 42 30 C1 8B 33 31 35 35 38 36
          0x20: 39 34 00 00 00 04 00 02 03 85 1C 0D 7F 03 CB 8F
          0x30: 43 37 32 30 30 2D 49 2F 4F 2D 32 46 45 2F 45 80
          0x40: 00 00 00 00 FF FF FF FF FF FF FF FF FF FF FF FF
          0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
Router#
```

Examples for a Cisco 12000 Series Internet Router

The following is sample output from the **show diag** command on a Cisco 12000 series Internet router:

```
Router# show diag 3

SLOT 3  (RP/LC 3 ): 4 Port Packet Over SONET OC-3c/STM-1 Multi Mode
  MAIN: type 33,  00-0000-00 rev 70 dev 0
        HW config: 0x01    SW key: 00-00-00
  PCA:  73-2147-02 rev 94 ver 2
        HW version 1.0  S/N 04499695
  MBUS: MBUS Agent (1)  73-2146-05 rev 73 dev 0
        HW version 1.1  S/N 04494882
        Test hist: 0x00    RMA#: 00-00-00    RMA hist: 0x00
  DIAG: Test count: 0x05000001    Test results: 0x00000000
  MBUS Agent Software version 01.27 (RAM) using CAN Bus A
  ROM Monitor version 00.0D
  Fabric Downloader version used 00.0D (ROM version is 00.0D)
  Board is analyzed
  Board State is Line Card Enabled (IOS  RUN )
  Insertion time: 00:00:10 (00:04:51 ago)
  DRAM size: 33554432 bytes
  FrFab SDRAM size: 67108864 bytes
  ToFab SDRAM size: 16777216 bytes
```

The following is sample output from the **show diag** command with the **summary** keyword:

```
Router# show diag summary

SLOT 0  (RP/LC 0 ): Route Processor
SLOT 2  (RP/LC 2 ): 4 Port Packet Over SONET OC-3c/STM-1 Single Mode
SLOT 4  (RP/LC 4 ): 4 Port Packet Over SONET OC-3c/STM-1 Single Mode
SLOT 7  (RP/LC 7 ): 4 Port Packet Over SONET OC-3c/STM-1 Single Mode
SLOT 9  (RP/LC 9 ): 4 Port Packet Over SONET OC-3c/STM-1 Single Mode
SLOT 11 (RP/LC 11): 4 Port Packet Over SONET OC-3c/STM-1 Single Mode
SLOT 16 (CSC 0   ): Clock Scheduler Card
SLOT 17 (CSC 1   ): Clock Scheduler Card
SLOT 18 (SFC 0   ): Switch Fabric Card
SLOT 19 (SFC 1   ): Switch Fabric Card
SLOT 20 (SFC 2   ): Switch Fabric Card
SLOT 24 (PS A1   ): AC Power Supply
SLOT 26 (PS B1   ): AC Power Supply
SLOT 28 (TOP FAN ): Blower Module
SLOT 29 (BOT FAN ): Blower Module
```

The following is sample output from the **show diag** command with the **details** keyword:

```
Router# show diag 4 details

SLOT 4  (RP/LC 4): 4 Port Packet Over SONET OC-3c/STM-1 Single Mode
  MAIN: type 33,  800-2389-01 rev 71 dev 16777215
        HW config: 0x00    SW key: FF-FF-FF
  PCA:  73-2275-03 rev 75 ver 3
```

```
        HW version 1.1  S/N 04529465
  MBUS: MBUS Agent (1)  73-2146-06 rev 73 dev 0
        HW version 1.1  S/N 04541395
        Test hist: 0xFF    RMA#: FF-FF-FF    RMA hist: 0xFF
  DIAG: Test count: 0x05000001    Test results: 0x00000000
  EEPROM contents (hex):
  00: 01 00 01 00  49 00 08 62  06 03 00 00  00 FF FF FF
  10: 30 34 35 34  31 33 39 35  FF FF FF FF  FF FF FF FF
  20: 01 01 00 00  00 00 00 FF  FF FF FF FF  FF FF FF FF
  30: A5 FF A5 A5  A5 A5 FF A5  A5 A5 A5 A5  A5 A5 A5 A5
  40: 00 21 01 01  00 49 00 08  E3 03 05 03  00 01 FF FF
  50: 03 20 00 09  55 01 01 FF  FF FF 00 FF  FF FF FF FF
  60: 30 34 35 32  39 34 36 35  FF FF FF FF  FF FF FF FF
  70: FF FF FF FF  FF FF FF FF  05 00 00 01  00 00 00 00
  MBUS Agent Software version 01.24 (RAM)
  Fabric Downloader version 00.0D
  Board is analyzed
  Flags: 0x4
  Board State is Line Card Enabled (IOS  RUN)
  Insertion time: 00:00:10 (00:04:51 ago)
  DRAM size: 33554432 bytes
  FrFab SDRAM size: 67108864 bytes
  ToFab SDRAM size: 16777216 bytes
```

Example for an ATM SAR AIM in a Cisco 3660

The following is sample output from the **show diag** command for one ATM Segmentation and Reassembly (SAR) AIM in a Cisco 3660 router:

```
Router# show diag 0

3660 Chassis type: ENTERPRISE

c3600 Backplane EEPROM:
    Hardware Revision        : 1.0
    Top Assy. Part Number    : 800-04740-02
.
.
.
ATM AIM: 1
    ATM AIM module with SAR only (no DSPs)
    Hardware Revision        : 1.0
    Top Assy. Part Number    : 800-03700-01
    Board Revision           : A0
    Deviation Number         : 0-0
    Fab Version              : 02
    PCB Serial Number        : JAB9801ABCD
```

Example Output from a Cisco 3660 Showing the FRU Number

The following is sample output from the **show diag** command on a Cisco 3660 router that shows the FRU numbers for slots 0 and 1:

```
Router# show diag
3660 Chassis type: ENTERPRISE
3660 Backplane EEPROM:
        Hardware Revision        : 1.0
        Top Assy. Part Number    : 800-04740-02
        Board Revision           : C0
        Deviation Number         : 0-0
        Fab Version              : 02
        PCB Serial Number        : HAD04471U36
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
```

```
        RMA History              : 00
        Chassis Serial Number    : JAB055180FF
        Chassis MAC Address      : 0007.ebea.4460
        MAC Address block size   : 112
        Manufacturing Test Data  : 00 00 00 00 00 00 00 00
        Fab Part Number          : 28-2651-02
        Number of Slots          : 6
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 00 C8 41 01 00 C0 46 03 20 00 12 84 02
          0x10: 42 43 30 80 00 00 00 00 02 02 C1 8B 48 41 44 30
          0x20: 34 34 37 31 55 33 36 03 00 81 00 00 00 00 04 00
          0x30: C2 8B 4A 41 42 30 35 35 31 38 30 46 46 C3 06 00
          0x40: 07 EB EA 44 60 43 00 70 C4 08 00 00 00 00 00 00
          0x50: 00 00 85 1C 0A 5B 02 01 06 FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
Slot 0:
        C3600 Mother board 2FE(TX) Port adapter, 2 ports
        Port adapter is analyzed
        Port adapter insertion time unknown
        EEPROM contents at hardware discovery:
        PCB Serial Number        : JAB05460CSV
        Processor type           : 34
        Top Assy. Part Number    : 800-04737-04
        Board Revision           : C0
        Fab Part Number          : 28-3234-02
        Deviation Number         : 65535-65535
        Manufacturing Test Data  : FF FF FF FF FF FF FF FF
        RMA Number               : 255-255-255-255
        RMA Test History         : FF
        RMA History              : FF
        Field Diagnostics Data   : FF FF FF FF FF FF FF FF
        Product (FRU) Number     : Leopard-2FE
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF C1 8B 4A 41 42 30 35 34 36 30 43 53 56 09
          0x10: 34 40 00 B3 C0 46 03 20 00 12 81 04 42 43 30 85
          0x20: 1C 0C A2 02 80 FF FF FF FF C4 08 FF FF FF FF FF
          0x30: FF FF FF 81 FF FF FF FF 03 FF 04 FF C5 08 FF FF
          0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF 00

Slot 1:
        Mueslix-4T Port adapter, 4 ports
        Port adapter is analyzed
        Port adapter insertion time unknown
        EEPROM contents at hardware discovery:
        Hardware revision 1.1           Board revision D0
        Serial number     17202570      Part number    800-02314-02
        FRU Part Number:  NM-4T=

        Test history      0x0           RMA number     00-00-00
        EEPROM format version 1
        EEPROM contents (hex):
          0x00: 01 54 01 01 01 06 7D 8A 50 09 0A 02 00 00 00 00
          0x10: 68 00 00 00 99 11 21 00 00 05 FF FF FF FF FF FF
Router#
```

Example for an NM-AIC-64 Installed in a Cisco 2611

The following is sample output from the **show diag** command for a Cisco 2611 router with the NM-AIC-64 installed.

```
Router# show diag

Slot 0:
C2611 2E Mainboard Port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time unknown
EEPROM contents at hardware discovery:
Hardware Revision : 2.3
PCB Serial Number : JAD044808SG (1090473337)
Part Number : 73-2840-13
RMA History : 00
RMA Number : 0-0-0-0
Board Revision : C0
Deviation Number : 0-0
EEPROM format version 4
EEPROM contents (hex):
0x00: 04 FF 40 00 92 41 02 03 C1 18 4A 41 44 30 34 34
0x10: 38 30 38 53 47 20 28 31 30 39 30 34 37 33 33 33
0x20: 37 29 82 49 0B 18 0D 04 00 81 00 00 00 00 42 43
0x30: 30 80 00 00 00 00 FF FF FF FF FF FF FF FF FF FF
0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Slot 1:
NM_AIC_64 Port adapter, 3 ports
Port adapter is analyzed
Port adapter insertion time unknown
EEPROM contents at hardware discovery:
Hardware Revision : 1.0
Part Number : 74-1923-01
Board Revision : 02
PCB Serial Number : DAN05060012
EEPROM format version 4
EEPROM contents (hex):
0x00: 04 FF 40 02 55 41 01 00 82 4A 07 83 01 42 30 32
0x10: C1 8B 44 41 4E 30 35 30 36 30 30 31 32 FF FF FF
0x20: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

Table 69 describes significant fields shown in the display.

Table 69 show diag (AIC) Field Descriptions

Field	Description
C2611 2E Mainboard Port adapter, 2 ports	Line card type; number of ports available.
Port adapter is analyzed	The system has identified the port adapter.
Port adapter insertion time	Elapsed time since insertion.
Hardware Revision	Version number of the port adapter.

Table 69 show diag (AIC) Field Descriptions

Field	Description
PCB Serial Number	Serial number of the printed circuit board.
Part Number	Part number of the port adapter.
RMA History	Counter that indicates how many times the port adapter has been returned and repaired.
RMA Number	Return material authorization number, which is an administrative number assigned if the port adapter needs to be returned for repair.
Board Revision	Revision number (signifying a minor revision) of the port adapter.
Deviation Number	Revision number (signifying a minor deviation) of the port adapter.
EEPROM format version	Version number of the EEPROM format.
EEPROM contents (hex)	Dumps of EEPROM programmed data.

Example for an AIM-VPN in a Cisco 2611XM

The following example shows how to obtain hardware information about an installed AIM-VPN on the Cisco 2611XM router.

```
Router# show diag 0

Encryption AIM 1:
        Hardware Revision        :1.0
        Top Assy. Part Number    :800-03700-01
        Board Revision           :A0
        Deviation Number         :0-0
        Fab Version              :02
        PCB Serial Number        :JAB9801ABCD
        RMA Test History         :00
        RMA Number               :0-0-0-0
        RMA History              :00
        EEPROM format version 4
        EEPROM contents (hex):
          0x00:04 FF 40 03 0B 41 01 00 C0 46 03 20 00 0E 74 01
          0x10:42 41 30 80 00 00 00 00 02 02 C1 8B 4A 41 42 39
          0x20:38 30 31 41 42 43 44 03 00 81 00 00 00 00 04 00
          0x30:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x40:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x50:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

Table 70 describes significant fields shown in the display.

Table 70 show diag (AIM-VPN) Field Descriptions

Field	Description
Hardware Revision	Version number of the port adapter.
Top Assy. Part Number	Part number of the port adapter.
Board Revision	Revision number (signifying a minor revision) of the port adapter.
Deviation Number	Revision number (signifying a minor deviation) of the port adapter.
PCB Serial Number	Serial number of the printed circuit board.
RMA Number	Return material authorization number, which is an administrative number assigned if the port adapter needs to be returned for repair.
RMA History	Counter that indicates how many times the port adapter has been returned and repaired.
EEPROM format version	Version number of the EEPROM format.
EEPROM contents (hex)	Dumps of EEPROM programmed data.

Example for an MSC-100 on the Cisco 7304 Router

The following is sample output from the **show diag** *slot-number* version of the command for an MSC-100 located in slot number 4 on a Cisco 7304 router. Information about the MSC is followed by information for its associated SPAs:

```
Router# show diag 4
Slot 4:
        7304-MSC-100 SPA Carrier Card Line Card
        Line Card state: Active
        Insertion time: 00:08:49 ago
        Bandwidth points: 4000000
        EEPROM contents at hardware discovery:
        Hardware Revision        : 0.18
        Boot Time out            : 0000
        PCB Serial Number        : CSJ07288905
        Part Number              : 73-8789-01
        Board Revision           : A0
        Fab Version              : 02
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Deviation Number         : 0-0
        Product Number           : 7304-MSC-100
        Top Assy. Part Number    : 68-1163-04
        Manufacturing Test Data  : 00 00 00 00 00 00 00 00
        Field Diagnostics Data   : 00 00 00 00 00 00 00 00
        Calibration Data         : Minimum: 0 dBmV, Maximum: 0 dBmV
              Calibration values :
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 04 50 41 00 12 46 00 00 C1 8B 43 53 4A
          0x10: 30 37 32 38 38 39 30 35 82 49 22 55 01 42 41 30
          0x20: 02 02 03 00 81 00 00 00 00 04 00 80 00 00 00 00
          0x30: CB 94 37 33 30 34 2D 4D 53 43 2D 31 30 30 20 20
          0x40: 20 20 20 20 20 20 87 44 04 8B 04 C4 08 00 00 00
          0x50: 00 00 00 00 00 C5 08 00 00 00 00 00 00 00 00 C8
          0x60: 09 00 00 00 00 00 00 00 00 00 C7 7C F6 44 3F 30
          0x70: 00 00 00 00 00 00 00 00 00 00 00 00 02 EE FF C8
```

```
          0x80: C8 37 26 05 DC 64 28 1E 37 26 09 C4 64 32 28 32
          0x90: DD 0C E4 64 32 28 43 24 2E E0 AA 82 64 F4 24 00
          0xA0: 00 00 00 00 00 00 F0 2E FF FF FF FF FF FF FF FF
          0xB0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0xC0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0xD0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0xE0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0xF0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x100: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x110: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x120: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x130: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x140: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x150: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x160: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x170: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x180: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x190: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x1A0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x1B0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x1C0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x1D0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x1E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x1F0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
        FPGA information:
          Current FPGA version     : 00.23
          IOS bundled FPGA version : 00.23
        CPLD version     : 01.02

Subslot 4/1:
        Shared port adapter: SPA-4FE-7304, 4 ports
        State: ok
        Insertion time: 00:15:13 ago
        Bandwidth: 400000 kbps
        EEPROM contents:
```

Examples for Shared Port Adapters on the Cisco 7304 Router

The following is sample output from the **show diag subslot** command for a 4-Port 10/100 Fast Ethernet SPA located in the bottom subslot (1) of the MSC that is installed in slot 4 on a Cisco 7304 router:

```
Router# show diag subslot 4/1
Subslot 4/1:
        Shared port adapter: SPA-4FE-7304, 4 ports
        Info: hw-ver=0x100, sw-ver=0x0 fpga-ver=0x0
        State: ok
        Insertion time: 23:20:42 ago
        Bandwidth: 400000 kbps
        EEPROM contents:
        Hardware Revision        : 1.0
        Boot Time out            : 0190
        PCB Serial Number        : JAB073204G5
        Part Number              : 73-8717-03
        73/68 Level Revision     : 01
        Fab Version              : 02
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Deviation Number         : 0
        Product Number           : SPA-4FE-7304
        Product Version Id       : V01
        Top Assy. Part Number    : 68-2181-01
        73/68 Level Revision     : A0
        CLEI Code                : CNS9420AAA
```

```
Base MAC Address          : 0000.0000.0000
MAC Address block size    : 1024
Manufacturing Test Data   : 00 00 00 00 00 00 00 00
Field Diagnostics Data    : 00 00 00 00 00 00 00 00
Field Diagnostics Data    : 00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00 00 00 00 00
                            00 00 00 00
Calibration Data          : Minimum: 0 dBmV, Maximum: 0 dBmV
      Calibration values :
Power Consumption         : 160000mW max
                  Mode 1  : 0mW
                  Mode 2  : 0mW
                  Mode 3  : 0mW
EEPROM format version 4
EEPROM contents (hex):
  0x00: 04 FF 40 04 35 41 01 00 46 01 90 C1 8B 4A 41 42
  0x10: 30 37 33 32 30 34 47 35 82 49 22 0D 03 8A 30 31
  0x20: 20 20 02 02 03 00 81 00 00 00 00 04 00 88 00 00
  0x30: 00 00 CB 94 53 50 41 2D 34 46 45 2D 37 33 30 34
  0x40: 20 20 20 20 20 20 20 20 89 56 30 31 20 87 44 08
  0x50: 85 01 8A 41 30 20 20 C6 8A 43 4E 53 39 34 32 30
  0x60: 41 41 41 CF 06 00 00 00 00 00 00 43 04 00 C4 08
  0x70: 00 00 00 00 00 00 00 00 C5 08 00 00 00 00 00 00
  0x80: 00 00 F4 00 64 00 00 00 00 00 00 00 00 00 00 00
  0x90: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0xA0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0xB0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0xC0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0xD0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0xE0: 00 00 00 00 00 00 00 00 00 C8 09 00 00 00 00 00
  0xF0: 00 00 00 00 D7 08 3E 80 00 00 00 00 00 00 F3 00
  0x100: 41 01 08 F6 48 43 34 F6 49 44 35 02 31 04 B0 B4
  0x110: A0 8C 00 00 05 DC 64 46 32 00 00 07 08 64 46 32
  0x120: 00 00 09 C4 64 46 32 00 00 0C E4 64 46 32 00 00
  0x130: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 FE 02
  0x140: F2 A6 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
  0x150: CC A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x160: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x170: 00 00 D4 A0 00 00 00 00 00 00 00 00 00 00 00 00
  0x180: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x190: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1A0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1C0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1D0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1E0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1F0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
FPGA version:
  Software version : 04.17
  Hardware version : 04.17
```

The following is sample output from the **show diag subslot** command for a 2-Port 10/100/1000 Gigabit Ethernet SPA located in the top subslot (0) of the MSC that is installed in slot 4 on a Cisco 7304 router:

```
Router# show diag subslot 4/0
Subslot 4/0:
        Shared port adapter: SPA-2GE-7304, 2 ports
        Info: hw-ver=0x17, sw-ver=0x0 fpga-ver=0x0
        State: ok
        Insertion time: 00:08:47 ago
        Bandwidth: 2000000 kbps
        EEPROM contents:
        Hardware Revision        : 0.23
        Boot Time out            : 0190
        PCB Serial Number        : JAB073406YH
        Part Number              : 73-8792-02
        73/68 Level Revision     : 01
        Fab Version              : 02
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Deviation Number         : 0
        Product Number           : SPA-2GE-7304
        Product Version Id       : V01
        Top Assy. Part Number    : 68-2181-01
        73/68 Level Revision     : A0
        CLEI Code                : CNS9420AAA
        Base MAC Address         : 0000.0000.0000
        MAC Address block size   : 1024
        Manufacturing Test Data  : 00 00 00 00 00 00 00 00
        Field Diagnostics Data   : 00 00 00 00 00 00 00 00
        Field Diagnostics Data   : 00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00
        Calibration Data         : Minimum: 0 dBmV, Maximum: 0 dBmV
              Calibration values :
        Power Consumption        : 160000mW max
                         Mode 1 : 0mW
                         Mode 2 : 0mW
                         Mode 3 : 0mW
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 04 36 41 00 17 46 01 90 C1 8B 4A 41 42
          0x10: 30 37 33 34 30 36 59 48 82 49 22 58 02 8A 30 31
          0x20: 20 20 02 02 03 00 81 00 00 00 00 04 00 88 00 00
          0x30: 00 00 CB 94 53 50 41 2D 32 47 45 2D 37 33 30 34
          0x40: 20 20 20 20 20 20 20 20 89 56 30 31 20 87 44 08
          0x50: 85 01 8A 41 30 20 20 C6 8A 43 4E 53 39 34 32 30
          0x60: 41 41 41 CF 06 00 00 00 00 00 00 43 04 00 C4 08
          0x70: 00 00 00 00 00 00 00 00 C5 08 00 00 00 00 00 00
          0x80: 00 00 F4 00 64 00 00 00 00 00 00 00 00 00 00 00
          0x90: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
          0xA0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
          0xB0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
          0xC0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

```
  0xD0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0xE0: 00 00 00 00 00 00 00 00 00 C8 09 00 00 00 00 00
  0xF0: 00 00 00 00 D7 08 3E 80 00 00 00 00 00 00 F3 00
  0x100: 41 01 08 F6 48 43 34 F6 49 44 35 02 31 03 E8 B4
  0x110: A0 8C 37 26 05 DC 64 46 32 37 26 07 08 64 46 32
  0x120: 37 26 09 C4 64 46 32 32 DD 0C E4 64 46 32 43 24
  0x130: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 FE 02
  0x140: EF E2 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
  0x150: CC A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x160: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x170: 00 00 D4 A0 00 00 00 00 00 00 00 00 00 00 00 00
  0x180: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x190: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1A0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1C0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1D0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1E0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x1F0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
FPGA version:
  Software version : 04.17
  Hardware version : 04.17
```

Examples for a Shared Port Adapter on a Cisco 12000 Series Router

The following is sample output from the **show diag subslot** command for the 1-Port OC-192c/STM-64c POS/RPR XFP SPA in subslot 1 of the SIP located in chassis slot 1 on a Cisco 12000 series router:

```
Router# show diag subslot 1/1
SUBSLOT  1/1 (SPA-OC192POS-XFP): 1-port OC192/STM64 POS/RPR XFP Optics Shared Port Adapter
       Product Identifier (PID) : SPA-OC192POS-XFP
       Version Identifier (VID) : V01
       PCB Serial Number        : PRTA1304061
       Top Assy. Part Number    : 68-2190-01
       Top Assy. Revision       : A0
       Hardware Revision        : 2.0
       CLEI Code                : UNASSIGNED
       Insertion Time           : 00:00:10 (13:14:17 ago)
       Operational Status       : ok
```

Table 71 describes the significant fields shown in the display.

Table 71 show diag subslot Field Descriptions

Field	Description
Product Identifier (PID)	Product number of the SPA.
Version Identifier (VID)	Version number of the SPA.
PCB Serial Number	Serial number of the printed circuit board.
Top Assy. Part Number	Part number of the SPA.
Top Assy. Revision	Revision number (signifying a minor revision) of the SPA.
Hardware Revision	Revision number (signifying a minor revision) of the SPA hardware.
CLEI Code	Common Language Equipment Identification number.

Table 71 show diag subslot Field Descriptions (continued)

Field	Description
Insertion Time	Time when the SPA was installed, and elapsed time between that insertion time and the current time.
Operational Status	Current status of the SPA. For more information about the status field descriptions, refer to the **show hw-module subslot oir** command.

The following is sample output from the **show diag subslot details** command for the 1-Port OC-192c/STM-64c POS/RPR XFP SPA in subslot 1 of the SIP located in chassis slot 1 on a Cisco 12000 series router:

```
Router# show diag subslot 1/1 details
SUBSLOT  1/1 (SPA-OC192POS-XFP): 1-port OC192/STM64 POS/RPR XFP Optics Shared Port Adapter
       EEPROM version           : 4
       Compatible Type          : 0xFF
       Controller Type          : 1100
       Hardware Revision        : 2.0
       Boot Timeout             : 400 msecs
       PCB Serial Number        : PRTA1304061
       PCB Part Number          : 73-8546-01
       PCB Revision             : A0        Fab Version             : 01
       RMA Test History         : 00
       RMA Number               : 0-0-0-0
       RMA History              : 00
       Deviation Number         : 0
       Product Identifier (PID) : SPA-OC192POS-XFP
       Version Identifier (VID) : V01
       Top Assy. Part Number    : 68-2190-01
       Top Assy. Revision       : A0        IDPROM Format Revision   : 36
       System Clock Frequency   : 00 00 00 00 00 00 00 00
                                  00 00 00 00 00 00 00 00
                                  00 00 00 00 00 00
       CLEI Code                : UNASSIGNED
       Base MAC Address         : 00 00 00 00 00 00
       MAC Address block size   : 0
       Manufacturing Test Data  : 00 00 00 00 00 00 00 00
       Field Diagnostics Data   : 00 00 00 00 00 00 00 00
       Calibration Data         : Minimum: 0 dBmV, Maximum: 0 dBmV
             Calibration values :
       Power Consumption        : 11000 mWatts (Maximum)
       Environment Monitor Data : 03 30 04 B0 46 32 07 08
                                  46 32 09 C4 46 32 0C E4
                                  46 32 13 88 46 32 07 08
                                  46 32 EB B0 50 3C 00 00
                                  00 00 00 00 00 00 00 00
                                  00 00 00 00 00 00 00 00
                                  00 00 FE 02 F6 AC
       Processor Label          : 00 00 00 00 00 00 00
       Platform features        : 00 00 00 00 00 00 00 00
                                  00 00 00 00 00 00 00 00
                                  00 00 00 00 00 00 00 00
                                  00 00 00 00 00 00 00
       Asset ID                 :
       Asset Alias              :
       Insertion Time           : 00:00:10 (13:14:24 ago)
       Operational Status       : ok
```

Example for a SPA Interface Processor on a Cisco 12000 Series Router

The following is sample output from the **show diag** command for a SIP located in chassis slot 2 on a Cisco 12000 series router:

```
Router# show diag 2

SLOT 2  (RP/LC 2 ): Modular 10G SPA Interface Card
  MAIN: type 149,  800-26270-01 rev 84
        Deviation: 0
        HW config: 0x00    SW key: 00-00-00
  PCA:  73-9607-01 rev 91 ver 1
        Design Release 1.0  S/N SAD08460678
  MBUS: Embedded Agent
        Test hist: 0x00    RMA#: 00-00-00    RMA hist: 0x00
  DIAG: Test count: 0x00000000    Test results: 0x00000000
  FRU:  Linecard/Module: 12000-SIP-650
  FRU:  Linecard/Module: 12000-SIP-650
        Processor Memory: MEM-LC5-1024=(Non-Replaceable)
        Packet Memory: MEM-LC5-PKT-256=(Non-Replaceable)
  L3 Engine: 5 - ISE OC192 (10 Gbps)
  MBUS Agent Software version 1.114 (RAM) (ROM version is 3.4)
  ROM Monitor version 255.255
  Fabric Downloader version used 3.7 (ROM version is 255.255)
  Primary clock is CSC 1
  Board is analyzed
  Board State is Line Card Enabled (IOS  RUN )
  Insertion time: 1d00h (2d08h ago)
  Processor Memory size: 1073741824 bytes
  TX Packet Memory size: 268435456 bytes, Packet Memory pagesize: 32768 bytes
  RX Packet Memory size: 268435456 bytes, Packet Memory pagesize: 32768 bytes
  0 crashes since restart

  SPA Information:
        subslot 2/0: SPA-OC192POS-XFP (0x44C), status is ok
        subslot 2/1: Empty
        subslot 2/2: Empty
        subslot 2/3: Empty
```

Example for ADSL HWICs

The following is sample output from the **show diag** command for a Cisco 2811 router with HWIC-1ADSL installed in slot 1 and HWIC-1ADSLI installed in slot 2. Each HWIC has a daughtercard as part of its assembly. The command results below give the output from the HWIC followed by the output from its daughtercard.

```
Router# show diag 0

Slot 0:
C2811 Motherboard with 2FE and integrated VPN Port adapter, 2 ports
        Port adapter is analyzed
        Port adapter insertion time unknown
        Onboard VPN             : v2.2.0
        EEPROM contents at hardware discovery:
        PCB Serial Number        : FOC09052HHA
        Hardware Revision        : 2.0
        Top Assy. Part Number    : 800-21849-02
        Board Revision           : B0
        Deviation Number         : 0
        Fab Version              : 06
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Processor type           : 87
```

```
        Hardware date code       : 20050205
        Chassis Serial Number    : FTX0908A0B0
        Chassis MAC Address      : 0013.1ac2.2848
        MAC Address block size   : 24
        CLEI Code                : CNMJ7N0BRA
        Product (FRU) Number     : CISCO2811
        Part Number              : 73-7214-09
        Version Identifier       :   NA
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF C1 8B 46 4F 43 30 39 30 35 32 48 48 41 40
          0x10: 03 E7 41 02 00 C0 46 03 20 00 55 59 02 42 42 30
          0x20: 88 00 00 00 00 02 06 03 00 81 00 00 00 00 04 00
          0x30: 09 87 83 01 31 F1 1D C2 8B 46 54 58 30 39 30 38
          0x40: 41 30 42 30 C3 06 00 13 1A C2 28 48 43 00 18 C6
          0x50: 8A 43 4E 4D 4A 37 4E 30 42 52 41 CB 8F 43 49 53
          0x60: 43 4F 32 38 31 31 20 20 20 20 20 20 82 49 1C 2E
          0x70: 09 89 20 20 4E 41 D9 02 40 C1 FF FF FF FF FF FF

WIC Slot 1:
        ADSL over POTS
        Hardware Revision        : 7.0
        Top Assy. Part Number    : 800-26247-01
        Board Revision           : 01
        Deviation Number         : 0
        Fab Version              : 07
        PCB Serial Number        : FHH093600D4
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Product (FRU) Number     : HWIC-1ADSL
        Version Identifier       : V01
        CLEI Code                :
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 04 C8 41 07 00 C0 46 03 20 00 66 87 01
          0x10: 42 30 31 88 00 00 00 00 02 07 C1 8B 46 48 48 30
          0x20: 39 33 36 30 30 44 34 03 00 81 00 00 00 00 04 00
          0x30: CB 94 48 57 49 43 2D 31 41 44 53 4C 20 20 20 20
          0x40: 20 20 20 20 20 20 89 56 30 31 20 D9 02 40 C1 C6
          0x50: 8A FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

        EM Slot 0:
        ADSL over POTS non-removable daughtercard
        Hardware Revision        : 5.0
        Part Number              : 73-9307-05
        Board Revision           : 03
        Deviation Number         : 0
        Fab Version              : 05
        PCB Serial Number        : FHH0936006E
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Fab Part Number          : 28-6607-05
        Manufacturing Test Data  : 00 00 00 00 00 00 00 00
        Field Diagnostics Data   : 00 00 00 00 00 00 00 00
        Connector Type           : 01
        Version Identifier       : V01
        Product (FRU) Number     :
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 04 7A 41 05 00 82 49 24 5B 05 42 30 33
```

```
    0x10: 88 00 00 00 00 02 05 C1 8B 46 48 48 30 39 33 36
    0x20: 30 30 36 45 03 00 81 00 00 00 00 04 00 85 1C 19
    0x30: CF 05 C4 08 00 00 00 00 00 00 00 00 C5 08 00 00
    0x40: 00 00 00 00 00 00 05 01 89 56 30 31 20 FF FF FF
    0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
    0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
    0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

WIC Slot 2:
        ADSL over ISDN
        Hardware Revision        : 7.0
        Top Assy. Part Number    : 800-26248-01
        Board Revision           : 01
        Deviation Number         : 0
        Fab Version              : 07
        PCB Serial Number        : FHH093600DA
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Product (FRU) Number     : HWIC-1ADSLI
        Version Identifier       : V01
        CLEI Code                :
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 04 C9 41 07 00 C0 46 03 20 00 66 88 01
          0x10: 42 30 31 88 00 00 00 00 02 07 C1 8B 46 48 48 30
          0x20: 39 33 36 30 30 44 41 03 00 81 00 00 00 00 04 00
          0x30: CB 94 48 57 49 43 2D 31 41 44 53 4C 49 20 20 20
          0x40: 20 20 20 20 20 20 89 56 30 31 20 D9 02 40 C1 C6
          0x50: 8A FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

        EM Slot 0:
        ADSL over ISDN non-removable daughtercard
        Hardware Revision        : 5.0
        Part Number              : 73-9308-05
        Board Revision           : 03
        Deviation Number         : 0
        Fab Version              : 05
        PCB Serial Number        : FHH0936008M
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Fab Part Number          : 28-6607-05
        Manufacturing Test Data  : 00 00 00 00 00 00 00 00
        Field Diagnostics Data   : 00 00 00 00 00 00 00 00
        Connector Type           : 01
        Version Identifier       : V01
        Product (FRU) Number     :
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 04 7B 41 05 00 82 49 24 5C 05 42 30 33
          0x10: 88 00 00 00 00 02 05 C1 8B 46 48 48 30 39 33 36
          0x20: 30 30 38 4D 03 00 81 00 00 00 00 04 00 85 1C 19
          0x30: CF 05 C4 08 00 00 00 00 00 00 00 00 C5 08 00 00
          0x40: 00 00 00 00 00 00 05 01 89 56 30 31 20 FF FF FF
          0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

The following sample output from a Cisco 6500 series switch shows the FRU number:

```
Router# show diag

Slot 4: Logical_index 8
        2 port adapter FlexWAN controller
        Board is analyzed ipc ready
        HW rev 1.5, board revision A0
        Serial Number: SAD062404C8 Part number: 73-3869-08

        Slot database information:
        Flags: 0x2004   Insertion time: 0x20960 (1d04h ago)

        Controller Memory Size:
                112 MBytes CPU Memory
                16 MBytes Packet Memory
                128 MBytes Total on Board SDRAM
        IOS (tm) cwlc Software (cwpa-DW-M), Version 12.2(18)SXF2, RELEASE SOFTW)

        PA Bay 0 Information:
                ENHANCED ATM OC3 MM PA, 1 ports, FRU: PA-A3-OC3-MM
                EEPROM format version 1
                HW rev 2.00, Board revision A0
                Serial number: 29360940  Part number: 73-2430-04
Slot 4: Logical_index 9
        2 port adapter FlexWAN controller
        Board is analyzed ipc ready
        HW rev 1.5, board revision A0
        Serial Number: SAD062404C8 Part number: 73-3869-08

        Slot database information:
        Flags: 0x2004   Insertion time: 0x20D10 (1d04h ago)

        Controller Memory Size:
                112 MBytes CPU Memory
                16 MBytes Packet Memory
                128 MBytes Total on Board SDRAM
        IOS (tm) cwlc Software (cwpa-DW-M), Version 12.2(18)SXF2, RELEASE SOFTW)

        PA Bay 1 Information:
                Mx Serial PA, 4 ports
                EEPROM format version 1
                HW rev 1.00, Board revision A0
                Serial number: 04387628  Part number: 73-1577-04
Router#
```

The following sample output from a Cisco 7600 series router shows the FRU number:

```
Router#show diag

Slot 2: Logical_index 4
        2 port adapter Enhanced FlexWAN controller
        Board is analyzed ipc ready
        HW rev 2.1, board revision A0
        Serial Number: JAE0940MH7Z Part number: 73-9539-04

        Slot database information:
        Flags: 0x2004   Insertion time: 0x256BC (1d01h ago)

        Controller Memory Size:
                384 MBytes CPU Memory
                127 MBytes Packet Memory
                511 MBytes Total on Board SDRAM
        IOS (tm) cwlc Software (cwpa2-DW-M), Version 12.2(18)SXF2, RELEASE SOFT)

        PA Bay 0 Information:
```

```
                ENHANCED ATM OC3 MM PA, 1 ports, FRU: PA-A3-OC3-MM
                EEPROM format version 4
                HW rev 2.00, Board revision A0
                Serial number: JAE0937KUPX  Part number: 73-8728-01
Slot 2: Logical_index 5
        2 port adapter Enhanced FlexWAN controller
        Board is analyzed ipc ready
        HW rev 2.1, board revision A0
        Serial Number: JAE0940MH7Z Part number: 73-9539-04

        Slot database information:
        Flags: 0x2004   Insertion time: 0x22C34 (1d01h ago)

        Controller Memory Size:
                384 MBytes CPU Memory
                127 MBytes Packet Memory
                511 MBytes Total on Board SDRAM
        IOS (tm) cwlc Software (cwpa2-DW-M), Version 12.2(18)SXF2, RELEASE SOFT)

        PA Bay 1 Information:
                Mx Serial PA, 4 ports
                EEPROM format version 1
                HW rev 1.14, Board revision D0
                Serial number: 33929508  Part number: 73-1577-07
Router#
```

Related Commands

Command	Description
dsl operating-mode (ADSL)	Modifies the operating mode of the digital subscriber line for an ATM interface.
show dsl interface atm	Shows all of the ADSL-specific information for a specified ATM interface.
show controllers fastethernet	Displays Fast Ethernet interface information, transmission statistics and errors, and applicable MAC destination address and VLAN filtering tables.
show controllers gigabitethernet	Displays Gigabit Ethernet interface information, transmission statistics and errors, and applicable MAC destination address and VLAN filtering tables.

show disk0:

To display flash or file system information for a disk located in slot 0, use the **show disk** command in user EXEC or privileged EXEC mode.

show disk0: [**all** | **filesys**]

Syntax Description

all	(Optional) The **all** keyword displays complete information about flash memory, including information about the individual devices in flash memory and the names and sizes of all system image files stored in flash memory, including those that are invalid.
filesys	(Optional) Displays the device information block, the status information, and the usage information.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.3AA	This command was introduced.
12.2	This command was incorporated into Cisco IOS Release 12.2.
12.3(7)T	This command was enhanced to display information about the ATA ROM monitor library (monlib) file.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.

Usage Guidelines

The **show disk0:** command is supported only on platforms that have a disk file system located in slot 0. Use the **show disk0:** command to display details about the files in a particular ATA PCMCIA flash disk memory card.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

Note The name of the ATA monlib file may contain a platform name that does not match the platform that you are using. Different platforms may have a similar name or the same name for their ATA monlib file.

Examples

The following examples show displays of information about the flash disks or file system information for a disk. The output is self-explanatory.

```
c7200# show disk0:

-#- --length-- -----date/time------ path
1     29505176 Feb 27 2006 17:56:52 +00:00 c7200-jk9o3s-mz.124-6.T
2        32768 Feb 24 2006 13:30:30 +00:00 file1.log

34738176 bytes available (29540352 bytes used)

c7200# show disk0: all

-#- --length-- -----date/time------ path
1     29505176 Feb 27 2006 17:56:52 +00:00 c7200-jk9o3s-mz.124-6.T
2        32768 Feb 24 2006 13:30:30 +00:00 file1.log

34738176 bytes available (29540352 bytes used)

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:       4
   Number of Cylinders    984
   Sectors per Cylinder   32
   Sector Size            512
   Total Sectors          125952

ATA CARD FORMAT
   Number of FAT Sectors  62
   Sectors Per Cluster    8
   Number of Clusters     15693
   Number of Data Sectors 125812
   Base Root Sector       232
   Base FAT Sector        108
   Base Data Sector       264

ATA MONLIB INFO
   Image Monlib size = 73048
   Disk monlib size = 55296
   Name = NA
   Monlib end sector = NA
   Monlib Start sector = NA
   Monlib updated by = NA
   Monlib version = NA

c7200# show disk0: filesys

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:       4
   Number of Cylinders    984
   Sectors per Cylinder   32
   Sector Size            512
   Total Sectors          125952

ATA CARD FORMAT
   Number of FAT Sectors  62
   Sectors Per Cluster    8
   Number of Clusters     15693
   Number of Data Sectors 125812
   Base Root Sector       232
```

```
   Base FAT Sector        108
   Base Data Sector       264

ATA MONLIB INFO
   Image Monlib size = 73048
   Disk monlib size = 55296
   Name = NA
   Monlib end sector = NA
   Monlib Start sector = NA
   Monlib updated by = NA
   Monlib version = NA
```

Related Commands

Command	Description
dir disk0:	Displays a directory listing of files on an ATA PCMCIA flash disk card located in slot 0.
dir disk1:	Displays a directory listing of files on an ATA PCMCIA flash disk card located in slot 1.
show disk1:	Displays flash or file system information for a disk located in slot 1.

show disk1:

To display flash or file system information for a disk located in slot 1, use the **show disk1:** command in user EXEC or privileged EXEC mode.

show disk1: [**all** | **filesys**]

Syntax Description

all	(Optional) The **all** keyword displays complete information about flash memory, including information about the individual devices in flash memory and the names and sizes of all system image files stored in flash memory, including those that are invalid.
filesys	(Optional) Displays the device information block, the status information, and the usage information.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.3AA	This command was introduced.
12.2	This command was incorporated into Cisco IOS Release 12.2.
12.3(7)T	This command was enhanced to display information about the ATA ROM monitor library (monlib) file.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.

Usage Guidelines

The **show disk1:** command is supported only on platforms that have a disk file system. Use the **show disk01:** command to display details about the files in a particular ATA PCMCIA flash disk memory card located in slot 1.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

Note The name of the ATA monlib file may contain a platform name that does not match the platform that you are using. Different platforms may have a similar name or the same name for their ATA monlib file.

Examples

The following examples show displays of information about the flash disks or file system information for a disk. The output is self-explanatory.

```
c7200# show disk1:

-#- --length-- -----date/time------ path
1     29505176 Feb 27 2006 17:56:52 +00:00 c7200-jk9o3s-mz.124-6.T
2        32768 Feb 24 2006 13:30:30 +00:00 file1.log

34738176 bytes available (29540352 bytes used)

c7200# show disk1: all

-#- --length-- -----date/time------ path
1     29505176 Feb 27 2006 17:56:52 +00:00 c7200-jk9o3s-mz.124-6.T
2        32768 Feb 24 2006 13:30:30 +00:00 file1.log

34738176 bytes available (29540352 bytes used)

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:       4
   Number of Cylinders    984
   Sectors per Cylinder   32
   Sector Size            512
   Total Sectors          125952

ATA CARD FORMAT
   Number of FAT Sectors  62
   Sectors Per Cluster    8
   Number of Clusters     15693
   Number of Data Sectors 125812
   Base Root Sector       232
   Base FAT Sector        108
   Base Data Sector       264

ATA MONLIB INFO
   Image Monlib size = 73048
   Disk monlib size = 55296
   Name = NA
   Monlib end sector = NA
   Monlib Start sector = NA
   Monlib updated by = NA
   Monlib version = NA

c7200# show disk1: filesys

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:       4
   Number of Cylinders    984
   Sectors per Cylinder   32
   Sector Size            512
   Total Sectors          125952

ATA CARD FORMAT
   Number of FAT Sectors  62
   Sectors Per Cluster    8
   Number of Clusters     15693
   Number of Data Sectors 125812
   Base Root Sector       232
```

```
   Base FAT Sector        108
   Base Data Sector       264

ATA MONLIB INFO
   Image Monlib size = 73048
   Disk monlib size = 55296
   Name = NA
   Monlib end sector = NA
   Monlib Start sector = NA
   Monlib updated by = NA
   Monlib version = NA
```

Related Commands

Command	Description
dir disk0:	Displays a directory listing of files on an ATA PCMCIA flash disk card located in slot 0.
dir disk1:	Displays a directory listing of files on an ATA PCMCIA flash disk card located in slot 1.
show disk0:	Displays flash or file system information for a disk located in slot 0.

show environment

To display temperature, voltage, and blower information on the Cisco 7000 series, Cisco 7200 series, Cisco 7500 series routers, Cisco AS5300 series Access Servers, and Cisco 12000 series Gigabit Switch Routers (GSRs), use the **show environment** privileged EXEC command.

show environment [**alarms** | **all** | **fans** | **hardware** | **last** | **leds** | **power-supply** | **table** | **temperatures** | **voltages**]

Note The availability of keywords will depend on your system.

Syntax Description

alarms	(Optional) Displays the alarm contact information.
all	(Optional) Displays a detailed listing of all environmental monitor parameters (for example, the power supplies, temperature readings, voltage readings, and blower speeds). This is the default.
fans	(Optional) Displays blower and fan information.
hardware	(Optional) Displays hardware-specific information.
last	(Optional) Displays information on the last measurement made.
leds	(Optional) Displays the status of the MBus LEDs on the clock and scheduler cards and switch fabric cards.
power-supply	(Optional) Displays power supply voltage and current information. If applicable, displays the status of the Redundant Power Supply (RPS).
table	(Optional) Displays the temperature, voltage, and blower ranges and thresholds.
temperature	(Optional) Displays temperature information.
voltages	(Optional) Displays voltage information.

Defaults

If no options are specified, the default is **all**.

Command Modes

Privileged EXEC

CommandHistory

Release	Modification
10.0	This command was introduced.
11.2 GS	The **alarms**, **fans**, **hardware**, **leds**, **power-supply**, **table temperature**, and **voltages** keywords were added for Cisco 12000 series GSRs.
11.3(6)AA	This command was expanded to monitor the RPS and board temperature for the Cisco AS5300 platform, Cisco 3600 Series routers, Cisco 7200 series routers, and the Cisco 12000 series routers.

Usage Guidelines

Once a minute a routine is run that gets environmental measurements from sensors and stores the output into a buffer. This buffer is displayed on the console when the **show environment** command is entered.

If a measurement exceeds desired margins, but has not exceeded fatal margins, a warning message is printed to the system console. The system software queries the sensors for measurements once a minute, but warnings for a given test point are printed at most once every hour for sensor readings in the warning range and once every 5 minutes for sensor readings in the critical range. If a measurement is out of line within these time segments, an automatic warning message appears on the console. As noted, you can query the environmental status with the **show environment** command at any time to determine whether a measurement is at the warning or critical tolerance.

If a shutdown occurs because of detection of fatal environmental margins, the last measured value from each sensor is stored in internal nonvolatile memory.

For environmental specifications, refer to the hardware installation and configuration publication for your individual chassis.

If the Cisco 12000 series exceeds environmental conditions, a message similar to the following is displayed on the console:

```
%GSR_ENV-2-WARNING: Slot 3 Hot Sensor Temperature exceeds 40 deg C;
Check cooling systems
```

Note Blower temperatures that exceed environmental conditions do not generate a warning message.

You can also enable Simple Network Management Protocol (SNMP) notifications (traps or informs) to alert a network management system (NMS) when environmental thresholds are reached using the **snmp-server enable traps envmon** and **snmp-server host** global configuration commands.

Whenever Cisco IOS software detects a failure or recovery event from the DRPS unit, it sends an SNMP trap to the configured SNMP server. Unlike console messages, only one SNMP trap is sent when the failure event is first detected. Another trap is sent when the recovery is detected.

Cisco AS5300 DRPS software reuses the MIB attributes and traps defined in CISCO-ENVMON-MIB and CISCO-ACCESS-ENVMON-MIB. CISCO-ENVMON-MIB is supported by all Cisco routers with RPS units, and CISCO-ACCESS-ENVMON-MIB is supported by the Cisco 3600 series routers.

A power supply trap defined in CISCO-ENVMON-MIB is sent when a failure is detected and when a failure recovery occurs for the following events: input voltage fail, DC output voltage fail, thermal fail, and multiple failure events.

A fan failure trap defined in CISCO-ENVMON-MIB is sent when a fan failure or recovery event is detected by Cisco IOS software.

A temperature trap defined in CISCO-ACCESS-ENVMON-MIB is sent when a board overtemperature condition is detected by Cisco IOS software.

CISCO-ACCESS-ENVMON-MIB also defines an overvoltage trap. A similar trap is defined in CISCO-ENVMON-MIB, but it requires the ciscoEnvMonVoltageStatusValue in varbinds. This value indicates the current value of the voltage in the RPS. With Cisco AS5300 RPS units, the current voltage value is not sent to the motherboard.

CISCO-ENVMON-MIB is extended to add a new enumerated value, internalRedundant(5), for MIB attribute ciscoEnvMonSupplySource. This is used to identify a RPS unit.

Examples

In the following example, the typical **show environment** display is shown when no warning conditions are in the system for the Cisco 7000 series and Cisco 7200 series routers. This information may vary slightly depending on the platform you are using. The date and time of the query are displayed, along with the data refresh information and a message indicating that there are no warning conditions.

```
Router> show environment

Environmental Statistics
  Environmental status as of 13:17:39 UTC Thu Jun 6 1996
  Data is 7 second(s) old, refresh in 53 second(s)

  All Environmental Measurements are within specifications
```

Table 72 describes the significant fields shown in the display.

Table 72 show environment Field Descriptions

Field	Description
Environmental status as of...	Current date and time.
Data is..., refresh in...	Environmental measurements are output into a buffer every 60 seconds, unless other higher-priority processes are running.
Status message	If environmental measurements are not within specification, warning messages are displayed.

Cisco 7000 Series Routers

The following are examples of messages that display on the system console when a measurement has exceeded an acceptable margin:

```
ENVIRONMENTAL WARNING: Air flow appears marginal.
ENVIRONMENTAL WARNING: Internal temperature measured 41.3(C)
ENVIRONMENTAL WARNING: +5 volt testpoint measured 5.310(V)
```

The system displays the following message if voltage or temperature exceed maximum margins:

```
SHUTDOWN: air flow problem
```

In the following example, there have been two intermittent power failures since a router was turned on, and the lower power supply is not functioning. The last intermittent power failure occurred on Monday, June 10, 1996, at 11:07 p.m.

```
7000# show environment all

Environmental Statistics
  Environmental status as of 23:19:47 UTC Wed Jun 12 1996
  Data is 6 second(s) old, refresh in 54 second(s)

  WARNING: Lower Power Supply is NON-OPERATIONAL

  Lower Power Supply:700W, OFF     Upper Power Supply: 700W, ON

  Intermittent Powerfail(s): 2     Last on 23:07:05 UTC Mon Jun 10 1996

  +12 volts measured at  12.05(V)
   +5 volts measured at   4.96(V)
  -12 volts measured at -12.05(V)
  +24 volts measured at  23.80(V)

  Airflow temperature measured at 38(C)
  Inlet temperature measured at 25(C)
```

Table 73 describes the significant fields shown in the display.

Table 73 show environment all Field Descriptions for the Cisco 7000

Field	Description
Environmental status as of...	Date and time of last query.
Data is..., refresh in...	Environmental measurements are output into a buffer every 60 seconds, unless other higher-priority processes are running.
WARNING:	If environmental measurements are not within specification, warning messages are displayed.
Lower Power Supply	Type of power supply installed and its status (On or Off).
Upper Power Supply	Type of power supply installed and its status (On or Off).
Intermittent Powerfail(s)	Number of power hits (not resulting in shutdown) since the system was last booted.
voltage specifications	System voltage measurements.
Airflow and inlet temperature	Temperature of air coming in and going out.

The following example is for the Cisco 7000 series router. The router retrieves the environmental statistics at the time of the last shutdown. In this example, the last shutdown was Friday, May 19, 1995, at 12:40 p.m., so the environmental statistics at that time are displayed.

```
Router# show environment last

Environmental Statistics
  Environmental status as of 14:47:00 UTC Sun May 21 1995
  Data is 6 second(s) old, refresh in 54 second(s)

  WARNING: Upper Power Supply is NON-OPERATIONAL

LAST Environmental Statistics
  Environmental status as of 12:40:00 UTC Fri May 19 1995
  Lower Power Supply: 700W, ON     Upper Power Supply: 700W, OFF

  No Intermittent Powerfails

  +12 volts measured at  12.05(V)
   +5 volts measured at   4.98(V)
  -12 volts measured at -12.00(V)
  +24 volts measured at  23.80(V)

 Airflow temperature measured at 30(C)
  Inlet  temperature measured at 23(C)
```

Table 74 describes the significant fields shown in the display.

Table 74 show environment last Field Descriptions for the Cisco 7000

Field	Description
Environmental status as of...	Current date and time.
Data is..., refresh in...	Environmental measurements are output into a buffer every 60 seconds, unless other higher-priority processes are running.

Table 74 show environment last Field Descriptions for the Cisco 7000 (continued)

Field	Description
WARNING:	If environmental measurements are not within specification, warning messages are displayed.
LAST Environmental Statistics	Displays test point values at time of the last environmental shutdown.
Lower Power Supply: Upper Power Supply:	For the Cisco 7000 router, indicates the status of the two 700W power supplies. For the Cisco 7010 router, indicates the status of the single 600W power supply.

In the following example, shows sample output for the current environmental status in tables that list voltage and temperature parameters. There are three warning messages: one each about the lower power supply, the airflow temperature, and the inlet temperature. In this example, voltage parameters are shown to be in the normal range, airflow temperature is at a critical level, and inlet temperature is at the warning level.

```
Router> show environment table

Environmental Statistics
  Environmental status as of Mon 11-2-1992 17:43:36
  Data is 52 second(s) old, refresh in 8 second(s)

  WARNING: Lower Power Supply is NON-OPERATIONAL
  WARNING: Airflow temperature has reached CRITICAL level at 73(C)
  WARNING: Inlet temperature has reached WARNING level at 41(C)

Voltage Parameters:

 SENSE        CRITICAL                NORMAL                CRITICAL
-------|--------------------|-----------------------|--------------------

+12(V)                    10.20      12.05(V)      13.80
 +5(V)                     4.74       4.98(V)       5.26
-12(V)                   -10.20     -12.05(V)     -13.80
+24(V)                    20.00      24.00(V)      28.00

Temperature Parameters:

 SENSE     WARNING      NORMAL      WARNING      CRITICAL      SHUTDOWN
-------|-------------|------------|-------------|--------------|-----------

Airflow             10           60            70    73(C)    88
Inlet               10           39    41(C)   46             64
```

Table 75 describes the significant fields shown in the display.

Table 75 show environment Field Descriptions for the Cisco 7000 Series Router

Field	Description
SENSE (Voltage Parameters)	Voltage specification for a DC line.
SENSE (Temperature Parameters)	Air being measured. Inlet measures the air coming in, and Airflow measures the temperature of the air inside the chassis.
WARNING	System is approaching an out-of-tolerance condition.

Table 75 show environment Field Descriptions for the Cisco 7000 (continued)Series Router

Field	Description
NORMAL	All monitored conditions meet normal requirements.
CRITICAL	Out-of-tolerance condition exists.
SHUTDOWN	Processor has detected condition that could cause physical damage to the system.

Cisco 7200 Series Routers

The system displays the following message if the voltage or temperature enters the “Warning” range:

```
%ENVM-4-ENVWARN: Chassis outlet 3 measured at 55C/131F
```

The system displays the following message if the voltage or temperature enters the “Critical” range:

```
%ENVM-2-ENVCRIT: +3.45 V measured at +3.65 V
```

The system displays the following message if the voltage or temperature exceeds the maximum margins:

```
%ENVM-0-SHUTDOWN: Environmental Monitor initiated shutdown
```

The following message is sent to the console if a power supply has been inserted or removed from the system. This message relates only to systems that have two power supplies.

```
%ENVM-6-PSCHANGE: Power Supply 1 changed from Zytek AC Power Supply to removed
```

The following message is sent to the console if a power supply has been powered on or off. In the case of the power supply being shut off, this message can be due to the user shutting off the power supply or to a failed power supply. This message relates only to systems that have two power supplies.

```
%ENVM-6-PSLEV: Power Supply 1 state changed from normal to shutdown
```

The following is sample output from the **show environment all** command on the Cisco 7200 series router when there is a voltage warning condition in the system:

```
7200# show environment all

Power Supplies:
        Power supply 1 is unknown. Unit is off.
        Power supply 2 is Zytek AC Power Supply. Unit is on.

Temperature readings:
        chassis inlet    measured at 25C/77F
        chassis outlet 1 measured at 29C/84F
        chassis outlet 2 measured at 36C/96F
        chassis outlet 3 measured at 44C/111F
Voltage readings:
        +3.45 V measured at +3.83 V:Voltage in Warning range!
        +5.15 V measured at +5.09 V
        +12.15  measured at +12.42 V
        -11.95  measured at -12.10 V
```

Table 76 describes the significant fields shown in the display.

Table 76 show environment all Field Descriptions for the Cisco 7200 Series Router

Field	Description
Power Supplies:	Current condition of the power supplies including the type and whether the power supply is on or off.
Temperature readings:	Current measurements of the chassis temperature at the inlet and outlet locations.
Voltage readings:	Current measurement of the power supply test points.

The following example is for the Cisco 7200 series router. This example shows the measurements immediately before the last shutdown and the reason for the last shutdown (if appropriate).

```
7200# show environment last

   chassis inlet      previously measured at 27C/80F
   chassis outlet 1   previously measured at 31C/87F
   chassis outlet 2   previously measured at 37C/98F
   chassis outlet 3   previously measured at 45C/113F
   +3.3 V             previously measured at 4.02
   +5.0 V             previously measured at 4.92
   +12.0 V            previously measured at 12.65
   -12.0 V            previously measured at 11.71

last shutdown reason - power supply shutdown
```

Table 77 describes the significant fields shown in the display.

Table 77 show environment last Field Descriptions for the Cisco 7200 Series Router

Field	Description
chassis inlet	Temperature measurements at the inlet area of the chassis.
chassis outlet	Temperature measurements at the outlet areas of the chassis.
voltages	Power supply test point measurements.
last shutdown reason	Possible shutdown reasons are power supply shutdown, critical temperature, and critical voltage.

The following example is for the Cisco 7200 series router. This information lists the temperature and voltage shutdown thresholds for each sensor.

```
7200# show environment table

Sample Point      LowCritical    LowWarning     HighWarning    HighCritical
chassis inlet                                   40C/104F       50C/122F
chassis outlet 1                                43C/109F       53C/127F
chassis outlet 2                                75C/167F       75C/167F
chassis outlet 3                                55C/131F       65C/149F
+3.45 V           +2.76          +3.10          +3.80          +4.14
+5.15 V           +4.10          +4.61          +5.67          +6.17
+12.15 V          +9.72          +10.91         +13.37         +14.60
-11.95 V          -8.37          -9.57          -14.34         -15.53
Shutdown system at 70C/158F
```

Table 78 describes the significant fields shown in the display.

Table 78 show environment table Field Descriptions for the Cisco 7200 Series Router

Field	Description
Sample Point	Area for which measurements are taken.
LowCritical	Level at which a critical message is issued for an out-of-tolerance voltage condition. The system continues to operate; however, the system is approaching shutdown.
LowWarning	Level at which a warning message is issued for an out-of-tolerance voltage condition. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighWarning	Level at which a warning message is issued. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighCritical	Level at which a critical message is issued. For the chassis, the router is shut down. For the power supply, the power supply is shut down.
Shutdown system at	The system is shut down if the specified temperature is met.

Cisco 7500 Series Router

The sample output for the Cisco 7500 series routers may vary depending on the specific model (for example, the Cisco 7513 router). The following is sample output from the **show environment all** command on the Cisco 7500 series router:

```
7500# show environment all

Arbiter type 1, backplane type 7513 (id 2)
Power supply #1 is 1200W AC (id 1), power supply #2 is removed (id 7)
Active fault conditions: none
Fan transfer point: 100%
Active trip points: Restart_Inhibit
15 of 15 soft shutdowns remaining before hard shutdown

                        1
              0123456789012
Dbus slots:   X     XX    X

card        inlet      hotpoint      exhaust
RSP(6)     35C/95F     47C/116F      40C/104F
RSP(7)     35C/95F     43C/109F      39C/102F

Shutdown temperature source is 'hotpoint' on RSP(6), requested RSP(6)

+12V measured at 12.31
+5V measured at 5.21
-12V measured at -12.07
+24V measured at 22.08
+2.5 reference is 2.49

PS1 +5V Current      measured at 59.61 A (capacity 200 A)
PS1 +12V Current     measured at 5.08 A (capacity 35 A)
PS1 -12V Current     measured at 0.42 A (capacity 3 A)
PS1 output is 378 W
```

Table 79 describes the significant fields shown in the display.

Table 79 show environment all Field Descriptions for the Cisco 7500

Field	Description
Arbiter type 1	Numbers indicating the arbiter type and backplane type.
Power supply	Number and type of power supply installed in the chassis.
Active fault conditions:	Lists any fault conditions that exist (such as power supply failure, fan failure, and temperature too high).
Fan transfer point:	Software controlled fan speed. If the router is operating below its automatic restart temperature, the transfer point is reduced by 10 percent of the full range each minute. If the router is at or above its automatic restart temperature, the transfer point is increased in the same way.
Active trip points:	Compares temperature sensor against the values displayed at the bottom of the **show environment table** command output.
15 of 15 soft shutdowns remaining	When the temperature increases above the "board shutdown" level, a soft shutdown occurs (that is, the cards are shut down, and the power supplies, fans, and CI continue to operate). When the system cools to the restart level, the system restarts. The system counts the number of times this occurs and keeps the up/down cycle from continuing forever. When the counter reaches zero, the system performs a hard shutdown, which requires a power cycle to recover. The soft shutdown counter is reset to its maximum value after the system has been up for 6 hours.
Dbus slots:	Indicates which chassis slots are occupied.
card, inlet, hotpoint, exhaust	Temperature measurements at the inlet, hotpoint, and exhaust areas of the card. The (6) and (7) indicate the slot numbers. Dual-Route/Switch Processor (RSP) chassis can show two RSPs.
Shutdown temperature source	Indicates which of the three temperature sources is selected for comparison against the "shutdown" levels listed with the **show environment table** command.
Voltages (+12V, +5V, -12V, +24V, +2.5)	Voltages measured on the backplane.
PS1	Current measured on the power supply.

The following example is for the Cisco 7500 series router. This example shows the measurements immediately before the last shutdown.

```
7500# show environment last

 RSP(4) Inlet       previously measured at 37C/98F
 RSP(4) Hotpoint    previously measured at 46C/114F
 RSP(4) Exhaust     previously measured at 52C/125F
 +12 Voltage        previously measured at 12.26
 +5 Voltage         previously measured at 5.17
 -12 Voltage        previously measured at -12.03
 +24 Voltage        previously measured at 23.78
```

Table 80 describes the significant fields shown in the display.

Table 80 show environment last Field Descriptions for the Cisco 7500 Series Router

Field	Description
RSP(4) Inlet, Hotpoint, Exhaust	Temperature measurements at the inlet, hotpoint, and exhaust areas of the card.
Voltages	Voltages measured on the backplane.

The following example is for the Cisco 7500 series router. This information lists the temperature and voltage thresholds for each sensor. These thresholds indicate when system messages occur. There are two level of messages: warning and critical.

```
7500# show environment table

Sample Point      LowCritical    LowWarning     HighWarning    HighCritical
RSP(4) Inlet                                    44C/111F       50C/122F
RSP(4) Hotpoint                                 54C/129F       60C/140F
RSP(4) Exhaust
+12 Voltage       10.90          11.61          12.82          13.38
+5 Voltage        4.61           4.94           5.46           5.70
-12 Voltage       -10.15         -10.76         -13.25         -13.86
+24 Voltage       20.38          21.51          26.42          27.65
2.5 Reference                    2.43           2.51
Shutdown boards at           70C/158F
Shutdown power supplies at   76C/168F
Restart after shutdown below 40C/104F
```

Table 81 describes the significant fields shown in the display.

Table 81 show environment table Field Descriptions for the Cisco 7500 Series Router

Field	Description
Sample Point	Area for which measurements are taken.
LowCritical	Level at which a critical message is issued for an out-of-tolerance voltage condition. The system continues to operate; however, the system is approaching shutdown.
LowWarning	Level at which a warning message is issued for an out-of-tolerance voltage condition. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighWarning	Level at which a warning message is issued. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighCritical	Level at which a critical message is issued. For the chassis, the router is shut down. For the power supply, the power supply is shut down.
Shutdown boards at	The card is shut down if the specified temperature is met.
Shutdown power supplies at	The system is shut down if the specified temperature is met.
Restart after shutdown	The system will restart when the specified temperature is met.

Cisco AS5300 Series Access Servers

In the following example, how keywords and options are limited according to the physical characteristics of the system is shown:

```
as5300# show environment ?

  all    All environmental monitor parameters
  last   Last environmental monitor parameters
  table  Temperature and voltage ranges
  |      Output modifiers
  <cr>

as5300# show environment table

%This option not available on this platform
```

Cisco 12000 Series GSR

The following examples are for the Cisco 12000 series GSRs.

The following is sample output from the **show environment** command for a Cisco 12012 router. Slots 0 through 11 are the line cards, slots 16 and 17 are the clock and scheduler cards, slots 18 through 20 are the switch fabric cards, slots 24 through 26 are the power supplies, and slots 28 and 29 are the blowers. An “NA” in the table means that no values were returned. In some cases it is because the equipment is not supported for that environmental parameter (for example, the power supply and blowers in slots 24, 26, 28, and 29 do not have a 3V power supply, so an NA is displayed).

```
Router# show environment

Slot #  3V      5V      MBUS 5V Hot Sensor      Inlet Sensor
        (mv)    (mv)    (mv)     (deg C)          (deg C)
0       3300    4992    5040       42.0            37.0
2       3296    4976    5136       40.0            33.0
4       3280    4992    5120       38.5            31.5
7       3280    4984    5136       42.0            32.0
9       3292    4968    5160       39.5            31.5
11      3288    4992    5152       40.0            30.5
16      3308    NA      5056       42.5            38.0
17      3292    NA      5056       40.5            36.5
18      3304    NA      5176       36.5            35.0
19      3300    NA      5184       37.5            33.5
20      3304    NA      5168       36.5            34.0
24      NA      5536    5120       NA              31.5
26      NA      5544    5128       NA              31.5
28      NA      NA      5128       NA              NA
29      NA      NA      5104       NA              NA

Slot #  48V     AMP_48
        (Volt)  (Amp)
24      46      12
26      46      19

Slot #  Fan 0   Fan 1   Fan 2
        (RPM)   (RPM)   (RPM)
28      2160    2190    2160
29      2130    2190    2070
Router#
```

Table 82 describes the significant fields shown and lists the equipment supported by each environmental parameter. “NA” indicates that the reading could not be obtained, so the command should be again.

Table 82 show environment Field Descriptions for the Cisco 12000 Series Routers

Field	Description
Slot #	Slot number of the equipment. On the Cisco 12012 router, slots 0 through 11 are the line cards, slots 16 and 17 are the clock and scheduler cards, slots 18 through 20 are the switch fabric cards, slots 24 through 27 are the power supplies, and slots 28 and 29 are the blowers.
3V (mv)	Measures the 3v power supply on the card. The 3v power supply is on the line cards, GRP card, clock and scheduler cards, and switch fabric cards.
5V (mv)	Measures the 5v power supply on the card. The 5v power supply is on the line cards, GRP card, and power supplies.
MBUS 5V (mv)	Measures the 5v MBus on the card. The 5v MBus is on all equipment.
Hot Sensor (deg C)	Measures the temperature at the hot sensor on the card. The hot sensor is on the line cards, GRP card, clock and scheduler cards, switch fabric cards, and blowers.
Inlet Sensor (deg C)	Measures the current inlet temperature on the card. The inlet sensor is on the line cards, GRP card, clock and scheduler cards, switch fabric cards, and power supplies.
48V (Volt)	Measures the DC power supplies.
AMP_48 (Amp)	Measures the AC power supplies.
Fan 0, Fan 1, Fan 2	Measures the fan speed in rotations per minute.

The following is sample output from the **show environment all** command for the Cisco 12008 router. Slots 0 through 7 are the line cards, slots 16 and 17 are the clock scheduler cards (the clock scheduler cards control the fans), slots 18 through 20 are the switch fabric cards, and slots 24 and 26 are the power supplies. The Cisco 12008 router does not support slots 25, 27, 28, and 29. An “NA” in the table means that no values were returned. In some cases it is because the equipment is not supported for that environmental parameter (for example, the power supplies in slots 24 and 26 do not have a hot sensor, so an NA is displayed).

```
Router# show environment all

Slot #  Hot Sensor      Inlet Sensor
         (deg C)          (deg C)
2          31.0            22.0
5          33.5            26.5
16         25.5            21.5
18         22.0            21.0
19         22.5            21.0
24         NA              29.5
26         NA              24.5

Slot #  3V      5V      MBUS 5V
        (mv)    (mv)    (mv)
2       3292    5008    5136
5       3292    5000    5128
16      3272    NA      5128
18      3300    NA      5128
19      3316    NA      5128


Slot #  5V      MBUS 5V 48V     AMP_48
        (mv)    (mv)    (Volt)  (Amp)
```

```
24      0       5096    3       0
26      5544    5144    47      3

Slot #  Fan Information
16      Voltage 16V Speed slow: Main Fans Ok Power Supply fans Ok

Alarm Indicators
No alarms

Slot #  Card Specific Leds
16      Mbus OK SFCs Failed
18      Mbus OK
19      Mbus OK
24      Input Failed
26      Input Ok
```

The following is sample output from the **show environment table** command for a Cisco 12012 router. The **show environment table** command lists the warning, critical, and shutdown limits on your system and includes the GRP card and line cards (slots 0 to 15), clock and scheduler cards (slots 16 and 17), switch fabric cards (slots 18 to 20), and blowers.

```
Router# show environment table

Hot Sensor Temperature Limits (deg C):
                        Warning Critical Shutdown
GRP/GLC (Slots 0-15)       40      46      57
CSC     (Slots 16-17)      46      51      65
SFC     (Slots 18-20)      41      46      60

Inlet Sensor Temperature Limits (deg C):
                        Warning Critical Shutdown
GRP/GLC (Slots 0-15)       35      40      52
CSC     (Slots 16-17)      40      45      59
SFC     (Slots 18-20)      37      42      54

3V Ranges (mv):
                           Warning         Critical        Shutdown
                        Below   Above    Below  Above    Below  Above
GRP/GLC (Slots 0-15)     3200    3400     3100   3500     3050   3550
CSC     (Slots 16-17)    3200    3400     3100   3500     3050   3550
SFC     (Slots 18-20)    3200    3400     3100   3500     3050   3550

5V Ranges (mv):
                           Warning         Critical        Shutdown
                        Below   Above    Below  Above    Below  Above
GRP/GLC (Slots 0-15)     4850    5150     4750   5250     4680   5320

MBUS_5V Ranges (mv):
                           Warning         Critical        Shutdown
                        Below   Above    Below  Above    Below  Above
GRP/GLC (Slots 0-15)     5000    5250     4900   5350     4750   5450
CSC     (Slots 16-17)    4820    5150     4720   5250     4750   5450
SFC     (Slots 17-20)    5000    5250     4900   5350     4750   5450


Blower Operational Range (RPM):

Top Blower:
                Warning    Critical
                 Below      Below
Fan 0           1000        750
Fan 1           1000        750
Fan 2           1000        750
```

```
Bottom Blower:
                Warning    Critical
                 Below      Below
Fan 0           1000        750
Fan 1           1000        750
Fan 2           1000        750
```

The following is sample output from the **show environment leds** command for a Cisco 12012 router. The **show environment leds** command lists the status of the MBus LEDs on the clock, scheduler, and the switch fabric cards.

```
Router# show environment leds

16 leds Mbus OK
18 leds Mbus OK
19 leds Mbus OK
20 leds Mbus OK
```

Related Commands

Command	Description
snmp-server enable traps envmon	Controls (enables or disables) environmental monitoring SNMP notifications.
snmp-server host	Specifies how SNMP notifications should be sent (as traps or informs), the version of SNMP to use, the security level of the notifications (for SNMPv3), and the recipient (host) of the notifications.

show gsr

To display hardware information on the Cisco 12000 series Gigabit Switch Routers (GSRs), use the **show gsr** EXEC command.

show gsr [**chassis-info** [**details**]]

Syntax Description

chassis-info	(Optional) Displays backplane NVRAM information.
details	(Optional) In addition to the information displayed, this option includes hexadecimal output of the backplane NVRAM information.

Command Modes

EXEC

Command History

Release	Modification
11.2 GS	This command was added to support the Cisco 12000 series GSRs.

Usage Guidelines

Use this command to determine the type of hardware installed in your Cisco 12000 series GSR router.

Examples

The following is sample output from the **show gsr** command for a Cisco 12012 router. This command shows the type and state of the card installed in the slot.

```
Router# show gsr

Slot 0  type  = Route Processor
        state = IOS Running  MASTER
Slot 7  type  = 1 Port Packet Over SONET OC-12c/STM-4c
        state = Card Powered
Slot 16 type  = Clock Scheduler Card
        state = Card Powered  PRIMARY CLOCK
```

The following is sample output from the **show gsr chassis-info** command for a Cisco 12012 router:

```
Router# show gsr chassis-info

Backplane NVRAM [version 0x20] Contents -
  Chassis: type 12012 Fab Ver: 1
    Chassis S/N: ZQ24CS3WT86MGVHL
  PCA: 800-3015-1  rev: A0  dev: 257  HW ver: 1.0
    Backplane S/N: A109EXPR75FUNYJK
  MAC Addr: base 0000.EAB2.34FF  block size: 1024
  RMA Number: 0x5F-0x2D-0x44  code: 0x01  hist: 0x1A
```

show gt64010 (7200)

To display all GT64010 internal registers and interrupt status on the Cisco 7200 series routers, use the **show gt64010** EXEC command.

show gt64010

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

This command displays information about the CPU interface, DRAM/device address space, device parameters, direct memory access (DMA) channels, timers and counters, and protocol control information (PCI) internal registers. The information is generally useful for diagnostic tasks performed by technical support only.

Examples

The following is a partial sample output for the **show gt64010** command:

```
Router# show gt64010

GT64010 Channel 0 DMA:
 dma_list=0x6088C3EC, dma_ring=0x4B018480, dma_entries=256
 dma_free=0x6088CECC, dma_reqt=0x6088CECC, dma_done=0x6088CECC
 thread=0x6088CEAC, thread_end=0x6088CEAC
 backup_thread=0x0, backup_thread_end=0x0
 dma_working=0, dma_complete=6231, post_coalesce_frames=6231
 exhausted_dma_entries=0, post_coalesce_callback=6231

GT64010 Register Dump: Registers at 0xB4000000

CPU Interface:
 cpu_interface_conf   : 0x80030000 (b/s 0x00000380)
 addr_decode_err      : 0xFFFFFFFF (b/s 0xFFFFFFFF)
Processor Address Space :
 ras10_low            : 0x00000000 (b/s 0x00000000)
 ras10_high           : 0x07000000 (b/s 0x00000007)
 ras32_low            : 0x08000000 (b/s 0x00000008)
 ras32_high           : 0x0F000000 (b/s 0x0000000F)
 cs20_low             : 0xD0000000 (b/s 0x000000D0)
 cs20_high            : 0x74000000 (b/s 0x00000074)
 cs3_boot_low         : 0xF8000000 (b/s 0x000000F8)
 cs3_boot_high        : 0x7E000000 (b/s 0x0000007E)
 pci_io_low           : 0x00080000 (b/s 0x00000800)
 pci_io_high          : 0x00000000 (b/s 0x00000000)
 pci_mem_low          : 0x00020000 (b/s 0x00000200)
 pci_mem_high         : 0x7F000000 (b/s 0x0000007F)
```

```
 internal_spc_decode  : 0xA0000000 (b/s 0x000000A0)

 bus_err_low          : 0x00000000 (b/s 0x00000000)
 bus_err_high         : 0x00000000 (b/s 0x00000000)
.
.
.
```

show logging

To display the state of system logging (syslog) and the contents of the standard system logging message buffer,, use the **show logging** privileged EXEC command.

show logging [**slot** *slot-number* | **summary**]

Syntax Description

slot *slot-number*	(Optional) Displays information in the syslog history table for a specific line card. Slot numbers range from 0 to 11 for the Cisco 12012 router and 0 to 7 for the Cisco 12008 router.
summary	(Optional) Displays counts of messages by type for each line card.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
11.2 GS	The **slot** and **summary** keywords were added for the Cisco 12000 family.

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 Simple Network Management Protocol (SNMP) configuration parameters and protocol activity.

Note Within the context of the CLI, “syslog” is an abbreviation for the system message logging process in Cisco IOS software. “Syslog” is alsp used to identify the messages generated, as in "syslog messages." Technically, the term "syslog" refers only to the process of logging messages to a remote host or hosts, but is commonly used to refer to all Cisco IOS system logging processes.

Examples

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

```
Router# show logging

Syslog logging: enabled
     Console logging: disabled
     Monitor logging: level debugging, 266 messages logged.
     Trap logging: level informational, 266 messages logged.
     Logging to 192.180.2.238

SNMP logging: disabled, retransmission after 30 seconds
    0 messages logged
Router#
```

Table 83 describes the significant fields shown in the display.

Table 83 show logging in 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, syslog messages are saved to the specified server.
Console logging	Minimum level of severity required for a log message to be sent to the console. If disabled, the word “disabled” is displayed.
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.
SNMP logging	Displays whether SNMP logging is enabled, the number of messages logged, and the retransmission interval.

The following is sample output from the **show logging summary** command for the Cisco 12012 router. A number in the column indicates that the syslog contains that many messages for the line card. For example, line card in slot 9 has 1 system message, 4 warning messages, and 47 notification messages.

```
Router# show logging summary

+-----+-------+-------+-------+-------+-------+-------+-------+-------+
 SLOT | EMERG | ALERT | CRIT  | ERROR |WARNING| NOTICE| INFO  | DEBUG |
+-----+-------+-------+-------+-------+-------+-------+-------+-------+
|* 0* |     . |     . |     . |     . |     . |     . |     . |     . |
|  1  |       |       |       |       |       |       |       |       |
|  2  |       |       |       |     1 |     4 |    45 |       |       |
|  3  |       |       |       |       |       |       |       |       |
|  4  |       |       |       |     5 |     4 |    54 |       |       |
|  5  |       |       |       |       |       |       |       |       |
|  6  |       |       |       |       |       |       |       |       |
|  7  |       |       |       |    17 |     4 |    48 |       |       |
|  8  |       |       |       |       |       |       |       |       |
|  9  |       |       |       |     1 |     4 |    47 |       |       |
| 10  |       |       |       |       |       |       |       |       |
| 11  |       |       |       |    12 |     4 |    65 |       |       |
+-----+-------+-------+-------+-------+-------+-------+-------+-------+
Router#
```

Table 84 describes the logging level fields shown in the display.

Table 84 show logging summary Field Descriptions

Field	Description
SLOT	Indicates the slot number of the line card. An asterisk next to the slot number indicates the GRP card whose error message counts are not displayed. For information on the GRP card, use the **show logging** command.
EMERG	Indicates that the system is unusable.
ALERT	Indicates that immediate action is needed.
CRIT	Indicates a critical condition.
ERROR	Indicates an error condition.
WARNING	Indicates a warning condition.

Table 84 show logging summary Field Descriptions (continued) (continued)

Field	Description
NOTIFICE	Indicates a normal but significant condition.
INFO	Indicates an informational message only.
DEBUG	Indicates a debugging message.

Related Commands

Command	Description
clear logging	Clears messages from the logging buffer.
logging history size	Changes the number of syslog messages stored in the history table of the router.
logging linecard	Logs messages to an internal buffer on a line card and limits the logging messages displayed on terminal lines other than the console line to messages with a level at or above level.
show logging history	Displays information about the configuration of the syslog history table.

show logging history

To display information about the state of the syslog history table, use the **show logging history** privileged EXEC command.

show logging history

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

CommandHistory

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command displays information about the syslog history table, such as the table size, the status of messages, and text of messages stored in the table. Messages stored in the table are governed by the **logging history** global configuration command.

Examples

The following example shows sample output from the **show logging history** command. In this example, notifications of severity level 5 (notifications) through severity level 0 (emergencies) are configured to be written to the logging history table.

```
Router# show logging history

Syslog History Table: 1 maximum table entries,
saving level notifications or higher
0 messages ignored, 0 dropped, 15 table entries flushed,
SNMP notifications not enabled
  entry number 16: SYS-5-CONFIG_I
  Configured from console by console
  timestamp: 1110

Router#
```

Table 85 describes the significant fields shown in the output.

Table 85 show logging history Field Descriptions

Field	Description
maximum table entry	Number of messages that can be stored in the history table. Set with the **logging history size** command.
saving level notifications <x> or higher	Level of messages that are stored in the history table and sent to the SNMP server (if SNMP notification is enabled). The severity level can be configured with the **logging history** command.

Table 85 show logging history Field Descriptions (continued)

Field	Description
messages ignored	Number of messages not stored in the history table because the severity level is greater than that specified with the **logging history** command.
dropped	Number of messages that could not be processed due to lack of system resources. Dropped messages do not appear in the history table and are not sent to the SNMP server.
table entries flushed	Number of messages that have been removed from the history table to make room for newer messages.
SNMP notifications	Whether syslog traps of the appropriate level are sent to the SNMP server. The sending of syslog traps are enabled or disabled through the **snmp-server enable traps syslog** command.
entry number:	Number of the message entry in the history table. In the example above, the message "SYS-5-CONFIG_I Configured from console by console" indicates a syslog message consisting of the facility name (SYS), which indicates where the message came from, the severity level (5) of the message, the message name (CONFIG_I), and the message text.
timestamp	Time, based on the up time of the router, that the message was generated.

Related Commands

Command	Description
clear logging	Clears messages from the logging buffer.
logging history	Limits syslog messages sent to the router's history table to a specified severity level.
logging history size	Changes the number of syslog messages that can be stored in the history table.
logging linecard	Logs messages to an internal buffer on a line card. This command limits the logging messages displayed on terminal lines other than the console line to messages with a level at or above level.
snmp-server enable traps	The [**no**] **snmp-server enable traps syslog** form of this command controls (enables or disables) the sending of system-logging messages to a network management station.

show memory

To display memory utilization statistics, use the **show memory** command in User or Privileged EXEC mode.

show memory [*start-address* [*end-address*] | [**processor** | **io** | **multibus**] [**free**] | **summary**]

Syntax Description

start-address [*end-address*]	(Optional) Display memory utilization statistics starting at the specified memory block address and, optionally, ending at the specified memory block address.
processor	(Optional) Displays only processor (fast) memory.
io	(Optional) Displays only Input/Output memory.
multibus	(Optional) Displays only multibus memory. (Limited platform support. Originally supported on the Cisco 7000 series.)
free	(Optional) Displays only free memory statistics for the specified memory type.
summary	(Optional) Summarizes the statistics by grouping them together by Allocating Process Call (Alloc PC).

Defaults

If a memory address is not specified, statistics for all memory addresses are displayed.

If a memory type (**processor** | **io** | **multibus**) is not specified, statistics for all memory types present are displayed.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced, using the following syntax: `show memory { <start_address> [end_address] | {[ processor | io | sram | multibus ] [free]} }`

Usage Guidelines

This command prints detailed memory information to the screen. This information is intended for use by Cisco technical support personnel.

Tip This command can generate a large amount of output. Use the Break key sequence (often Crtl+z) at the `--More--` prompt to return to the CLI prompt.

This command first displays how much memory is being used on the router by memory pool (processor, shared I/O memory, and, potentially, SRAM). Then this command displays, for each memory pool, a complete list of all blocks.

Examples

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

```
Router# show memory

              Head   Total(b)    Used(b)    Free(b)  Lowest(b) Largest(b)
Processor    B0EE38    5181896    2210036    2971860    2692456    2845368

          Processor memory
Address   Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What
B0EE38     1056 0        B0F280     1                  18F132    List Elements
B0F280     2656 B0EE38   B0FD08     1                  18F132    List Headers
B0FD08     2520 B0F280   B10708     1                  141384    TTY data
B10708     2000 B0FD08   B10F00     1                  14353C    TTY Input Buf
B10F00      512 B10708   B11128     1                  14356C    TTY Output Buf
B11128     2000 B10F00   B11920     1                  1A110E    Interrupt Stack
B11920       44 B11128   B11974     1                  970DE8    *Init*
B11974     1056 B11920   B11DBC     1                  18F132    messages
B11DBC       84 B11974   B11E38     1                  19ABCE    Watched Boolean
B11E38       84 B11DBC   B11EB4     1                  19ABCE    Watched Boolean
B11EB4       84 B11E38   B11F30     1                  19ABCE    Watched Boolean
B11F30       84 B11EB4   B11FAC     1                  19ABCE    Watched Boolean
Router#
```

The following is sample output from the **show memory free** command:

```
Router# show memory free

              Head   Total(b)    Used(b)    Free(b)  Lowest(b) Largest(b)
Processor    B0EE38    5181896    2210076    2971820    2692456    2845368

          Processor memory
Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What
            24    Free list 1
CEB844      32 CEB7A4   CEB88C     0  0       0       96B894    SSE Manager
            52    Free list 2
            72    Free list 3
            76    Free list 4
            80    Free list 5
D35ED4      80 D35E30   D35F4C     0  0       D27AE8  96B894    SSE Manager
D27AE8      80 D27A48   D27B60     0  D35ED4  0       22585E    SSE Manager
            88    Free list 6
           100    Free list 7
D0A8F4     100 D0A8B0   D0A980     0  0       0       2258DA    SSE Manager
           104    Free list 8
B59EF0     108 B59E8C   B59F84     0  0       0       2258DA    (fragment)
```

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 86 describes the significant fields shown in the first section of the display.

Table 86 show memory Field Descriptions—First Section

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of used bytes plus free bytes.
Used(b)	Amount of memory in use.
Free(b)	Amount of memory not in use.

Table 86 show memory Field Descriptions—First Section (continued)

Field	Description
Lowest(b)	Smallest amount of free memory since last boot.
Largest(b)	Size of largest available free block.

The second section of the display is a block-by-block listing of memory use. Table 87 describes the significant fields shown in the second section of the display.

Table 87 Characteristics of Each Block of Memory—Second Section

Field	Description
Address	Hexadecimal address of block.
Bytes	Size of block (in bytes).
Prev.	Address of previous block (should match Address on previous line).
Next	Address of next block (should match address on next line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of previous free block (if free).
NextF	Address of next free block (if free).
Alloc PC	"Allocating Process Call" — 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 I/O memory blocks.

The following is sample output from the **show memory io** command:

```
Router# 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
```

The **show memory summary** command displays a summary of all memory pools and memory usage per Alloc PC (address of the system call that allocated the block).

The following is partial sample output from the **show memory summary** command.

"Size" is the number of bytes in each block. "Bytes" is the total size for all blocks ("Bytes" equals the "Size" value multiplied by the "Blocks" value). For a description of the other fields, see Table 20 and Table 21.

```
Router# show memory summary

                Head    Total(b)     Used(b)     Free(b)   Lowest(b)  Largest(b)
Processor   8404A580    64102816    10509276    53593540    52101448    51007568
      I/O    7C53000     3854336     2138224     1716112     1708432     1716064
```

```
          Processor memory
Alloc PC         Size     Blocks      Bytes    What
0x2AB2            192          1        192    IDB: Serial Info
0x70EC             92          2        184    Init
0xC916            128         50       6400    RIF Cache
0x76ADE          4500          1       4500    XDI data
0x76E84          4464          1       4464    XDI data
0x76EAC           692          1        692    XDI data
0x77764           408          1        408    Init
0x77776           116          1        116    Init
0x777A2           408          1        408    Init
0x777B2           116          1        116    Init
0xA4600            24          3         72    List
0xD9B5C            52          1         52    SSE Manager
.......................
0x0                 0       3413    2072576    Pool Summary
0x0                 0         28    2971680    Pool Summary (Free Blocks)
0x0                40       3441     137640    Pool Summary(All Block Headers)
0x0                 0       3413    2072576    Memory Summary
0x0                 0         28    2971680    Memory Summary (Free Blocks)
```

Related Commands

Command	Description
show processes memory	Displays a summary of how much memory is being allocated and freed by each process on the router.

show memory allocating-process

To display statistics on allocated memory with corresponding allocating processes, use the **show memory allocating-process** command in user EXEC or privileged EXEC mode.

show memory allocating-process [**totals**]

Syntax Description

totals	(Optional) Displays allocating memory totals.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

The **show memory allocating-process** command displays information about memory available after the system image decompresses and loads.

Examples

The following is sample output from the **show memory allocating-process** command:

```
Router# show memory allocating-process

                Head     Total(b)     Used(b)     Free(b)   Lowest(b)    Largest(b)
Processor  44E03560    186632636    26131896   160500740   160402052     153078204
     Fast  44DE3560       131072       58280       72792       72792         72764

          Processor memory

 Address  Bytes Prev.    Next     Ref    Alloc Proc    Alloc PC  What
6148EC40   1504 0        6148F24C   1  *Init*          602310FC  List Elements
6148F24C   3004 6148EC40 6148FE34   1  *Init*          60231128  List Headers
6148FE34   9000 6148F24C 61492188   1  *Init*          6023C634  Interrupt Stack
61492188     44 6148FE34 614921E0   1  *Init*          60C17FD8  *Init*
614921E0   9000 61492188 61494534   1  *Init*          6023C634  Interrupt Stack
61494534     44 614921E0 6149458C   1  *Init*          60C17FD8  *Init*
6149458C    220 61494534 61494694   1  *Init*          602450F4  *Init*
61494694   4024 6149458C 61495678   1  *Init*          601CBD64  TTY data
.
.
.
```

Table 92 describes the significant fields shown in the display.

Table 88 show memory allocating-process Field Descriptions

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of used bytes plus free bytes.

Table 88 show memory allocating-process Field Descriptions (continued)

Field	Description
Used(b)	Amount of memory in use in bytes.
Free(b)	Amount of memory not in use (in bytes).
Lowest(b)	Smallest amount of free memory since last boot (in bytes).
Largest(b)	Size of largest available free block (in bytes).
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev.	Address of the preceding block (should match the address on preceding row).
Next	Address of the following block (should match the address on following row).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
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 following is sample output from the **show memory allocating-process totals** command:

```
Router# show memory allocating-process totals

               Head    Total(b)     Used(b)     Free(b)   Lowest(b)  Largest(b)
Processor   44E03560   186632636    26142524   160490112   160402052   153078204
     Fast   44DE3560      131072       58280       72792       72792       72764

Allocator PC Summary for: Processor

    PC          Total   Count  Name
0x4041AF8C    5710616    3189  *Packet Data*
0x4041AF40    2845480    3190  *Packet Header*
0x404DBA28    1694556     203  Process Stack
0x4066EA68    1074080      56  Init
0x404B5F68    1049296       9  pak subblock chunk
0x41DCF230     523924      47  TCL Chunks
0x404E2488     448920       6  MallocLite
0x4066EA8C     402304      56  Init
0x40033878     397108       1  Init
0x41273E24     320052       1  CEF: table event ring
0x404B510C     253152      24  TW Buckets
0x42248F0C     229428       1  Init
0x42248F28     229428       1  Init
0x42248F48     229428       1  Init
0x423FF210     218048       5  Dn48oC!M
0x421CB530     208144       1  epa crypto blk
0x417A07F0     196764       3  L2TP Hash Table
0x403AFF50     187836       3  Init
```

Table 86 describes the significant fields shown in the display.

Table 89 show memory allocating-process totals Field Descriptions

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of used bytes plus free bytes.
Used(b)	Amount of memory in use (in bytes).
Free(b)	Amount of memory not in use (in bytes).
Lowest(b)	Smallest amount of free memory since last boot (in bytes).
Largest(b)	Size of the largest available free block in bytes.
PC	Program counter
Total	Total memory allocated by the process (in bytes).
Count	Number of allocations.
Name	Name of the allocating process.

Related Commands

Command	Description
show processes memory	Displays memory used per process.

show memory dead

To display statistics of memory allocated by processes that are now dead, use the **show memory dead** command in user EXEC or privileged EXEC mode.

show memory dead [**totals**]

Syntax Description

totals	(Optional) Displays memory totals for processes that have been terminated.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

The **show memory dead** command displays information about processes that have been terminated. Terminated processes accounts for memory allocated under another process.

Examples

The following is sample output from the **show memory dead** command:

```
Router# show memory dead

               Head   Total(b)    Used(b)    Free(b)    Lowest(b)   Largest(b)
      I/O    600000    2097152     461024    1636128      1635224      1635960

          Processor memory

 Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What
1D8310       60 1D82C8   1D8378     1                   3281FFE   Router Init
2CA964       36 2CA914   2CA9B4     1                   3281FFE   Router Init
2CAA04      112 2CA9B4   2CAAA0     1                   3A42144   OSPF Stub LSA RBTree
2CAAA0       68 2CAA04   2CAB10     1                   3A420D4   Router Init
2ED714       52 2ED668   2ED774     1                   3381C84   Router Init
2F12AC       44 2F124C   2F1304     1                   3A50234   Router Init
2F1304       24 2F12AC   2F1348     1                   3A420D4   Router Init
2F1348       68 2F1304   2F13B8     1                   3381C84   Router Init
300C28      340 300A14   300DA8     1                   3381B42   Router Init
```

Table 86 describes the significant fields shown in the display.

Table 90 show memory dead Field Descriptions

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of used bytes plus free bytes.
Used(b)	Amount of memory in use.

Table 90 show memory dead Field Descriptions (continued)

Field	Description
Free(b)	Amount of memory not in use (in bytes).
Lowest(b)	Smallest amount of free memory since last boot (in bytes).
Largest(b)	Size of the largest available free block (in bytes).
Address	Hexadecimal address of the block (in bytes).
Bytes	Size of the block (in bytes).
Prev.	Address of the preceding block.
Next	Address of the following block.
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the system call that allocated the block.
What	Name of the process that owns the block, or "(fragment)" if the block is a fragment, or "(coalesced)" if the block was coalesced from adjacent free blocks.

show memory debug references

To display the list of blocks containing references to a given range of addresses in the memory or references to free memory, use the **show memory debug references** command in user EXEC or privileged EXEC mode.

show memory debug references [**dangling**[*start-address start-address*]]

Syntax Description

dangling	(Optional) Displays the possible references to free memory.
start-address	(Optional) Address numbers <0-4294967295> that determine the address range.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory debug references** command:

```
Router# show memory debug references 2 3

Address  Reference Cont_block Cont_block_name
442850BC         2  44284960   bss
44285110         3  44284960   bss
4429C33C         2  44284960   bss
4429C34C         2  44284960   bss
4429C35C         3  44284960   bss
.
.
.
```

The following is sample output from the **show memory debug references dangling** command:

```
Router# show memory debug references dangling

Address  Reference Free_block Cont_block Cont_block_name
442D5774 458CE5EC  458CE5BC   44284960   bss
442D578C 46602998  46602958   44284960   bss
442D58A0 465F9BC4  465F9B94   44284960   bss
442D58B8 4656785C  4656781C   44284960   bss
442D5954 45901E7C  45901E4C   44284960   bss
.
.
.
```

Table 86 describes the significant fields shown in the displays.

Table 91 show memory debug references Field Descriptions

Field	Description
Address	Hexadecimal address of the block that has the given or dangling reference.
Reference	Address which is given or dangling.
Free_block	Address of the free block which now contains the memory referenced by the dangling reference.
Cont_block	Address of the control block which contains the block that has the reference.
Cont_block_name	Name of the control block.

show memory debug unused

To display the list of memory blocks which have been allocated but not used, use the **show memory debug unused** command in user EXEC or privileged EXEC mode.

show memory debug unused

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory debug unused** command:

```
Router# show memory debug unused

Address  Alloc_pc PID  size     Name
654894B8 62BF31DC -2   44       *Init*
6549A074 601F7A84 -2   4464     XDI data
6549B218 601F7274 -2   4500     XDI data
6549DFB0 6089DDA4 42   84       Init
65509160 6089DDA4 1    84       *Init*
6550A260 6089DDA4 2    84       *Init*
6551FDB4 6089DDA4 4    84       *Init*
6551FF34 627EFA2C -2   24       *Init*
65520B3C 6078B1A4 -2   24       Parser Mode Q1
65520B88 6078B1C8 -2   24       Parser Mode Q2
65520C40 6078B1A4 -2   24       Parser Mode Q1
65520C8C 6078B1C8 -2   24       Parser Mode Q2
65520D44 6078B1A4 -2   24       Parser Mode Q1
65520D90 6078B1C8 -2   24       Parser Mode Q2
65520E48 6078B1A4 -2   24       Parser Mode Q1
65520E94 6078B1C8 -2   24       Parser Mode Q2
65520F4C 6078B1A4 -2   24       Parser Mode Q1
65520F98 6078B1C8 -2   24       Parser Mode Q2
65521050 6078B1A4 -2   24       Parser Mode Q1
6552109C 6078B1C8 -2   24       Parser Mode Q2
65521154 6078B1A4 -2   24       Parser Mode Q1
655211A0 6078B1C8 -2   24       Parser Mode Q2
.
.
.
```

Table 92 describes the significant fields shown in the display.

Table 92 show memory debug unused Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Alloc_pc	Address of the system call that allocated the block.
PID	Process identifier of the process that allocated the block.
size	Size of the unused block (in bytes).
Name	Name of the process that owns the block.

show memory ecc

To display single-bit Error Code Correction (ECC) error logset data, use the **show memory ecc** command in privileged EXEC mode.

show memory ecc

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(30)CC	This command was introduced in Cisco IOS Release 11.1(30)CC.
12.0(4)XE	This command was integrated into Cisco IOS Release 12.0(4)XE.
12.0(6)S	This command was integrated into Cisco IOS Release 12.0(6)S.
12.1(13)	This command was integrated into Cisco IOS Release 12.1(13).

Usage Guidelines

Use this command to determine if the router has experienced single-bit parity errors.

Examples

The following is sample output from the **show memory ecc** command from a 12000-series router running Cisco IOS Release 12.0(23)S:

```
Router# show memory ecc
ECC Single Bit error log
------------------------
Single Bit error detected and corrected at 0x574F3640
- Occured 1 time(s)
- Whether a scrub was attempted at this address: Yes
- Syndrome of the last error at this address: 0xE9
- Error detected on a read-modify-write cycle ? No
- Address region classification: Unknown
- Address media classification : Read/Write Single Bit error detected and corrected at
0x56AB3760
- Occured 1 time(s)
- Whether a scrub was attempted at this address: Yes
- Syndrome of the last error at this address: 0x68
- Error detected on a read-modify-write cycle ? No
- Address region classification: Unknown
- Address media classification : Read/Write

Total Single Bit error(s) thus far: 2
```

Table 86 describes the significant fields shown in the first section of the display.

Table 93 show memory ecc Field Descriptions

Field	Description
Occured *n* time(s)	Number of single-bit errors that has occurred.
Whether a scrub was attempted at this address:	Indicates whether a scrub has been performed.
Syndrome of the last error at this address:	Describes the syndrome of last error.
Error detected on a read-modify-write cycle ?	Indicates whether an error has occurred.
Address region classification:	Describes the region of the error.
Address media classification :	Describes the media of the error and correction.

Related Commands

Command	Description
show memory	Displays statistics about memory, including memory-free pool statistics.

show memory failures alloc

To display statistics about failed memory allocation requests, use the **show memory failures alloc** command in the privileged EXEC mode.

show memory failures alloc

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory failures alloc** command:

```
Router# show memory failures alloc

Caller       Pool          Size   Alignment   When
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:04
0x60394744  I/O             1684     32      00:10:04
```

Table 86 describes the significant fields shown in the display.

Table 94 show memory failures alloc Field Descriptions

Field	Description
Caller	Address of the allocator function that issued memory allocation request that failed.
Pool	Pool from which the memory was requested.
Size	Size of the memory requested in bits.
Alignment	Memory alignment in bits.
When	Time of day at which the memory allocation request was issued.

show memory fast

To display fast memory details for the router, use the **show memory fast** command.

show memory fast [**allocating-process** [**totals**] | **dead** [**totals**] | **free** [**totals**]]

Syntax Description

allocating-process	(Optional) Include allocating process names with the standard output.
dead	(Optional) Display only memory owned by dead processes.
free	(Optional) Display only memory not allocated to a process.
totals	(Optional) Summarizes the statistics for allocating processes, dead memory, or free memory.

Command Modes

Exec

Command History

Release	Modification
12.1	This command was introduced in a release prior to 12.1.

Usage Guidelines

The show memory fast command displays the statistics for the fast memory. “Fast memory” is another name for “processor memory,” and is also known as “cache memory.” Cache memory is called fast memory because the processor can generally access the local cache (traditionally stored on SRAM positioned close to the processor) much more quickly than main (primary) memory.

Cache = fast memory closest to processor = “processor memory”

Primary Memory = the main memory below cache.

Note The **show memory fast** command is a command alias for the **show memory processor** command. These commands will generate the same output on most platforms.

Examples

The following example shows sample output from the **show memory fast** and the **show memory processor** commands:

```
Router>show memory fast

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
8404A580 0001493284 00000000 841B6ECC 000  0        84BADF88 815219D8  (coalesced)
841B6ECC 0000020004 8404A580 841BBD18 001  -------- -------- 815DB094  Managed Chunk Queue
Elements
841BBD18 0000001504 841B6ECC 841BC320 001  -------- -------- 8159EAC4  List Elements
841BC320 0000005004 841BBD18 841BD6D4 001  -------- -------- 8159EB04  List Headers
841BD6D4 0000000048 841BC320 841BD72C 001  -------- -------- 81F2A614  *Init*
841BD72C 0000001504 841BD6D4 841BDD34 001  -------- -------- 815A9514  messages
841BDD34 0000001504 841BD72C 841BE33C 001  -------- -------- 815A9540  Watched messages
841BE33C 0000001504 841BDD34 841BE944 001  -------- -------- 815A95E4  Watched Semaphore
```

```
841BE944 0000000504 841BE33C 841BEB64 001  -------- -------- 815A9630  Watched Message
Queue
841BEB64 0000001504 841BE944 841BF16C 001  -------- -------- 815A9658  Watcher Message
Queue
841BF16C 0000001036 841BEB64 841BF5A0 001  -------- -------- 815A2B24  Process Array
-- More --
<Ctrl+z>

Router>show memory processor

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
8404A580 0001493284 00000000 841B6ECC 000  0        84BADF88 815219D8  (coalesced)
841B6ECC 0000020004 8404A580 841BBD18 001  -------- -------- 815DB094  Managed Chunk Queue
Elements
841BBD18 0000001504 841B6ECC 841BC320 001  -------- -------- 8159EAC4  List Elements
841BC320 0000005004 841BBD18 841BD6D4 001  -------- -------- 8159EB04  List Headers
841BD6D4 0000000048 841BC320 841BD72C 001  -------- -------- 81F2A614  *Init*
841BD72C 0000001504 841BD6D4 841BDD34 001  -------- -------- 815A9514  messages
841BDD34 0000001504 841BD72C 841BE33C 001  -------- -------- 815A9540  Watched messages
841BE33C 0000001504 841BDD34 841BE944 001  -------- -------- 815A95E4  Watched Semaphore
841BE944 0000000504 841BE33C 841BEB64 001  -------- -------- 815A9630  Watched Message
Queue
841BEB64 0000001504 841BE944 841BF16C 001  -------- -------- 815A9658  Watcher Message
Queue
841BF16C 0000001036 841BEB64 841BF5A0 001  -------- -------- 815A2B24  Process Array
-- More --
<Ctrl+z>

Router>
```

The following example shows sample output from the **show memory fast allocating-process** command, followed by sample output from the **show memory fast allocating-process totals** command:

```
Router#show memory fast allocating-process

          Processor memory

 Address      Bytes     Prev     Next Ref   Alloc Proc     Alloc PC  What
8404A580 0001493284 00000000 841B6ECC 000                  815219D8  (coalesced)
841B6ECC 0000020004 8404A580 841BBD18 001  *Init*          815DB094  Managed Chunk Queue
Elements
841BBD18 0000001504 841B6ECC 841BC320 001  *Init*          8159EAC4  List Elements
841BC320 0000005004 841BBD18 841BD6D4 001  *Init*          8159EB04  List Headers
841BD6D4 0000000048 841BC320 841BD72C 001  *Init*          81F2A614  *Init*
841BD72C 0000001504 841BD6D4 841BDD34 001  *Init*          815A9514  messages
841BDD34 0000001504 841BD72C 841BE33C 001  *Init*          815A9540  Watched messages
841BE33C 0000001504 841BDD34 841BE944 001  *Init*          815A95E4  Watched Semaphore
841BE944 0000000504 841BE33C 841BEB64 001  *Init*          815A9630  Watched Message Queue
841BEB64 0000001504 841BE944 841BF16C 001  *Init*          815A9658  Watcher Message Queue
841BF16C 0000001036 841BEB64 841BF5A0 001  *Init*          815A2B24  Process Array
 --More--
<Ctrl+z>

c2600-1#show memory fast allocating-process totals

Allocator PC Summary for: Processor

    PC          Total   Count  Name
0x815C085C    1194600     150  Process Stack
0x815B6C28     948680       5  pak subblock chunk
```

```
0x819F1DE4     524640       8  BGP (0) update
0x815C4FD4     393480       6  MallocLite
0x815B5FDC     351528      30  TW Buckets
0x819F14DC     327900       5  connected
0x81A1E838     327900       5  IPv4 Unicast net-chunk(8)
0x8153DFB8     248136     294  *Packet Header*
0x82142438     133192       4  CEF: 16 path chunk pool
0x82151E0C     131116       1  Init
0x819F1C8C     118480       4  BGP (0) attr
0x815A4858     100048     148  Process
0x8083DA44      97248      17


 --More--
<Ctrl+z>
```

The following example shows sample output from the **show memory fast dead** command:

```
Router#show memory fast dead

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
8498FC20 0000000028 8498FB90 8498FC64 001  -------- -------- 81472B24  AAA MI SG NAME
        -------
             68
Router#show memory fast dead totals

Dead Proc Summary for: Processor

    PC          Total   Count  Name
0x81472B24         68       1  AAA MI SG NAME

Router#
```

show memory multibus

To display statistics about multibus memory, including memory-free pool statistics, use the **show memory multibus** command in user EXEC or privileged EXEC mode.

show memory multibus [**allocating-process** [**totals**]| **dead** [**totals**]| **free** [**totals**]]

Syntax Description

allocating-process [**totals**]	(Optional) Displays allocating memory totals by name.
dead [**totals**]	(Optional) Displays memory totals on dead processes.
fragment [**detail**]	(Optional) Displays memory statistics for fragmented processes.
free [**totals**]	(Optional) Displays statistics on free memory.
statistics [**history**]	(Optional) Displays memory pool history statistics on all processes.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory multibus** command:

```
Router# show memory multibus

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
6540BBA0 0000016388 00000000 6540FBD4 001  -------- -------- 60883984  TW Buckes
6540FBD4 0000016388 6540BBA0 65413C08 001  -------- -------- 60883984  TW Buckes
65413C08 0000016388 6540FBD4 65417C3C 001  -------- -------- 60883984  TW Buckes
65417C3C 0000006004 65413C08 654193E0 001  -------- -------- 608A0D4C  Process k
654193E0 0000012004 65417C3C 6541C2F4 001  -------- -------- 608A0D4C  Process k
6541C2F4 0000411712 654193E0 65480B64 000  0        0        608A0D4C  (fragmen)
65480B64 0000020004 6541C2F4 654859B8 001  -------- -------- 608CF99C  Managed s
654859B8 0000010004 65480B64 654880FC 001  -------- -------- 6085C7F8  List Eles
654880FC 0000005004 654859B8 654894B8 001  -------- -------- 6085C83C  List Heas
654894B8 0000000048 654880FC 65489518 001  -------- -------- 62BF31DC  *Init*
.
.
.
```

Table 95 describes the significant fields shown in the display.

Table 95 show memory multibus Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).

Table 95 show memory multibus Field Descriptions (continued)

Field	Description
Prev	Address of the preceding block (should match the address on the preceding line).
Next	Address of the following block (should match the address on the following line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the system call that allocated the block.
What	Name of the process that owns the block, or "(fragmen)" if the block is a fragment, or "(coalesced)" if the block was coalesced from adjacent free blocks.

show memory pci

To display statistics about Peripheral Component Interconnect (PCI) memory, use the **show memory pci** command in user EXEC or privileged EXEC mode.

show memory pci

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory pci** command:

```
Router# show memory pci

          I/O memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
0E000000 0000000032 00000000 0E000050 000  64F5EBF4 0        00000000  (fragmen)
0E000050 0000000272 0E000000 0E000190 001  -------- -------- 607E2EC0  *Packet *
0E000190 0000000272 0E000050 0E0002D0 001  -------- -------- 607E2EC0  *Packet *
0E0002D0 0000000272 0E000190 0E000410 001  -------- -------- 607E2EC0  *Packet *
0E000410 0000000272 0E0002D0 0E000550 001  -------- -------- 607E2EC0  *Packet *
0E000550 0000000272 0E000410 0E000690 001  -------- -------- 607E2EC0  *Packet *
0E000690 0000000272 0E000550 0E0007D0 001  -------- -------- 607E2EC0  *Packet *
0E0007D0 0000000272 0E000690 0E000910 001  -------- -------- 607E2EC0  *Packet *
0E000910 0000000272 0E0007D0 0E000A50 001  -------- -------- 607E2EC0  *Packet *
0E000A50 0000000272 0E000910 0E000B90 001  -------- -------- 607E2EC0  *Packet *
0E000B90 0000000272 0E000A50 0E000CD0 001  -------- -------- 607E2EC0  *Packet *
 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
0E000CD0 0000000272 0E000B90 0E000E10 001  -------- -------- 607E2EC0  *Packet *
0E000E10 0000000272 0E000CD0 0E000F50 001  -------- -------- 607E2EC0  *Packet *
```

Table 86 describes the significant fields shown in the display.

Table 96 show memory pci Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev	Address of the preceding block (should match the address on the preceding line).
Next	Address of the following block (should match the address on the following line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.

Table 96 show memory pci Field Descriptions (continued)

Field	Description
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the system call that allocated the block.
what	Name of process that owns the block, or “(fragmen)” if the block is a fragment, or "(coalesced)" if the block was coalesced from adjacent free blocks.

show memory processor

To display statistics on the router processor memory, use the **show memory processor** command in user EXEC or privileged EXEC mode.

show memory processor [**fragment** | **free** | **statistics**]

Syntax Description

fragment	(Optional) Displays the block details of fragmented free blocks and allocated blocks, which are shown either preceding or following the blocks on the free list.
free	(Optional) Displays the number of free blocks.
statistics	(Optional) Displays only memory processor statistics.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory processor** commands:

```
Router# show memory processor

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
6540BBA0 0000016388 00000000 6540FBD4 001  -------- -------- 60883984  TW Buckes
6540FBD4 0000016388 6540BBA0 65413C08 001  -------- -------- 60883984  TW Buckes
65413C08 0000016388 6540FBD4 65417C3C 001  -------- -------- 60883984  TW Buckes
65417C3C 0000006004 65413C08 654193E0 001  -------- -------- 608A0D4C  Process k
654193E0 0000012004 65417C3C 6541C2F4 001  -------- -------- 608A0D4C  Process k
6541C2F4 0000411712 654193E0 65480B64 000  0        0        608A0D4C  (fragmen)
65480B64 0000020004 6541C2F4 654859B8 001  -------- -------- 608CF99C  Managed s
654859B8 0000010004 65480B64 654880FC 001  -------- -------- 6085C7F8  List Eles
654880FC 0000005004 654859B8 654894B8 001  -------- -------- 6085C83C  List Heas
654894B8 0000000048 654880FC 65489518 001  -------- -------- 62BF31DC  *Init*
```

Table 97 describes the significant fields shown in the display.

Table 97 show memory processor Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev.	Address of the preceding block (should match the address on the preceding line).
Next	Address of the following block (should match the address on the following line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.

Table 97 show memory processor Field Descriptions (continued)

Field	Description
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the system call that allocated the block.
What	Name of the process that owns the block, or "(fragmen)" if the block is a fragment, or "(coalesced)" if the block was coalesced from adjacent free blocks.

The following is sample output from the **show memory processor fragment** command:

```
Router# show memory processor fragment

          Processor memory

Free memory size :  3144348 Number of free blocks:       96

Allocator PC Summary for allocated blocks in pool: Processor

    PC          Total   Count  Name
0x6069A038     262196       1  TACL FLT
0x62224AA8     219188       1  QOS_MODULE_MAIN
0x61648840     131124       1  Init
0x6218DAA4      73780       1  CCSIP_UDP_SOCKET
0x61649288      65588       1  CEF: loadinfo chunk
0x61BFD4B8      65588       1  PPTP mgd timer chunk
0x61EE1050      65588       1  eddri_self_event
0x607C13C4      49204       1  Exec
0x608A0D4C      35208       4  Process Stack
0x6069D804      32052       1  TACL hist
0x61631A90      21444       2  CEF: IPv4 Unicast RPF subblock
0x62BA5DD8      20432       1  Init
0x6086F858      20052       1  RMI-RO_RU Chun
0x608CF99C      20052       1  Managed Chunk Queue Elements
```

Table 98 describes the significant fields shown in the display.

Table 98 show memory processor fragment Field Descriptions

Field	Description
PC	Program counter
Total	Total memory allocated by the process (in bytes).
Count	Number of allocations.
Name	Name of the allocating process.

The following is sample output from the **show memory processor free** command:

```
Router# show memory processor free

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what

             24    Free list 1
66994680 0000000072 66994618 669946FC 000  0        6698FFC8 60699114  Turbo ACr
6698FFC8 0000000072 6698FF60 66990044 000  66994680 659CF6B0 60699114  Turbo ACr
```

```
659CF6B0 0000000024 659CF678 659CF6FC 000  6698FFC8 659CF86C 6078A2CC  Init
659CF86C 0000000024 659CF710 659CF8B8 000  659CF6B0 65ADB53C 6078A2CC  Init
65ADB53C 0000000024 65ADB504 65ADB588 000  659CF86C 65ADFC38 6078A2CC  Init
65ADFC38 0000000024 65ADFC00 65ADFC84 000  65ADB53C 65B6C504 6078A2CC  Init
65B6C504 0000000024 65B6C4B8 65B6C550 000  65ADFC38 6593E924 6078A2CC  Init
6593E924 0000000028 6593E8E8 6593E974 000  65B6C504 65CCB054 6078A2CC  Init
65CCB054 0000000024 65CCB01C 65CCB0A0 000  6593E924 65CCBD98 6078A2CC  Init
65CCBD98 0000000028 65CCBD60 65CCBDE8 000  65CCB054 65CCFB70 6078A2CC  Init
65CCFB70 0000000024 65CCFB38 65CCFBBC 000  65CCBD98 65D0BB58 6078A2CC  Init
65D0BB58 0000000024 65D0BB20 65D0BBA4 000  65CCFB70 65D0C5F0 6078A2CC  Init
65D0C5F0 0000000024 65D0C5B8 65D0C63C 000  65D0BB58 65CFF2F4 6078A2CC  Init
65CFF2F4 0000000024 65CFF2BC 65CFF340 000  65D0C5F0 6609B7B8 6078A2CC  Init
6609B7B8 0000000036 6609AFC8 6609B810 000  65CFF2F4 660A0BD4 6078A2CC  Init
```

Table 92 describes the significant fields shown in the display.

Table 99 show memory processor free Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev	Address of the preceding block (should match the address on preceding row).
Next	Address of the following block (should match the address on following row).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the system call that allocated the block.
what	Name of the 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 following is sample output from the **show memory processor statistics** command:

```
Router# show memory processor statistics

               Head    Total(b)     Used(b)     Free(b)   Lowest(b)  Largest(b)
Processor   6540BBA0   415187836    27216968   387970868   385755044   381633404
      I/O    E000000    33554432     6226336    27328096    27328096    27317852
.
.
.
```

Table 86 describes the significant fields shown in the display.

Table 100 show memory processor statistics Field Descriptions

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of the used bytes plus free bytes.
Used(b)	Amount of memory in use (in bytes).
Free(b)	Amount of memory not in use (in bytes).

Table 100 show memory processor statistics Field Descriptions (continued)

Field	Description
Lowest(b)	Smallest amount of free memory since last boot (in bytes).
Largest(b)	Size of the largest available free block (in bytes).

show memory scan

To monitor the number and type of parity (memory) errors on your system, use the **show memory scan** command in Exec mode.

show memory scan

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
12.0(4)XE	This command was introduced for the Cisco 7500 series.
12.0(7)T	This command was implemented in Cisco IOS Release 12.0T for the Cisco 7500 series.
12.0(6)S	This command was implemented in Cisco IOS Release 12.0S for the Cisco 7500 series.
12.1(1)E	This command was implemented in Cisco IOS Release 12.1E for the Cisco 7500 series.

Usage Guidelines

For the **show memory scan** command to function, the memory scan feature must be enabled on the RSP using the **memory scan** global configuraiton mode command.

Examples

The following example shows a result with no memory errors:

```
Router# show memory scan

Memory scan is on.
No parity error has been detected.
```

If errors are detected in the system, the **show memory scan** command generates an error report. In the following example, memory scan detected a parity error:

```
Router# show memory scan

Memory scan is on.
Total Parity Errors 1.
Address   BlockPtr   BlckSize  Disposit  Region Timestamp
6115ABCD  60D5D090   9517A4    Scrubed   Local 16:57:09 UTC Thu  Mar 18
```

Table 101 describes the fields contained in the error report.

Table 101 show memory scan Field Descriptions

Field	Description
Address	The byte address where the error occurred.
BlockPtr	The pointer to the block that contains the error.
BlckSize	The size of the memory block
Disposit	The action taken in response to the error: • BlockInUse—An error was detected in a busy block. • InFieldPrev—An error was detected in the previous field of a block header. • InHeader—An error was detected in a block header. • Linked—A block was linked to a bad list. • MScrubed—The same address was "scrubbed" more than once, and the block was linked to a bad list. • MultiError—Multiple errors have been found in one block. • NoBlkHdr—No block header was found. • NotYet—An error was found; no action has been taken at this time. • Scrubed—An error was "scrubbed." • SplitLinked—A block was split, and only a small portion was linked to a bad list.
Region	The memory region in which the error was found: • IBSS—image BSS • IData—imagedata • IText—imagetext • local—heap
Timestamp	The time the error occurred.

Related Commands

Command	Description
memory scan	Controls (enables or disables) the memory scan feature.

show memory statistics history table

To display the history of memory consumption, use the **show memory statistics history table** command in user EXEC or privileged EXEC mode.

show memory statistics history table

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.

Usage Guidelines

The **show memory statistics history table** command displays a histogram of memory usage. The quantity on the x-axis is percentage of memory free and on the y-axis is time. The height of the histogram at any given point in time indicates the percentage of free memory in the pool.

Examples

The following is sample output from the **show memory statistics history table** command:

```
Router# show memory statistics history table

History for Processor memory

Time: 15:48:56.806
Used(b): 422748036 Largest(b): 381064952 Free blocks :291
Maximum memory users for this period
Process Name           Holding   Num Alloc
Virtual Exec             26992          37
TCP Protocols            14460           6
IP Input                  1212           1

Time: 14:42:54.506
Used(b): 422705876 Largest(b): 381064952 Free blocks :296
Maximum memory users for this period
Process Name           Holding   Num Alloc
Exec                  400012740          24
Dead                   1753456          90
Pool Manager            212796         257

Time: 13:37:26.918
Used(b): 20700520 Largest(b): 381064952 Free blocks :196
Maximum memory users for this period
Process Name           Holding   Num Alloc
Exec                      8372           5

Time: 12:39:44.422
Used(b): 20701436 Largest(b): 381064952 Free blocks :193
```

```
Time: 11:46:25.135
Used(b): 20701436 Largest(b): 381064952 Free blocks :193
Maximum memory users for this period
Process Name           Holding   Num Alloc
CDP Protocol              3752          25

Time: 10:44:24.342
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 09:38:53.038
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 08:33:35.154
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 07:28:05.987
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 06:35:22.878
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 05:42:14.286
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 04:41:53.486
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 03:48:47.891
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 02:46:32.391
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 01:54:27.931
Used(b): 20717804 Largest(b): 381064952 Free blocks :189

Time: 01:02:05.535
Used(b): 20717804 Largest(b): 381064952 Free blocks :189
Maximum memory users for this period
Process Name           Holding   Num Alloc
Entity MIB API           67784          16
TTY Background           12928           4
Exec                      7704           3

Time: 00:00:17.936
Used(b): 21011192 Largest(b): 381064952 Free blocks :186
Maximum memory users for this period
Process Name           Holding   Num Alloc
Init                  18653520        6600
CCPROXY_CT              599068          57
Proxy Session Applic    275424          21

History for I/O memory

Time: 15:48:56.809
Used(b):  7455520 Largest(b): 59370080 Free blocks :164

Time: 14:42:54.508
Used(b):  7458064 Largest(b): 59370080 Free blocks :165
Maximum memory users for this period
Process Name           Holding   Num Alloc
Pool Manager            141584         257

Time: 13:37:26.920
```

```
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 12:39:44.424
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 11:46:25.137
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 10:44:24.344
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 09:38:53.040
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 08:33:35.156
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 07:28:05.985
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 06:35:22.877
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 05:42:14.285
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 04:41:53.485
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 03:48:47.889
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 02:46:32.389
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 01:54:27.929
Used(b):  7308336 Largest(b): 59797664 Free blocks :23

Time: 01:02:05.533
Used(b):  7308336 Largest(b): 59797664 Free blocks :23

Time: 00:00:17.937
Used(b):  7308336 Largest(b): 59797664 Free blocks :23
Maximum memory users for this period
Process Name           Holding   Num Alloc
Init                   7296000         214
Pool Manager               816           3
```

Table 102 describes the significant fields shown in the display.

Table 102 show memory statistics history table Field Descriptions

Field	Description
Time:	Time at which snapshot was taken. In hh:mm:ss.ms format.
Used(b):	Memory used (in bytes).
Largest(b):	Size of the largest block (in bytes).
Free blocks:	Number of free blocks.
Process Name	Name of the process.

Table 102 show memory statistics history table Field Descriptions (continued)

Field	Description
Holding	Memory in bytes held by the process.
Num Alloc	Number of successful memory allocation requests made by the process.

Related Commands

Command	Description
memory statistics history table	Changes the memory log time.

show memory transient

To display statistics about transient memory, use the **show memory transient** command in user EXEC or privileged EXEC mode.

show memory transient [**allocating-process** [**totals**]| **dead** [**totals**]| **fragment** [**detail**]| **free** [**totals**]| **statistics** [**history**]]

Syntax Description

allocating-process	(Optional) Displays allocating memory totals by name.
dead [**totals**]	(Optional) Displays memory totals on dead processes.
fragment [**detail**]	(Optional) Displays memory statistics for fragmented processes.
free [**totals**]	(Optional) Displays statistics on free memory.
statistics [**history**]	(Optional) Displays memory pool history statistics on all processes.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory transient** command:

```
Router# show memory transient

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
81F99C00 0002236408 00000000 821BBC28 000  829C8104 82776FD0 8060B6D0  (coalesc)
821BBC28 0000020004 81F99C00 821C0A7C 001  -------- -------- 8002D5C0  Managed s
821C0A7C 0000010004 821BBC28 821C31C0 001  -------- -------- 811604C0  List Eles
821C31C0 0000005004 821C0A7C 821C457C 001  -------- -------- 81160500  List Heas
```

Table 86 describes the significant fields shown in the display.

Table 103 show memory transient Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev	Address of the preceding block (should match the address on preceding line).
Next	Address of the following block (should match the address on following line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the preceding free block (if free).

Table 103 show memory transient Field Descriptions (continued)

Field	Description
NextF	Address of the following free block (if free).
Alloc PC	Address of the system call that allocated the block.
what	Name of the process that owns the block, or "(fragment)" if the block is a fragment, or "(coalesced)" if the block was coalesced from adjacent free blocks.

show pci

To display information about the peripheral component interconnect (PCI) hardware registers or bridge registers for the Cisco 7200 series routers, use the **show pci** EXEC command.

show pci {**hardware** | **bridge** [*register*]}

Syntax Description

hardware	Displays PCI hardware registers.
bridge	Displays PCI bridge registers.
register	(Optional) Number of a specific bridge register in the range from 0 to 7. If not specified, this command displays information about all registers.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

The output of this command is generally useful for diagnostic tasks performed by technical support only.

Note The **show pci hardware** EXEC command displays a substantial amount of information.

Examples

The following is sample output for the PCI bridge register 1 on a Cisco 7200 series router:

```
Router# show pci bridge 1

Bridge 4, Port Adaptor 1, Handle=1
DEC21050 bridge chip, config=0x0
(0x00): cfid   = 0x00011011
(0x04): cfcs   = 0x02800147
(0x08): cfccid = 0x06040002
(0x0C): cfpmlt = 0x00010010

(0x18): cfsmlt = 0x18050504
(0x1C): cfsis  = 0x22805050
(0x20): cfmla  = 0x48F04880
(0x24): cfpmla = 0x00004880

(0x3C): cfbc   = 0x00000000
(0x40): cfseed = 0x00100000
(0x44): cfstwt = 0x00008020
```

The following is partial sample output for the PCI hardware register, which also includes information on all the PCI bridge registers on a Cisco 7200 series router:

```
Router# show pci hardware
```

```
GT64010 External PCI Configuration registers:
 Vendor / Device ID   : 0xAB114601 (b/s 0x014611AB)
 Status / Command     : 0x17018002 (b/s 0x02800117)
 Class / Revision     : 0x00000006 (b/s 0x06000000)
 Latency              : 0x0F000000 (b/s 0x0000000F)
 RAS[1:0] Base        : 0x00000000 (b/s 0x00000000)
 RAS[3:2] Base        : 0x00000001 (b/s 0x01000000)
 CS[2:0] Base         : 0x00000000 (b/s 0x00000000)
 CS[3] Base           : 0x00000000 (b/s 0x00000000)
 Mem Map Base         : 0x00000014 (b/s 0x14000000)
 IO Map Base          : 0x01000014 (b/s 0x14000001)
 Int Pin / Line       : 0x00010000 (b/s 0x00000100)

Bridge 0, Downstream MB0 to MB1, Handle=0
DEC21050 bridge chip, config=0x0
(0x00): cfid   = 0x00011011
(0x04): cfcs   = 0x02800143
(0x08): cfccid = 0x06040002
(0x0C): cfpmlt = 0x00011810

(0x18): cfsmlt = 0x18000100
(0x1C): cfsis  = 0x02809050
(0x20): cfmla  = 0x4AF04880
(0x24): cfpmla = 0x4BF04B00

(0x3C): cfbc   = 0x00000000
(0x40): cfseed = 0x00100000
(0x44): cfstwt = 0x00008020
.
.
.
```

show pci hardware

To display information about the Host-PCI bridge, use the **show pci hardware** EXEC command.

show pci hardware

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

CommandHistory

Release	Modification
11.2	This command was introduced.

Usage Guidelines

The output of this command is generally useful for diagnostic tasks performed by technical support only:

```
router# show pci hardware

hardware PCI hardware registers

Each device on the PCI bus is assigned a PCI device number.  For the
C2600, device numbers are as follows:

Device    Device number
0         First LAN device
1         Second LAN device
2         AIM device (if present)
3         Not presently used
4         Port module - first PCI device
5         Port module - second PCI device
6         Port module - third PCI device
7         Port module - fourth PCI device
8-14      Not presently used
15        Xilinx PCI bridge
```

Examples

The following is partial sample output for the PCI hardware register, which also includes information on all the PCI bridge registers. Table 104 describes the significant fields shown in the display.

```
router# show pci hardware

XILINX Host-PCI Bridge Registers:
Vendor / Device ID: 0x401310EE
Status / Command: 0x040001C6
PCI Slave Base Reg 0: 0x00000000
PCI Slave Base Reg 1: 0x04000000
```

Table 104 show pci hardware Field Descriptions

Field	Description
Device/Vendor ID	Identifies the PCI vendor and device. The value 0x401310EE identifies the device as the Xilinx-based Host-PCI bridge for the Cisco 2600 router.
Status/Command	Provides status of the Host-PCI bridge. Refer to the PCI Specification for more information.
PCI Slave Base Reg 0	The base address of PCI Target Region 0 for the Host-PCI bridge. This region is used for Big-Endian transfers between PCI devices and memory.
PCI Slave Base Reg 1	The base address of PCI Target Region 1 for the Host-PCI bridge. This region is used for Little-Endian transfers between PCI devices and memory.

show processes

To display information about the active processes, use the **show processes** command in EXEC mode.

show processes [**history**]

Syntax Description

history	(Optional) Displays the process history in an ordered format.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(2)T	The **history** keyword was added.

Examples

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

```
Router# show processes

CPU utilization for five seconds: 21%/0%; one minute: 2%; five minutes: 2%
PID QTy      PC Runtime (ms)  Invoked   uSecs     Stacks    TTY  Process
  1 Mwe  2FEA4E         1808       464    3896     1796/3000   0  IP-EIGRP Router
  2 Lst  11682         10236       109   93908     1828/2000   0  Check heaps
  3 Mst  3AE9C             0       280       0     1768/2000   0  Timers
  4 Lwe  74AD2             0        12       0     1492/2000   0  ARP Input
  5.ME   912E4             0         2       0     1892/2000   0  IPC Zone Manager
  6.ME   91264             0         1       0     1936/2000   0  IPC Realm Manager
  7.ME   91066             0        30       0     1784/2000   0  IPC Seat Manager
  8.ME  133368             0         1       0     1928/2000   0  CXBus hot stall
  9.ME  1462EE             0         1       0     1940/2000   0 Microcode load
 10 Msi 127538             4        76      52     1608/2000   0 Env Mon
 11.ME  160CF4             0         1       0     1932/2000   0 MIP Mailbox
 12 Mwe 125D7C             4       280      14     1588/2000   0 SMT input
 13 Lwe AFD0E              0         1       0     1772/2000   0 Probe Input
 14 Mwe AF662              0         1       0     1784/2000   0 RARP Input
 15 Hwe A1F9A            228       549     415     3240/4000   0 IP Input
 16 Msa C86A0              0       114       0     1864/2000   0 TCP Timer
 17 Lwe CA700              0         1       0     1756/2000   0 TCP Protocols
 18.ME  CCE7C              0         1       0     1940/2000   0 TCP Listener
 19 Mwe AC49E              0         1       0     1592/2000   0 BOOTP Server
 20 Mwe 10CD84            24        77     311     1652/2000   0 CDP Protocol
 21 Mwe 27BF82             0         2       0     1776/2000   0 ATMSIG Input
```

The following is sample output from the **show processes history** command:

```
Router# show process history
 PID Exectime(ms) Caller PC Process Name
   3           12 0x0        Exec
  16            0 0x603F4DEC GraphIt
  21            0 0x603CFEF4 TTY Background
  22            0 0x6042FD7C Per-Second Jobs
  67            0 0x6015CD38 SMT input
  39            0 0x60178804 FBM Timer
```

```
  16           0 0x603F4DEC GraphIt
  21           0 0x603CFEF4 TTY Background
  22           0 0x6042FD7C Per-Second Jobs
  16           0 0x603F4DEC GraphIt
  21           0 0x603CFEF4 TTY Background
  22           0 0x6042FD7C Per-Second Jobs
  67           0 0x6015CD38 SMT input
  39           0 0x60178804 FBM Timer
  24           0 0x60425070 Compute load avgs
  11           0 0x605210A8 ARP Input
  69           0 0x605FDAF4 DHCPD Database
  69           0 0x605FD568 DHCPD Database
  51           0 0x60670B3C IP Cache Ager
  69           0 0x605FD568 DHCPD Database
  36           0 0x606E96DC SSS Test Client
  69           0 0x605FD568 DHCPD Database
 --More--
PID Exectime(ms) Caller PC Process Name
  16           0 0x603F4DEC GraphIt
  21           0 0x603CFEF4 TTY Background
  22           0 0x6042FD7C Per-Second Jobs
  34           0 0x60679D74 CDP Protocol
  19           0 0x6041FBA4 Net Background
  36           0 0x606E97AC SSS Test Client
  12           0 0x60722A40 HC Counter Timers
  69           0 0x605FD568 DHCPD Database
  44           0 0x6031AD14 Adj Manager
  65           4 0x60BC5BE0 SAA Event Processor
  25           8 0x6042FDDC Per-minute Jobs
  16           0 0x603F4DEC GraphIt
  21           0 0x603CFEF4 TTY Background
  22           0 0x6042FD7C Per-Second Jobs
  67           0 0x6015CD38 SMT input
  39           0 0x60178804 FBM Timer
   2           0 0x60496768 Load Meter
  16           0 0x603F4DEC GraphIt
  21           0 0x603CFEF4 TTY Background
  22           0 0x6042FD7C Per-Second Jobs
  16           0 0x603F4DEC GraphIt
  21           0 0x603CFEF4 TTY Background
  22           0 0x6042FD7C Per-Second Jobs
 --More--
. . .
```

Table 105 describes the significant fields shown in the displays.

Table 105 show processes Field Descriptions

Field	Description
CPU utilization for five seconds	CPU utilization for the last 5 seconds. The second number indicates the percent of CPU time spent at the interrupt level.
one minute	CPU utilization for the last minute.
five minutes	CPU utilization for the last 5 minutes.
PID	Process ID.
Q	Process queue priority. Possible values: C (critical), H (high), M (medium), L (low).

Table 105 show processes Field Descriptions (continued)

Field	Description
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 have 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 will never execute 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 the process.
5Sec	CPU utilization by task in the last 5 seconds.
1Min	CPU utilization by task in the last minute.
5Min	CPU utilization by task in the last 5 minutes.

Note Because the network server has a 4-millisecond clock resolution, run times are considered reliable only after a large number of invocations or a reasonable, measured run time.

For a list of process descriptions, see http://www.cisco.com/warp/public/63/showproc_cpu.html .

Related Commands

Command	Description
show processes memory	Displays amount of system memory used per system process.

show processes cpu

To display CPU utilization information about the active processes in a device, use the **show processes cpu** command in privileged EXEC mode.

show processes cpu [**history** | **sorted**]

Syntax Description

history	(Optional) Displays CPU history in a graph format.
sorted	(Optional) Displays CPU utilization sorted by percentage.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.
12.2(2)T	The **history** keyword was added.
12.3(8)T	This command was enhanced to display Address Resolution Protocol (ARP) output.

Usage Guidelines

When you use the optional **history** keyword, output shows (in ASCII graphical form) the total CPU usage on the device over a period of time. Time periods are one minute, one hour, and 72 hours, displayed in increments of one second, one minute, and one hour, respectively. Maximum usage is measured and recorded every second; average usage is calculated on periods of more than one second.

Consistently high CPU utilization over an extended period of time indicates a problem and using the **show processes cpu** command is useful for troubleshooting. Also, you can use the output of this command in the Cisco Output Interpreter tool to display potential issues and fixes. Output Interpreter is available to registered users of Cisco.com who are logged in and have Java Script enabled.

For a list of system processes, go to http://www.cisco.com/warp/public/63/showproc_cpu.html.

Examples

The following is sample output from the **show processes cpu** command without keywords:

```
Router# show processes cpu

CPU utilization for five seconds: 5%/2%; one minute: 3%; five minutes: 2%
  PID  Runtime (ms)    Invoked   uSecs   5Sec  1Min  5Min  TTY  Process
    1          1736         58   29931    0%    0%    0%  0    Check heaps
    2            68        585     116  1.00% 1.00%    0%  0    IP Input
    3             0        744       0    0%    0%    0%  0    TCP Timer
    4             0          2       0    0%    0%    0%  0    TCP Protocols
    5             0          1       0    0%    0%    0%  0    BOOTP Server
    6            16        130     123    0%    0%    0%  0    ARP Input
    7             0          1       0    0%    0%    0%  0    Probe Input
    8             0          7       0    0%    0%    0%  0    MOP Protocols
    9             0          2       0    0%    0%    0%  0    Timers
   10           692         64   10812    0%    0%    0%  0    Net Background
   11             0          5       0    0%    0%    0%  0    Logger
   12             0         38       0    0%    0%    0%  0    BGP Open
```

```
  13             0           1       0     0%     0%     0%  0    Net Input
  14           540        3466     155     0%     0%     0%  0    TTY Background
  15             0           1       0     0%     0%     0%  0    BGP I/O
  16          5100        1367    3730     0%     0%     0%  0    IGRP Router
  17            88        4232      20  0.20% 1.00%     0%  0    BGP Router
  18           152       14650      10     0%     0%     0%  0    BGP Scanner
  19           224          99    2262     0%     0% 1.00%  0    Exec
```

The following is sample output of the one-hour portion of the output. The Y-axis of the graph is the CPU utilization. The X-axis of the graph is the increment within the time period displayed in the graph. This example shows the individual minutes during the previous hour. The most recent measurement is on the left of the X-axis.

```
router# show processes cpu history

!--- One minute output omitted

6665776865756676676666666766767767676666676676767667666566667
6378016198993513709771991443732358689932740858269643922613
100
90
80         *  *                     * *     *  * *  *
70  * * ***** *  ** ***** ***  **** ******  *  *******     * *
60  #***##*##*#***#####*#*########*#*###*#*##*#*##*#*######*#
50  ############################################################
40  ############################################################
30  ############################################################
20  ############################################################
10  ############################################################
   0....5....1....1....2....2....3....3....4....4....5....5....
             0    5    0    5    0    5    0    5    0    5
              CPU% per minute (last 60 minutes)
             * = maximum CPU% # = average CPU%

!--- 72-hour output omitted
```

The top two rows, read vertically, display the highest percentage of CPU utilization recorded during the time increment. In this example, the CPU utilization for the last minute recorded is 66 percent. The device may have reached 66 percent only once during that minute, or it may have reached 66 percent multiple times. The device records only the peak reached during the time increment and the average over the course of that increment.

The following is sample output from the **show processes cpu** command that shows an ARP probe process:

```
Router# show processes cpu | include ARP

17       38140    389690          97  0.00%  0.00%  0.00%   0 ARP Input
36           0         1           0  0.00%  0.00%  0.00%   0 IP ARP Probe
40           0         1           0  0.00%  0.00%  0.00%   0 ATM ARP INPUT
80           0         1           0  0.00%  0.00%  0.00%   0 RARP Input
114          0         1           0  0.00%  0.00%  0.00%   0 FR ARP
```

Table 106 describes the fields shown in the output.

Table 106 show processes cpu Field Descriptions

Field	Description
CPU utilization for five seconds	CPU utilization for the last 5 seconds and the percent of CPU time spent at the interrupt level.
one minute	CPU utilization for the last minute and the percent of CPU time spent at the interrupt level.
five minutes	CPU utilization for the last 5 minutes and the percent of CPU time spent at the interrupt level.
PID	Process ID.
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.
5Sec	CPU utilization by task in the last 5 seconds.
1Min	CPU utilization by task in the last minute.
5Min	CPU utilization by task in the last 5 minutes.
TTY	Terminal that controls the process.
Process	Name of the process.

Note Because platforms have a 4- to 8-millisecond clock resolution, run times are considered reliable only after several invocations or a reasonable, measured run time.

Related Commands

Command	Description
show processes memory	Displays the amount of system memory used per system process.

show processes memory

To show memory used, use the **show processes memory** command in EXEC mode.

show processes memory [*pid* | **sorted**]

Syntax Description

pid	(Optional) Process ID number of a specific process. This keyword shows detail for only the specified process.
sorted	(Optional) Displays CPU history sorted by percentage of utilization.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show processes memory** command:

```
Router# show processes memory

Total: 5611448, Used: 2307548, Free: 3303900
 PID  TTY  Allocated      Freed    Holding    Getbufs    Retbufs Process
   0    0     199592       1236    1907220          0          0 *Init*
   0    0        400      76928        400          0          0 *Sched*
   0    0    5431176    3340052     140760     349780          0 *Dead*
   1    0        256        256       1724          0          0 Load Meter
   2    0        264          0       5032          0          0 Exec
   3    0          0          0       2724          0          0 Check heaps
   4    0      97932          0       2852      32760          0 Pool Manager
   5    0        256        256       2724          0          0 Timers
   6    0         92          0       2816          0          0 CXBus hot stall
   7    0          0          0       2724          0          0 IPC Zone Manager
   8    0          0          0       2724          0          0 IPC Realm Manager
   9    0          0          0       2724          0          0 IPC Seat Manager
  10    0        892        476       3256          0          0 ARP Input
  11    0         92          0       2816          0          0 SERIAL A'detect
  12    0        216          0       2940          0          0 Microcode Loader
  13    0          0          0       2724          0          0 RFSS watchdog
  14    0   15659136   15658584       3276          0          0 Env Mon
.
.
.
  77    0        116          0       2844          0          0 IPX-EIGRP Hello
                                    2307224 Total
```

Table 107 describes the significant fields shown in the display.

Table 107 show processes memory Field Descriptions

Field	Description
Total:	Total amount of memory held.
Used:	Total amount of used memory.
Free:	Total amount of free memory.
PID	Process ID.
TTY	Terminal that controls the process.
Allocated	Bytes of memory allocated by the process.
Freed	Bytes of memory freed by the process, regardless of who originally allocated it.
Holding	Amount of memory currently allocated to the process.
Getbufs	Number of times the process has requested a packet buffer.
Retbufs	Number of times the process has relinquished a packet buffer.
Process	Process name.
Init	System initialization.
Sched	The scheduler.
Dead	Processes as a group that are now dead.
Total	Total amount of memory held by all processes.

The following is sample output from the show process memory command when a PID is specified:

```
Router# show process memory 1

Proc Memory Summary for pid = 1
Holding = 6844

pc = 0x6049B900, size = 000006044, count = 0001
pc = 0x60480650, size = 000000612, count = 0001
pc = 0x6048254C, size = 000000188, count = 0001

Router#
```

Related Commands

Command	Description
show memory	Displays statistics about memory, including memory-free pool statistics.
show processes	Displays information about the active processes.

show protocols

To display the configured protocols, use the **show protocols** EXEC command.

This command shows the global and interface-specific status of any configured Level 3 protocol; for example, IP, DECnet, IPX, AppleTalk, and so on.

show protocols

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

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

```
Router# show protocols

Global values:
  Internet Protocol routing is enabled
  DECNET routing is enabled
  XNS routing is enabled
  Appletalk routing is enabled
  X.25 routing is enabled
Ethernet 0 is up, line protocol is up
  Internet address is 192.168.1.1, subnet mask is 255.255.255.0
  Decnet cost is 5
  XNS address is 2001.AA00.0400.06CC
  AppleTalk address is 4.129, zone Twilight
Serial 0 is up, line protocol is up
  Internet address is 192.168.7.49, subnet mask is 255.255.255.240
Ethernet 1 is up, line protocol is up
  Internet address is 192.168.2.1, subnet mask is 255.255.255.0
  Decnet cost is 5
  XNS address is 2002.AA00.0400.06CC
  AppleTalk address is 254.132, zone Twilight
Serial 1 is down, line protocol is down
  Internet address is 192.168.7.177, subnet mask is 255.255.255.240
  AppleTalk address is 999.1, zone Magnolia Estates
```

For more information on the parameters or protocols shown in this sample output, see the *Cisco IOS Network Protocols Configuration Guide, Part 1*, *Network Protocols Configuration Guide, Part 2*, and *Network Protocols Configuration Guide, Part 3*.

show slot

To display information about the PCMCIA flash memory cards file system, use the **show slot** command in user EXEC or privileged EXEC mode.

show slot [**all** | **chips** | **filesys**]

Syntax Description

all	(Optional) Displays all possible flash system information for all PCMCIA flash cards in the system.
chips	(Optional) Displays flash chip information.
filesys	(Optional) Displays file system information.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

Use the **show slot** command to display details about the files in a particular linear PCMCIA flash memory card of less than 20 MB and some 32 MB linear PCMCIA cards.

Note Use the **show disk** command for ATA PCMCIA cards. Other forms of this commands are **show disk0:** and **show disk1:**.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

To see which flash cards are used in your router, use the **show version** command and look at the bottom portion of the output.

The following display indicates an ATA PCMCIA flash disk.

```
Router# show version
.
.
.
46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
```

The following display indicates a linear PCMCIA flash card with 20480K bytes of flash memory in card at slot 1 with a sector size of 128K.

```
Router# show version
.
.
.
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
```

Note In some cases the **show slot** command will not display the file systems, use **show slot0:** or **show slot1:**.

Examples

The following example displays information about slot 0. The output is self-explanatory.

```
Router# show slot

PCMCIA Slot0 flash directory:
File  Length   Name/status
  1   11081464  c3660-bin-mz.123-9.3.PI5b
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)
```

The following example shows all possible flash system information for all PCMCIA flash cards in the system.

```
Router# show slot all
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1        20223K  10821K     9402K     4096K      Read/Write     Direct

PCMCIA Slot0 flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   11081464  c3660-bin-mz.123-9.3.PI5b
        0x40      0x5EA3  0x5EA3
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

The following example shows flash chip information

```
Router# show slot chips
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

Related Commands

Command	Description
dir slot0:	Directory listing of files on a PCMCIA Flash card located in slot0.
dir slot1:	Directory listing of files on a PCMCIA Flash card located in slot1.
show slot0:	Displays information about the PCMCIA flash memory card's file system located in slot 0.
show slot1:	Displays information about the PCMCIA flash memory card's file system located in slot 1.

show slot0:

To display information about the PCMCIA flash memory card's file system located in slot 0, use the **show slot0:** command in user EXEC or privileged EXEC mode.

show slot0: [**all** | **chips** | **filesys**]

Syntax Description

all	(Optional) Displays all possible flash system information for all PCMCIA flash cards in the system.
chips	(Optional) Displays flash chip information.
filesys	(Optional) Displays file system information.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

Use the **show slot0:** command to display details about the files in a particular linear PCMCIA flash memory card of less than 20 MB and some 32 MB linear PCMCIA cards.

Note Use the **show disk** command for ATA PCMCIA cards. Other forms of this commands are **show disk0:** and **show disk1:**.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

To see which flash cards are used in your router, use the **show version** command and look at the bottom portion of the output.

The following display indicates an ATA PCMCIA flash disk.

```
Router# show version
.
.
.
46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
```

The following display indicates a linear PCMCIA flash card with 20480K bytes of flash memory in card at slot 1 with a sector size of 128K.

```
Router# show version
.
.
.
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
```

Examples

The following example displays information about slot 0. The output is self-explanatory.

```
Router# show slot0:

PCMCIA Slot0 flash directory:
File  Length   Name/status
  1   11081464  c3660-bin-mz.123-9.3.PI5b
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

Router# show slot0: all
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1        20223K  10821K     9402K     4096K      Read/Write     Direct

PCMCIA Slot0 flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   11081464  c3660-bin-mz.123-9.3.PI5b
        0x40      0x5EA3  0x5EA3
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

The following example shows flash chip information.

```
Router# show slot0: chips
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

Related Commands

Command	Description
dir slot0:	Directory listing of files on a PCMCIA Flash card located in slot0.
dir slot1:	Directory listing of files on a PCMCIA Flash card located in slot1.
show slot1:	Displays information about the PCMCIA flash memory card's file system located in slot 1.
show slot	Displays information about the PCMCIA flash memory cards.

show slot1:

To display information about the PCMCIA flash memory card's file system located in slot 1, use the **show slot1:** command in user EXEC or privileged EXEC mode.

show slot1: [**all** | **chips** | **filesys**]

Syntax Description

all	(Optional) Shows all possible flash system information for all PCMCIA flash cards in the system.
chips	(Optional) Shows flash chip information.
filesys	(Optional) Shows file system information.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

Use the **show slot1:** command to display details about the files in a particular linear PCMCIA flash memory card of less than 20 MB and some 32 MB linear PCMCIA cards located in slot 1.

Note Use the **show disk** command for ATA PCMCIA cards. Other forms of this commands are **show disk0:** and **show disk1:**.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

To see which flash cards are used in your router, use the **show version** command and look at the bottom portion of the output.

The following display indicates an ATA PCMCIA flash disk.

```
Router# show version
.
.
.
46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
```

The following display indicates a linear PCMCIA flash card with 20480K bytes of flash memory in card at slot 1 with a sector size of 128K.

```
Router# show version
.
.
.
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
```

Examples

The following example displays information about slot 0 using the **slot0:** command form. The output is self-explanatory.

```
Router# show slot1:

PCMCIA Slot1 flash directory:
File  Length   Name/status
  1   10907068  c3660-bin-mz.123-7.9.PI4
[10907132 bytes used, 5739008 available, 16646140 total]
16384K bytes of processor board PCMCIA Slot1 flash (Read/Write)

Router# show slot1: all
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1        20223K  10821K     9402K     4096K      Read/Write     Direct

PCMCIA Slot0 flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   11081464  c3660-bin-mz.123-9.3.PI5b
        0x40      0x5EA3  0x5EA3
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

The following example shows flash chip information.

```
Router# show slot1: chips
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

Related Commands

Command	Description
dir slot0:	Directory listing of files on a PCMCIA Flash card located in slot0.
dir slot1:	Directory listing of files on a PCMCIA Flash card located in slot1.
show slot0:	Displays information about the PCMCIA flash memory card's file system located in slot 0.
show slot	Displays information about the PCMCIA flash memory cards.

show stacks

To monitor the stack usage of processes and interrupt routines, use the **show stacks** EXEC command.

show stacks

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The display from this command includes the reason for the last system reboot. If the system was reloaded because of a system failure, a saved system stack trace is displayed. This information is of use only to your technical support representative in analyzing crashes in the field. It is included here in case you need to read the displayed statistics to an engineer over the phone.

Examples

The following is sample output from the **show stacks** command following a system failure:

```
Router# show stacks

Minimum process stacks:
Free/Size  Name
 652/1000  Router Init
 726/1000  Init
 744/1000  BGP Open
 686/1200  Virtual Exec

Interrupt level stacks:
Level    Called Free/Size  Name
  1           0 1000/1000  env-flash
  3         738  900/1000  Multiport Communications Interfaces
  5         178  970/1000  Console UART
System was restarted by bus error at PC 0xAD1F4, address 0xD0D0D1A
GS Software (GS3), Version 9.1(0.16), BETA TEST SOFTWARE
Compiled Tue 11-Aug-92 13:27 by jthomas
Stack trace from system failure:
FP: 0x29C158, RA: 0xACFD4
FP: 0x29C184, RA: 0xAD20C
FP: 0x29C1B0, RA: 0xACFD4
FP: 0x29C1DC, RA: 0xAD304
FP: 0x29C1F8, RA: 0xAF774
FP: 0x29C214, RA: 0xAF83E
FP: 0x29C228, RA: 0x3E0CA
FP: 0x29C244, RA: 0x3BD3C
```

Related Commands

Command	Description
show processes	Displays information about the active processes.

show subsys

To display the subsystem information, use the **show subsys** privileged EXEC command.

show subsys [**class** *class* | **name** *name*]

Syntax Description

class *class*	(Optional) Displays the subsystems of the specified class. Valid classes are **driver**, **kernel**, **library**, **management**, **protocol**, and **registry**.
name *name*	(Optional) Displays the specified subsystem. Use the asterisk character (*) as a wildcard at the end of the name to list all subsystems, starting with the specified characters.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

Use the **show subsys** command to confirm that all required features are in the running image.

Examples

In the following example, partial sample output is shown from the **show subsys** command:

```
Router# show subsys

                    Class         Version
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
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
.
.
.
```

Table 108 describes the significant fields shown in the display.

Table 108 show subsys Field Descriptions

Field	Description
static_map	Name of the subsystem.
Class	Class of the subsystem. Possible classes include Kernel, Library, Driver, Protocol, Management, Registry, and SystemInit.
Version	Version of the subsystem.

show tcp

To display the status of TCP connections, use the **show tcp** EXEC command.

show tcp [*line-number*]

Syntax Description

line-number	(Optional) Absolute line number of the line for which you want to display Telnet connection status.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

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

```
Router# show tcp

tty0, connection 1 to host cider
Connection state is ESTAB, I/O status: 1, unread input bytes: 0
Local host: 172.31.232.17, Local port: 11184
Foreign host: 172.31.1.137, Foreign port: 23

Enqueued packets for retransmit: 0, input: 0, saved: 0

Event Timers (current time is 67341276):
Timer:       Retrans   TimeWait    AckHold    SendWnd  KeepAlive    GiveUp     PmtuAger
Starts:           30          0         32          0          0         0            0
Wakeups:           1          0         14          0          0         0            0
Next:              0          0          0          0          0         0            0

iss:   67317172  snduna:   67317228  sndnxt:   67317228     sndwnd:   4096
irs: 1064896000  rcvnxt: 1064897597  rcvwnd:       2144  delrcvwnd:      0

SRTT: 317 ms, RTTO: 900 ms, RTV: 133 ms, KRTT: 0 ms
minRTT: 4 ms, maxRTT: 300 ms, ACK hold: 300 ms
Flags: higher precedence, idle user, retransmission timeout

Datagrams (max data segment is 536 bytes):
Rcvd: 41 (out of order: 0), with data: 34, total data bytes: 1596
Sent: 57 (retransmit: 1), with data: 35, total data bytes: 55
```

Table 109 describes the first five lines of output shown in the display.

Table 109 show tcp Field Descriptions—First Section of Output

Field	Description
tty0	Identifying number of the line.
connection 1	Number identifying the TCP connection.

Table 109 show tcp Field Descriptions—First Section of Output (continued)

Field	Description
to host xxx	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. These states follow in the order in which a connection progresses through them. • 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. • 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, see RFC 793, *Transmission Control Protocol Functional Specification.*
I/O status:	Number describing the current internal status of the connection.
unread input bytes:	Number of bytes that the lower-level TCP processes have read, but the higher-level TCP processes have not yet processed.
Local host:	IP address of the network server.
Local port:	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:	IP address of the remote host to which the TCP connection has been made.
Foreign port:	Destination port for the remote host.

Table 109 show tcp Field Descriptions—First Section of Output (continued)

Field	Description
Enqueued packets for retransmit:	Number of packets waiting on the retransmit queue. These are packets on this TCP connection that have been sent but have not yet been acknowledged by the remote TCP host.
input:	Number of packets that are waiting on the input queue to be read by the user.
saved:	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 have been received, packets 1 and 2 would enter the input queue, and packets 4, 5, and 6 would enter the saved queue.

The following line of output shows the current time according to the system clock of the local host:

```
Event Timers (current time is 67341276):
```

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 re-sent data 30 times because it received no response from the remote host, and it sent an acknowledgment many more times because there was no data on which to piggyback.

```
Timer:        Retrans    TimeWait     AckHold     SendWnd  KeepAlive     GiveUp     PmtuAger
Starts:            30           0          32           0          0          0            0
Wakeups:            1           0          14           0          0          0            0
Next:               0           0           0           0          0          0            0
```

Table 110 describes the fields in the preceding lines of output.

Table 110 show tcp Field Descriptions—Second Section of Output

Field	Description
Timer:	The names of the timers in the display.
Starts:	The number of times the timer has been started during this connection.
Wakeups:	Number of keepalives sent without receiving any response. (This field is reset to zero when a response is received.)
Next:	The system clock setting that will trigger the next time this timer will go off.
Retrans	The Retransmission timer is used to time TCP packets that have not been acknowledged and are waiting for retransmission.
TimeWait	The TimeWait timer is used to ensure that the remote system receives a request to disconnect a session.
AckHold	The Acknowledgment timer is used to delay the sending of acknowledgments to the remote TCP in an attempt to reduce network use.
SendWnd	The Send Window is used to ensure that there is no closed window due to a lost TCP acknowledgment.
KeepAlive	The KeepAlive timer is used to control the transmission of test messages to the remote TCP to ensure that the link has not been broken without the local TCP's knowledge.

Table 110 show tcp Field Descriptions—Second Section of Output (continued)

Field	Description
GiveUp	The GiveUp timer determines the amount of time a local host will wait for an acknowledgement (or other appropriate reply) of a transmitted message after the the maximum number of retransmissions has been reached. If the timer expires, the local host gives up retransmission attempts and declares the connection dead.
PmtuAger	The PMTU age timer is a time interval for how often TCP reestimates the path MTU with a larger maximum segment size (MSS). When the age timer is used, TCP path MTU becomes a dynamic process. If the MSS is smaller than what the peer connection can manage, a larger MSS is tried every time the age timer expires. The discovery process stops when the send MSS is as large as the peer negotiated or the timer has been manually disabled by setting it to infinite.

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 111 describes the significant fields shown in the display.

```
iss:   67317172  snduna:   67317228  sndnxt:   67317228     sndwnd:   4096
irs: 1064896000  rcvnxt: 1064897597  rcvwnd:       2144  delrcvwnd:      0
```

Table 111 show tcp Field Descriptions—Sequence Number

Field	Description
iss:	Initial send sequence number.
snduna:	Last send sequence number that the local host sent but has not received an acknowledgment for.
sndnxt:	Sequence number the local host will send next.
sndwnd:	TCP window size of the remote host.
irs:	Initial receive sequence number.
rcvnxt:	Last receive sequence number that the local host has acknowledged.
rcvwnd:	TCP window size of the local host.
delrcvwnd:	Delayed receive window—data the local host has read from the connection, but has not yet subtracted from the receive window 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.

The following lines of output display values that the local host uses to keep track of transmission times so that TCP can adjust to the network it is using.

Table 112 describes the significant fields shown in the display.

```
SRTT: 317 ms, RTTO: 900 ms, RTV: 133 ms, KRTT: 0 ms
minRTT: 4 ms, maxRTT: 300 ms, ACK hold: 300 ms
Flags: higher precedence, idle user, retransmission timeout
```

Table 112 show tcp Field Descriptions—Line Beginning with "SRTT"

Field	Description
SRTT:	A calculated smoothed round-trip timeout.
RTTO:	Round-trip timeout.
RTV:	Variance of the round-trip time.
KRTT:	New round-trip timeout (using the Karn algorithm). This field separately tracks the round-trip time of packets that have been re-sent.
minRTT:	Smallest recorded round-trip timeout (hard-wire value used for calculation).
maxRTT:	Largest recorded round-trip timeout.
ACK hold:	Time the local host will delay an acknowledgment in order to piggyback data on it.
Flags:	Properties of the connection.

For more information on these fields, refer to *Round Trip Time Estimation*, P. Karn & C. Partridge, ACM SIGCOMM-87, August 1987.

Table 113 describes the significant fields shown in the display.

```
Datagrams (max data segment is 536 bytes):
Rcvd: 41 (out of order: 0), with data: 34, total data bytes: 1596
Sent: 57 (retransmit: 1), with data: 35, total data bytes: 55
```

Table 113 show tcp Field Descriptions—Last Section of Output

Field	Description
Rcvd:	Number of datagrams the local host has received during this connection (and the number of these datagrams that were out of order).
with data:	Number of these datagrams that contained data.
total data bytes:	Total number of bytes of data in these datagrams.
Sent:	Number of datagrams the local host sent during this connection (and the number of these datagrams that needed to be re-sent).
with data:	Number of these datagrams that contained data.
total data bytes:	Total number of bytes of data in these datagrams.

Related Commands

Command	Description
show tcp brief	Displays a concise description of TCP connection endpoints.

show tcp brief

To display a concise description of TCP connection endpoints, use the **show tcp brief** EXEC command.

show tcp brief [**all**]

Syntax Description

all	(Optional) Displays status for all endpoints. Without this keyword, endpoints in the LISTEN state are not shown.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.

Examples

The following is sample output from the **show tcp brief** command while a user has connected into the system via Telnet:

```
Router> show tcp brief

TCB       Local Address           Foreign Address        (state)
609789AC  Router.cisco.com.23     cider.cisco.com.3733   ESTAB
```

Table 114 describes the significant fields shown in the display.

Table 114 show tcp brief Field Descriptions

Field	Description
TCB	An internal identifier for the endpoint.
Local Address	The local IP address and port.
Foreign Address	The foreign IP address and port (at the opposite end of the connection).
(state)	The state of the connection. States are described in the syntax description of the **show tcp** command.

Related Commands

Command	Description
show tcp	Displays the status of TCP connections.

show tdm connections

To display a snapshot of the time-division multiplexing (TDM) bus connection memory in a Cisco AS5200 access server, use the **show tdm connections** EXEC command.

show tdm connections [**motherboard** | **slot** *slot-number*]

Syntax Description

motherboard	(Optional) Motherboard in the Cisco AS5200 access server.
slot *slot-number*	(Optional) Slot number.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

The **show tdm connections** command shows the connection memory for all TDM bus connections in the access server if you do not limit the display to the motherboard or a slot.

Examples

In the following example, source stream 3 (ST3) channel 2 switched out of stream 6 (ST6) channel 2 is shown:

```
AS5200# show tdm connections motherboard

MT8980 motherboard unit 0, Control Register = 0x1F, ODE Register = 0x06
Connection Memory for ST6:
Ch0:  0x62, Ch1:  0x00, Ch2:  0x00, Ch3:  0x00
Ch4:  0x00, Ch5:  0x00, Ch6:  0x00, Ch7:  0x00
Ch8:  0x00, Ch9:  0x00, Ch10: 0x00, Ch11: 0x00
Ch12: 0x00, Ch13: 0x00, Ch14: 0x00, Ch15: 0x00
Ch16: 0x00, Ch17: 0x00, Ch18: 0x00, Ch19: 0x00
Ch20: 0x00, Ch21: 0x00, Ch22: 0x00, Ch23: 0x00
Ch24: 0x00, Ch25: 0x00, Ch26: 0x00, Ch27: 0x00
Ch28: 0x00, Ch29: 0x00, Ch30: 0x00, Ch31: 0x00
```

To interpret the hexadecimal number 0x62 into meaningful information, you must translate it into binary code. These two hexadecimal numbers represent a connection from any stream and a channel on any stream. The number 6 translates into the binary code 0110, which represents the third-source stream. The number 2 translates into the binary code 0010, which represents the second-source channel.

Stream 6 (ST6) channel 0 is the destination for ST3 channel 2 in this example.

Related Commands

Command	Description
show tcp	Displays the status of TCP connections.

show tdm data

To display a snapshot of the time-division multiplexing (TDM) bus data memory in a Cisco AS5200 access server, use the **show tdm data** EXEC command.

show tdm data [**motherboard** | **slot** *slot-number*]

Syntax Description

motherboard	(Optional) Motherboard in the Cisco AS5200 access server.
slot *slot-number*	(Optional) Slot number.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

The data memory for all TDM bus connections in the access server is displayed if you do not specify a motherboard or slot.

Examples

In the following example, a snapshot of TDM memory is shown where the normal ISDN idle pattern (0x7E) is present on all channels of the TDM device resident on the motherboard:

```
AS5200# show tdm data motherboard

MT8980 motherboard unit 0, Control Register = 0x1F, ODE Register = 0x06
Data Memory for ST0:
Ch0:  0x7E, Ch1:  0x7E, Ch2:  0x7E, Ch3:  0x7E
Ch4:  0x7E, Ch5:  0x7E, Ch6:  0x7E, Ch7:  0x7E
Ch8:  0x7E, Ch9:  0x7E, Ch10: 0x7E, Ch11: 0x7E
Ch12: 0x7E, Ch13: 0x7E, Ch14: 0x7E, Ch15: 0x7E
Ch16: 0x7E, Ch17: 0x7E, Ch18: 0x7E, Ch19: 0x7E
Ch20: 0x7E, Ch21: 0x7E, Ch22: 0x7E, Ch23: 0x7E
Ch24: 0x7E, Ch25: 0x7E, Ch26: 0x7E, Ch27: 0x7E
Ch28: 0x7E, Ch29: 0x7E, Ch30: 0x7E, Ch31: 0x7E
Data Memory for ST1:
Ch0:  0x7E, Ch1:  0x7E, Ch2:  0x7E, Ch3:  0x7E
Ch4:  0x7E, Ch5:  0x7E, Ch6:  0x7E, Ch7:  0x7E
Ch8:  0x7E, Ch9:  0x7E, Ch10: 0x7E, Ch11: 0x7E
Ch12: 0x7E, Ch13: 0x7E, Ch14: 0x7E, Ch15: 0x7E
Ch16: 0x7E, Ch17: 0x7E, Ch18: 0x7E, Ch19: 0x7E
Ch20: 0x7E, Ch21: 0x7E, Ch22: 0x7E, Ch23: 0x7E
Ch24: 0x7E, Ch25: 0x7E, Ch26: 0x7E, Ch27: 0x7E
Ch28: 0x7E, Ch29: 0x7E, Ch30: 0x7E, Ch31: 0x7E
```

Related Commands

Command	Description
show tdm connections	Displays data about the TDM bus connection memory in a Cisco AS5200 access server.

show tech-support

To display general information about the router when reporting a problem, use the **show tech-support** privileged EXEC command.

show tech-support [**page**] [**password**] [**cef** | **ipmulticast** | **isis** | **mpls** | **ospf** [*process-ID* | **detail**] | **rsvp**]

Syntax Description

page	(Optional) Causes the output to display a page of information at a time. Use the return key to display the next line of output or use the space bar to display the next page of information. If not used, the output scrolls (that is, does not stop for page breaks).
password	(Optional) Leaves passwords and other security information in the output. If not used, passwords and other security-sensitive information in the output are replaced with the label "<removed>" (this is the default).
cef	(Optional) Displays show command output specific to Cisco Express Forwarding (CEF).
ipc	(Optional) Displays show command output specific to Inter-Process Communications (IPC).
ipmulticast	(Optional) Displays show command output related to the IP Multicast configuration, including Protocol Independent Multicast (PIM) information, Internet Group Management Protocol (IGMP) information, and Distance Vector Multicast Routing Protocol (DVMRP) information.
isis	(Optional) Displays show command output specific to Connectionless Network Service (CLNS) and Intermediate System-to-Intermediate System Protocol (ISIS).
mpls	(Optional) Displays show command output specific to Multilayer Switching Protocol (MPLS) forwarding and applications.
ospf [*process-ID* | *detail*]	(Optional) Displays show command output specific to Open Shortest Path First Protocol (OSPF) networking.
rsvp	(Optional) Displays show command output specific to Resource Reservation Protocol (RSVP) networking.

Defaults

The output scrolls without page breaks.
Passwords and other security information are removed from the output.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
11.3(7), 11.2(16)	The output for this command was expanded to show additional information for **boot**, **bootflash**, **context**, and **traffic** for all enabled protocols. (CSCdj06229)

Release	Modification
11.3(7)T	This command was integrated into Cisco IOS Release 11.3(7)T.
12.0	The following keyword extensions were added: • **cef** • **ipmulticast** • **isis** • **mpls** • **ospf**

Usage Guidelines

The **show tech-support** command is useful for collecting a large amount of information about your routing device for troubleshooting purposes. The output of this command can be provided to technical support representatives when reporting a problem.

The **show tech-support** command displays the output of a number of show commands at once. The output from this command will vary depending on your platform and configuration. For example, Access Servers will display voice-related show output. Additionally, the **show** *protocol* **traffic** commands will be displayed for only the protocols enabled on your device. The output of the **show tech-support** command can include the output of the following commands:

- **show apollo traffic**
- **show appletalk traffic**
- **show bootflash**
- **show bootvar**
- **show buffers**
- **show cdp neighbors**
- **show cef**
- **show clns traffic**
- **show context**
- **show controllers**
- **show decnet traffic**
- **show interfaces**
- **show ip cef**
- **show ip interface**
- **show ip traffic**
- **show isis**
- **show mpls**
- **show novell traffic**
- **show processes cpu**
- **show processes memory**
- **show running-config**
- **show stacks**

- **show version**
- **show vines traffic**
- **show xns traffic**
- **show file systems**
- **dir nvram:**
- **show disk0: all**
- **show process cpu**
- **show pci controller**

Use of the optional **cef**, **ipmulticast**, **ipc**, **isis**, **mpls** , **ospf**, or **rsvp** keywords provides a way to display a number of show commands specific to a particular protocol or process in addition to the **show** commands listed previously.

For example, if your TAC support representative suspects that you may have a problem in your Cisco Express Forwarding (CEF) configuration, you may be asked to provide the output of the **show tech-support cef** command. The **show tech-support** [**page**] [**password**] **cef** command will display the output from the following commands in addition to the output for the standard **show tech-support** command:

- **show ip cef summary**
- **show adjacency summary**
- **show ip cef events summary**
- **show ip cef inconsistency records detail**
- **show cef interface**
- **show cef events**
- **show cef timers**
- **show interfaces stats**
- **show cef drop**
- **show cef not-cef-switched**

Examples

For a sample display of the output from the **show tech-support** command, refer to the documentation for the **show** commands listed in the "Usage Guidelines" section.

Related Commands

Command	Description
show apollo traffic	Displays information about the number and type of Apollo Domain packets transmitted and received by the Cisco IOS software.
show appletalk traffic	Displays statistics about AppleTalk traffic, including MacIP traffic.
show bootflash	Displays the contents of boot Flash memory.
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting.
show buffers	Displays statistics for the buffer pools on the network server.

Command	Description
show clns traffic	Displays a list of the CLNS packets this router has seen.
show context	Displays context data.
show controllers	Displays information that is specific to the hardware.
show controllers tech-support	Displays general information about a VIP card when reporting a problem.
show decnet traffic	Displays the DECnet traffic statistics (including datagrams sent, received, and forwarded).
show interfaces	Displays ALC information.
show ip traffic	Displays statistics about IP traffic.
show novell traffic	Displays information about the number and type of IPX packets transmitted and received.
show processes cpu	Displays information about the active processes.
show processes memory	Shows the amount of memory used.
show running-config	Displays the current configuration of your routing device.
show stacks	Displays the stack usage of processes and interrupt routines.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.
show vines traffic	Displays the statistics maintained about VINES protocol traffic.
show xns traffic	Displays information about the number and type of XNS packets transmitted and received by the Cisco IOS software.

test flash

To test Flash memory on MCI and envm Flash EPROM interfaces, use the **test flash** EXEC command.

test flash

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

In the following example, the Flash memory is tested:

```
test flash
```

Related Commands

Command	Description
test interfaces	Tests the system interfaces on the modular router.
test memory	Performs a test of Multibus memory (including nonvolatile memory) on the modular router.

test interfaces

To test the system interfaces on the modular router, use the **test interfaces** EXEC command.

test interfaces

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The **test interfaces** EXEC command is intended for the factory checkout of network interfaces. It is not intended for diagnosing problems with an operational router. The **test interfaces** output does not report correct results if the router is attached to a "live" network. For each network interface that has an IP address that can be tested in loopback (MCI and ciscoBus Ethernet and all serial interfaces), the **test interfaces** command sends a series of ICMP echoes. Error counters are examined to determine the operational status of the interface.

Examples

In the following example, the system interfaces are tested:

```
test interfaces
```

Related Commands

Command	Description
test flash	Tests Flash memory on MCI and envm Flash EPROM interfaces.
test memory	Performs a test of Multibus memory (including nonvolatile memory) on the modular router.

test memory

To perform a test of Multibus memory (including nonvolatile memory) on the modular router, use the **test memory** EXEC command. The memory test overwrites memory.

test memory

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The memory test overwrites memory. If you use the **test memory** command, you will need to rewrite nonvolatile memory. For example, if you test Multibus memory, which is the memory used by the CSC-R 4-Mbps Token Ring interfaces, you will need to reload the system before the network interfaces will operate properly. The **test memory** command is intended primarily for use by Cisco personnel.

Examples

In the following example, the memory is tested:

```
test memory
```

Related Commands

Command	Description
test flash	Tests Flash memory on MCI and envm Flash EPROM interfaces.
test interfaces	Tests the system interfaces on the modular router.

trace (privileged)

To discover the routes that packets will actually take when traveling to their destination, use the **trace** privileged EXEC command.

trace [*protocol*] [*destination*]

Syntax Description

protocol	(Optional) Protocols that can be used are **appletalk**, **clns**, **ip** and **vines**.
destination	(Optional) 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 Cisco IOS software examination of the format of the *destination* argument. For example, if the software finds a *destination* argument in IP format, the *protocol* value defaults to **ip**.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The **trace** command works by taking advantage of the error messages generated by routers when a datagram exceeds its time-to-live (TTL) value.

The **trace** command starts by sending probe datagrams with a TTL value of one. This causes the first router to discard the probe datagram and send back an error message. The **trace** command sends several probes at each TTL level and displays the round-trip time for each.

The **trace** 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 router has seen and discarded the probe. A "destination unreachable" error message indicates that the destination node has received the probe and discarded it because it could not deliver the packet. If the timer goes off before a response comes in, the **trace** command prints an asterisk (*).

The **trace** 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, type **Ctrl-^ X** by simultaneously pressing and releasing the **Ctrl**, **Shift**, and **6** keys, and then pressing the **X** key.

To use nondefault parameters and invoke an extended **trace** test, enter the command without a *destination* argument. You will be stepped through a dialog to select the desired parameters.

Common Trace Problems

Due to bugs in the IP implementation of various hosts and routers, the IP **trace** command may behave in unexpected ways.

Not all destinations will 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 has been reached, may indicate this problem.

There is a known problem with the way some hosts handle an "ICMP TTL exceeded" message. Some hosts generate an "ICMP" message but they reuse the TTL of the incoming packet. Because 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 six hops away, the **trace** command will time out on responses 6 through 11.

Trace IP Routes

The following display shows sample IP **trace** output when a destination host name has been specified:

```
Router# trace ABA.NYC.mil

Type escape sequence to abort.
Tracing the route to ABA.NYC.mil (26.0.0.73)
    1 DEBRIS.CISCO.COM (192.180.1.6) 1000 msec 8 msec 4 msec
    2 BARRNET-GW.CISCO.COM (192.180.16.2) 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 (192.200.254.6) 8 msec 8 msec 8 msec
    5 SU.ARC.BARRNET.NET (192.200.3.8) 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 115 describes the significant fields shown in the display.

Table 115 trace Field Descriptions

Field	Description
1	Indicates the sequence number of the router in the path to the host.
DEBRIS.CISCO.COM	Host name of this router.
192.180.1.6	Internet address of this router.
1000 msec 8 msec 4 msec	Round-trip time for each of the three probes that are sent.

Extended IP Trace Dialog

The following display shows a sample **trace** session involving the extended dialog of the **trace** command:

```
Router# trace

Protocol [ip]:
Target IP address: mit.edu
Source address:
Numeric display [n]:
Timeout in seconds [3]:
Probe count [3]:
Minimum Time to Live [1]:
Maximum Time to Live [30]:
Port Number [33434]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Type escape sequence to abort.
Tracing the route to MIT.EDU (18.72.2.1)
  1 ICM-DC-2-V1.ICP.NET (192.108.209.17) 72 msec 72 msec 88 msec
  2 ICM-FIX-E-H0-T3.ICP.NET (192.157.65.122) 80 msec 128 msec 80 msec
  3 192.203.229.246 540 msec 88 msec 84 msec
  4 T3-2.WASHINGTON-DC-CNSS58.T3.ANS.NET (140.222.58.3) 84 msec 116 msec 88 msec
```

```
 5 T3-3.WASHINGTON-DC-CNSS56.T3.ANS.NET (140.222.56.4) 80 msec 132 msec 88 msec
 6 T3-0.NEW-YORK-CNSS32.T3.ANS.NET (140.222.32.1) 92 msec 132 msec 88 msec
 7 T3-0.HARTFORD-CNSS48.T3.ANS.NET (140.222.48.1) 88 msec 88 msec 88 msec
 8 T3-0.HARTFORD-CNSS49.T3.ANS.NET (140.222.49.1) 96 msec 104 msec 96 msec
 9 T3-0.ENSS134.T3.ANS.NET (140.222.134.1) 92 msec 128 msec 92 msec
10 W91-CISCO-EXTERNAL-FDDI.MIT.EDU (192.233.33.1) 92 msec 92 msec 112 msec
11 E40-RTR-FDDI.MIT.EDU (18.168.0.2) 92 msec 120 msec 96 msec
12 MIT.EDU (18.72.2.1) 96 msec 92 msec 96 msec
```

Table 116 describes the fields that are unique to the extended trace sequence, as shown in the display.

Table 116 trace Field Descriptions

Field	Description
Target IP address	You must enter a host name or an IP address. There is no default.
Source address	One of the interface addresses of the router to use as a source address for the probes. The router will normally pick what it feels is the best source address to use.
Numeric display	The default is to have both a symbolic and numeric display; however, you can suppress the symbolic display.
Timeout in seconds	The number of seconds to wait for a response to a probe packet. The default is 3 seconds.
Probe count	The number of probes to be sent at each TTL level. The default count is 3.
Minimum Time to Live [1]	The TTL value for the first probes. The default is 1, but it can be set to a higher value to suppress the display of known hops.
Maximum Time to Live [30]	The largest TTL value that can be used. The default is 30. The **trace** command terminates when the destination is reached or when this value is reached.
Port Number	The destination port used by the User Datagram Protocol (UDP) probe messages. The default is 33434.
Loose, Strict, Record, Timestamp, Verbose	IP header options. You can specify any combination. The **trace** command issues prompts for the required fields. Note that the **trace** command will place the requested options in each probe; however, there is no guarantee that all routers (or end nodes) will process the options.
Loose	Allows you to specify a list of nodes that must be traversed when going to the destination.
Strict	Allows you to specify a list of nodes that must be the only nodes traversed when going to the destination.
Record	Allows you to specify the number of hops to leave room for.
Timestamp	Allows you to specify the number of time stamps to leave room for.
Verbose	If you select any option, the verbose mode is automatically selected and the **trace** command prints the contents of the option field in any incoming packets. You can prevent verbose mode by selecting it again, toggling its current setting.

Table 117describes the characters that can appear in **trace** command output.

Table 117 ip trace Text Characters

Char	Description
nn msec	For each node, the round-trip time (in milliseconds) for the specified number of probes.
*	The probe timed out.
?	Unknown packet type.
A	Administratively unreachable. Usually, this output indicates that an access list is blocking traffic.
H	Host unreachable.
N	Network unreachable.
P	Protocol unreachable.
Q	Source quench.
U	Port unreachable.

Related Commands

Command	Description
trace (user)	Discovers the CLNS routes that packets will actually take when traveling to their destination.

trace (user)

To discover the IP routes that packets will actually take when traveling to their destination, use the **trace** EXEC command.

trace [*protocol*] [*destination*]

Syntax Description

protocol	(Optional) Protocols that can be used are **appletalk**, **clns**, **ip** and **vines**.
destination	(Optional) 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 Cisco IOS software examination of the format of the *destination* argument. For example, if the software finds a *destination* argument in IP format, the *protocol* defaults to **ip**.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The **trace** command works by taking advantage of the error messages generated by routers when a datagram exceeds its time-to-live (TTL) value.

The **trace** command starts by sending probe datagrams with a TTL value of one. This causes the first router to discard the probe datagram and send back a system message. The **trace** command sends several probes at each TTL level and displays the round-trip time for each.

The **trace** command sends out one probe at a time. Each outgoing packet may result in one or two system messages. A "time exceeded" system message indicates that an intermediate router has seen and discarded the probe. A "destination unreachable" system message indicates that the destination node has received the probe and discarded it because it could not deliver the packet. If the timer goes off before a response comes in, **trace** prints an asterisk (*).

The **trace** 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, type **Ctrl-^ X** by simultaneously pressing and releasing the **Ctrl**, **Shift**, and **6** keys, and then pressing the **X** key.

Common Trace Problems

Due to bugs in the IP implementation of various hosts and routers, the IP **trace** command may behave in unexpected ways.

Not all destinations will 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 has been reached, may indicate this problem.

There is a known problem with the way some hosts handle an “ICMP TTL exceeded” message. Some hosts generate an *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 six hops away, **trace** will time out on responses 6 through 11.

Trace IP Routes

The following display shows sample IP **trace** output when a destination host name has been specified:

```
Router# trace ip ABA.NYC.mil

Type escape sequence to abort.
Tracing the route to ABA.NYC.mil (26.0.0.73)
  1 DEBRIS.CISCO.COM (192.180.1.6) 1000 msec 8 msec 4 msec
  2 BARRNET-GW.CISCO.COM (192.180.16.2) 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 (192.200.254.6) 8 msec 8 msec 8 msec
  5 SU.ARC.BARRNET.NET (192.200.3.8) 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 118 describes the significant fields shown in the display.

Table 118 trace Field Descriptions

Field	Description
1	Indicates the sequence number of the router in the path to the host.
DEBRIS.CISCO.COM	Host name of this router.
192.180.1.61	Internet address of this router.
1000 msec 8 msec 4 msec	Round-trip time for each of the three probes that are sent.

Table 119 describes the characters that can appear in **trace** output.

Table 119 ip trace Text Characters

Char	Description
nn msec	For each node, the round-trip time (in milliseconds) for the specified number of probes.
*	The probe timed out.
?	Unknown packet type.
A	Administratively unreachable. Usually, this output indicates that an access list is blocking traffic.
H	Host unreachable.
N	Network unreachable.
P	Protocol unreachable.
Q	Source quench.
U	Port unreachable.

Related Commands

Command	Description
trace (privileged)	Probes the routes that packets follow when traveling to their destination from the router.