CHAPTER 1

Command-Line Interfaces

This chapter describes the command-line interfaces (CLI) available on the Catalyst 6000 family switches and contains these sections:

For definitions of terms and acronyms listed in this publication, see Appendix A, "Acronyms."

Switch CLI

The Catalyst 6000 family switches are multimodule systems. Commands you enter from the CLI can apply to the entire system or to a specific module, port, or VLAN.

You can configure and maintain the Catalyst 6000 family switches by entering commands from the switch CLI. The CLI is a basic command-line interpreter similar to the UNIX C shell. Using the CLI **session** command, you can access the router configuration software and perform tasks such as history substitution and alias creation.

Note The Catalyst 6000 family consists of the Catalyst 6000 and 6500 series switches. The Catalyst 6000 series consists of the Catalyst 6006 and 6009 switches; the Catalyst 6500 series consists of the Catalyst 6506 and 6509 switches. Throughout this publication and all Catalyst 6000 family documents, the phrase *Catalyst 6000 family switches* refers to all four switches, unless otherwise noted.

Accessing the Switch CLI

You can access the switch CLI from a console terminal connected to an EIA/TIA-232 port or through a Telnet session. The CLI allows fixed baud rates. Telnet sessions disconnect automatically after remaining idle for a user-defined time period.

Note EIA/TIA-232 was known as RS-232 before its acceptance as a standard by the Electronic Industries Alliance and Telecommunications Industry Association.

Accessing the Switch CLI via the Console Port (EIA/TIA-232)

To access the switch through the console (EIA/TIA-232) port, perform these steps:

	Task	Command
Step 1	From the Cisco Systems Console prompt, press **Return**.	
Step 2	At the prompt, enter the system password. The Console> prompt appears indicating that you have accessed the CLI in normal mode.	<*password*>
Step 3	Enter the necessary commands to complete your desired tasks.	Appropriate commands
Step 4	When finished, exit the session.	**quit**

After connecting through the console port, you see this display:

```
Cisco Systems Console
Enter password:
Console>
Console>
```

Accessing the Switch CLI via Telnet

To access the switch through a Telnet session, you must first set the IP address for the switch. You can open multiple sessions to the switch via Telnet.

To access the switch from a remote host with Telnet, perform these steps:

	Task	Command
Step 1	From the remote host, enter the **telnet** command and the name or IP address of the switch you want to access.	**telnet** *hostname* | *ip_addr*
Step 2	At the prompt, enter the password for the CLI. If no password has been configured, press **Return**.	<*password*>
Step 3	Enter the necessary commands to complete your desired tasks.	Appropriate commands
Step 4	When finished, exit the Telnet session.	**quit**

After connecting through a Telnet session, you see this display:

```
host% telnet cat6000-1.cisco.com
Trying 172.16.44.30 ...
Connected to cat6000-1.
```

Operating the Switch CLI

This section describes command modes and functions that allow you to operate the switch CLI.

Accessing the Command Modes

The CLI has two modes of operation: normal and privileged. Both are password-protected. Use normal-mode commands for everyday system monitoring. Use privileged commands for system configuration and basic troubleshooting.

After you log in, the system enters normal mode, which gives you access to normal-mode commands only. You can enter privileged mode by entering the **enable** command followed by the enable password. Privileged mode is indicated by the word "enable" in the system prompt. To return to normal mode, enter the **disable** command at the prompt.

The following example shows how to enter privileged mode:

```
Console> enable
Enter password: <password>
Console> (enable)
```

Using Command-Line Processing

Switch commands are not case sensitive. You can abbreviate commands and parameters as long as they contain enough letters to be different from any other currently available commands or parameters. You can scroll through the last 20 commands stored in the history buffer, and enter or edit the command at the prompt. (See Table 1-1.)

Table 1-1 Command-Line Processing Keystroke

Keystroke	Function
Ctrl-A	Jumps to the first character of the command line.
Ctrl-B or the left arrow key	Moves the cursor back one character.
Ctrl-C	Escapes and terminates prompts and tasks.
Ctrl-D	Deletes the character at the cursor.
Ctrl-E	Jumps to the end of the current command line.
Ctrl-F or the right arrow key[1]	Moves the cursor forward one character.
Ctrl-K	Deletes from the cursor to the end of the command line.
Ctrl-L; Ctrl-R	Repeats current command line on a new line.
Ctrl-N or the down arrow key[1]	Enters next command line in the history buffer.
Ctrl-P or the up arrow key[1]	Enters previous command line in the history buffer.
Ctrl-U; Ctrl-X	Deletes from the cursor to the beginning of the command line.
Ctrl-W	Deletes last word typed.

Table 1-1 Command-Line Processing Keystroke (continued)

Keystroke	Function
Esc B	Moves the cursor back one word.
Esc D	Deletes from the cursor to the end of the word.
Esc F	Moves the cursor forward one word.
Delete key or Backspace key	Erases mistake when entering a command; reenter command after using this key.

1. The arrow keys function only on ANSI-compatible terminals such as VT100s.

Using the Command-Line Editing Features

Catalyst 6000 family switch software includes an enhanced editing mode that provides a set of editing key functions similar to those of the Emacs editor. You can enter commands in uppercase, lowercase, or a mix of both. Only passwords are case sensitive. You can abbreviate commands and keywords to the number of characters that allow a unique abbreviation.

For example, you can abbreviate the **show** command to **sh**. After entering the command at the system prompt, press **Return** to execute the command.

Moving Around on the Command Line

Perform one of these tasks to move the cursor around on the command line for corrections or changes:

Task	Keystrokes
• Move the cursor back one character.	Press **Ctrl-B** or press the left arrow key[1].
• Move the cursor forward one character.	Press **Ctrl-F** or press the right arrow key[1].
• Move the cursor to the beginning of the command line.	Press **Ctrl-A**.
• Move the cursor to the end of the command line.	Press **Ctrl-E**.
• Move the cursor back one word.	Press **Esc B**.
• Move the cursor forward one word.	Press **Esc F**.

1. The arrow keys function only on ANSI-compatible terminals such as VT100s.

Pasting in Buffer Entries

The system provides a buffer that contains the last ten items you deleted. You can recall these items and paste them in the command line by performing this task:

Task	Keystrokes
• Recall the most recent entry in the buffer.	Press **Ctrl-Y**.
• Recall the next buffer entry.	Press **Esc Y**.

The buffer contains only the last ten items you have deleted or cut. If you press **Esc Y** more than ten times, you cycle back to the first buffer entry.

Editing Command Lines That Wrap

The new editing command set provides a wraparound feature for commands that extend beyond a single line on the screen. When the cursor reaches the right margin, the command line shifts ten spaces to the left. You cannot see the first ten characters of the line, but you can scroll back and check the syntax at the beginning of the command. To scroll back, perform this task:

Task	Keystrokes
Return to the beginning of a command line to verify that you have entered a lengthy command correctly.	Press **Ctrl-B** or the left arrow key repeatedly until you scroll back to the beginning of the command entry, or press **Ctrl-A** to return directly to the beginning of the line[1].

1. The arrow keys function only on ANSI-compatible terminals such as VT100s.

Use line wrapping with the command history feature to recall and modify previous complex command entries. See the "Using History Substitution" section on page 1-7 for information about recalling previous command entries.

The system assumes your terminal screen is 80 columns wide. If your screen has a different width, enter the terminal width command to tell the router the correct width of your screen.

Deleting Entries

Perform one of these tasks to delete command entries if you make a mistake or change your mind:

Task	Keystrokes
• Erase the character to the left of the cursor.	Press the **Delete** or **Backspace** key.
• Delete the character at the cursor.	Press **Ctrl-D**.
• Delete from the cursor to the end of the command line.	Press **Ctrl-K**.
• Delete from the cursor to the beginning of the command line.	Press **Ctrl-U** or **Ctrl-X**.
• Delete the word to the left of the cursor.	Press **Ctrl-W**.
• Delete from the cursor to the end of the word.	Press **Esc D**.

Scrolling Down a Line or a Screen

When you use the help facility to list the commands in a particular mode, the list is often longer than the terminal screen can display. In such cases, a ---More--- prompt is displayed at the bottom of the screen. To view the next line or screen, perform these tasks:

Task	Keystrokes
• Scroll down one line.	Press the **Return** key.
• Scroll down one screen.	Press the **Spacebar**.

Note The ---More--- prompt is used for any output that has more lines than can be displayed on the terminal screen, including **show** command output.

Redisplaying the Current Command Line

If you enter a command and the system suddenly sends a message to your screen, you can recall your current command line entry. To do so, perform this task:

Task	Keystrokes
Redisplay the current command line.	Press **Ctrl-L** or **Ctrl-R**.

Transposing Mistyped Characters

If you mistype a command entry, you can transpose the mistyped characters by performing this task:

Task	Keystrokes
Transpose the character to the left of the cursor with the character located at the cursor.	Press **Ctrl-T**.

Controlling Capitalization

You can change words to uppercase or lowercase, or capitalize a set of letters, with simple keystroke sequences:

Task	Keystrokes
• Capitalize at the cursor.	Press **Esc C**.
• Change the word at the cursor to lowercase.	Press **Esc L**.
• Capitalize letters from the cursor to the end of the word.	Press **Esc U**.

Designating a Keystroke as a Command Entry

You can use a particular keystroke as an executable command. Perform this task:

Task	Keystrokes
Insert a code to indicate to the system that the keystroke immediately following should be treated as a command entry, *not* an editing key.	Press **Ctrl-V** or **Esc Q**.

Using Command Aliases

Like regular commands, aliases are not case sensitive. However, unlike regular commands, some aliases cannot be abbreviated. See Table 1-2 for a list of switch CLI aliases that cannot be abbreviated.

Table 1-2 Switch CLI Command Aliases

Alias	Command
?	**help**
batch	**configure**
di	**show**
earl	**cam**
exit	**quit**
logout	**quit**

Using History Substitution

Commands that you enter during each terminal session are stored in a history buffer, which stores the last 20 commands you entered during a terminal session. History substitution allows you to access these commands without retyping them by using special abbreviated commands. (See Table 1-3.)

Table 1-3 History Substitution Commands

Command	Function
To repeat recent commands:	
!!	Repeat the most recent command.
!-nn	Repeat the nnth most recent command.
!n	Repeat command n.
!aaa	Repeat the command beginning with string aaa.
!?aaa	Repeat the command containing the string aaa.
To modify and repeat the most recent command:	
^aaa^bbb	Replace string aaa with string bbb in the most recent command.
To add a string to the end of a previous command and repeat it:	
!!aaa	Add string aaa to the end of the most recent command.
!n aaa	Add string aaa to the end of command n.

Table 1-3 History Substitution Commands (continued)

Command	Function
!aaa bbb	Add string bbb to the end of the command beginning with string aaa.
!?aaa bbb	Add string bbb to the end of the command containing string aaa.

Accessing Command Help

To see a list of top-level commands and command categories, type **help** or **?** in normal or privileged mode. Context-sensitive help (usage and syntax information) for individual commands can be seen by appending **help** or **?** to any specific command. If you enter a command using the wrong number of arguments or inappropriate arguments, usage and syntax information for that command is displayed. Additionally, appending **help** or **?** to a command category displays a list of commands in that category.

Top-Level Commands and Command Categories

In normal mode, use the **help** or **?** command to display a list of top-level commands and command categories, as follows:

```
Console> help
Commands:
------------------------------------------------------------------------
cd                  Set default flash device
dir                 Show list of files on flash device
enable              Enable privileged mode
help                Show this message
history             Show contents of history substitution buffer
ping                Send echo packets to hosts
pwd                 Show default flash device
quit                Exit from the Admin session
session             Tunnel to ATM or Router module
set                 Set, use 'set help' for more info
show                Show, use 'show help' for more info
traceroute          Trace the route to a host
verify              Verify checksum of file on flash device
wait                Wait for x seconds
whichboot           Which file booted Console>
Console>
```

In privileged mode, enter the **help** or **?** command to display a list of top-level commands and command categories, as follows:

```
Console> (enable) help
Commands:
------------------------------------------------------------------------
cd                  Set default flash device
clear               Clear, use 'clear help' for more info
configure           Configure system from network
copy                Copy files between TFTP/module/flash devices
delete              Delete a file on flash device
dir                 Show list of files on flash device
disable             Disable privileged mode
disconnect          Disconnect user session
download            Download code to a processor
enable              Enable privileged mode
format              Format a flash device
help                Show this message
```

```
history             Show contents of history substitution buffer
ping                Send echo packets to hosts
pwd                 Show default flash device
quit                Exit from the Admin session
reconfirm           Reconfirm VMPS
reload              Force software reload to linecard
reset               Reset system or module
session             Tunnel to ATM or Router module
set                 Set, use 'set help' for more info
show                Show, use 'show help' for more info
slip                Attach/detach Serial Line IP interface
squeeze             Reclaim space used by deleted files
switch              Switch to standby <clock|supervisor>
telnet              Telnet to a remote host
test                Test, use 'test help' for more info
traceroute          Trace the route to a host
undelete            Undelete a file on flash device
upload              Upload code from a processor
verify              Verify checksum of file on flash device
wait                Wait for x seconds
whichboot           Which file booted
write               Write system configuration to terminal/network
Console> (enable)
```

Command Categories

On some commands (such as **clear**, **set**, and **show**), typing **help** or **?** after the command provides a list of commands in that category. For example, this display shows a partial list of commands for the **clear** category:

```
Console> (enable) clear help

Clear commands:
--------------------------------------------------------------------------------
clear alias                 Clear aliases of commands
clear arp                   Clear ARP table entries
clear banner                Clear Message Of The Day banner
clear boot                  Clear booting environment variable
clear cam                   Clear CAM table entries
clear channel               Clear PAgP statistical information
...
```

Context-Sensitive Help

Usage and syntax information for individual commands can be seen by appending **help** or **?** to any specific command. For example, the following display shows usage and syntax information for the **set length** command:

```
Console> set length help
Usage: set length <screenlength> [default]
       (screenlength = 5..512, 0 to disable 'more' feature)
Console>
```

Designating Modules, Ports, and VLANs

The Catalyst 6000 family modules (module slots), ports, and VLANs are numbered starting with 1. The supervisor engine module is module 1, residing in the top slot. On each module, port 1 is the leftmost port. To reference a specific port on a specific module, the command syntax is *mod/port*. For example, **3/1** denotes module 3, port 1. In some commands, such as **set trunk**, **set cam**, and **set vlan**, you can enter lists of ports and VLANs.

You can designate ports by entering the module and port number pairs, separated by commas. To specify a range of ports, use a dash (-) between the module number and port number pairs. Dashes take precedence over commas. The following examples show several ways of designating ports:

Example 1: **2/1,2/3** denotes module 2, port 1 and module 2, port 3.

Example 2: **2/1-12** denotes module 2, ports 1 through 12.

Example 3: **2/1-2/12** also denotes module 2, ports 1 through 12.

Each VLAN is designated by a single number. You can specify lists of VLANs the same way you do for ports. Individual VLANs are separated by commas (,); ranges are separated by dashes (-). In the following example, VLANs 1 through 10 and VLAN 1000 are specified:

```
1-10,1000
```

Designating MAC Addresses, IP and IPX Addresses, and IP Aliases

Some commands require a MAC address that you must designate in a standard format. The MAC address format must be six hexadecimal numbers separated by hyphens, as shown in this example:

```
00-00-0c-24-d2-fe
```

Some commands require an IP address. The IP address format is 32 bits, written as four octets separated by periods (dotted decimal format). IP addresses are made up of a network section, an optional subnet section, and a host section, as shown in this example:

```
126.2.54.1
```

If DNS is configured properly on the switch, you can use IP hostnames instead of IP addresses. For information on configuring DNS, refer to the *Software Configuration Guide* for your switch.

If the IP alias table is configured, you can use IP aliases in place of the dotted decimal IP address. This is true for most commands that use an IP address, except commands that define the IP address or IP alias.

When entering the IPX address syntax, use the following format:

- IPX net address—1..FFFFFFFE
- IPX node address—x.x.x where x is 0..FFFF
- IPX address—ipx_net.ipx_node (for example 3.0034.1245.AB45, A43.0000.0000.0001)

Using Command Completion

The command completion feature consists of these functions:

- Command self-repeat
- Keyword lookup or partial keyword lookup
- Command completion

Use the command self-repeat function to display matches to all possible keywords if a string represents a unique match. If a unique match is not found, the longest matching string is provided. To display the matches, enter a space after the last parameter and enter **?**. Once the matches are displayed, the system comes back to the prompt and displays the last command without the **?**. In the example below, notice how the system repeats the command entered without the **?**.

```
Console> (enable) set mls nde
  disable              Disable multilayer switching data export filter
  enable               Enable multilayer switching data export filter
  engineer             Engineer setting of the export filter
  flow                 Setting multilayer switching export filter
  <collector_ip>       IP address
Console> (enable) set mls nde
```

Use the keyword-lookup function to display a list of valid keywords and arguments for a command. To display the matches, enter a space after the last parameter and enter **?**. For example, eight parameters are used by the **set mls** command. To see these parameters, enter **set mls ?** at the privileged prompt. In the example below, notice how the system repeats the command entered without the **?**:

```
Console> (enable) set mls ?
  agingtime                  Set agingtime for MLS cache entry
  disable                    Disable MLS in the switch
  enable                     Enable MLS in the switch
  nde                        Configure Netflow Data Export
  flow                       Set minimum flow mask
  include                    Include MLS-RP
  multicast                  Set MLS feature for multicast
  statistics                 Add protocols to protocol statistics list
Console> (enable) set mls
```

Use the partial-keyword-lookup function to display a list of commands that begin with a specific set of characters. To display the matches, enter **?** immediately after the last parameter. For example, enter **co?** at the privileged prompt to display a list of commands that start with **co**. The system displays all commands that begin with **co** and repeats the command entered without the **?**:

```
Console> (enable) co?
configure                  Configure system from network
copy                       Copy files between TFTP/RCP/module/flash devices
Console> (enable) co
```

Use the command completion function to complete a command or keyword. When you enter a unique partial character string and press **Tab**, the system completes the command or keyword on the command line. For example, if you enter **co** at the privileged prompt and press **Tab**, the system completes the command as **configure** because it is the only command that matches the criteria.

If no completion can be done, no action is carried out and the system returns to the prompt and the last command. The cursor appears immediately after the keyword, allowing you to enter additional information.

ROM Monitor CLI

The ROM monitor is a ROM-based program that executes upon platform power-up, reset, or when a fatal exception occurs.

Accessing the ROM Monitor CLI

The system enters ROM-monitor mode if the switch does not find a valid system image, if the NVRAM configuration is corrupted, or if the configuration register is set to enter ROM-monitor mode. From the ROM-monitor mode, you can load a system image manually from Flash memory, from a network server file, or from bootflash. You can also enter ROM-monitor mode by restarting the switch and pressing the **Break** key during the first 60 seconds of startup.

Note Break is always enabled for 60 seconds after rebooting the system, regardless of whether Break is configured to be off by configuration register settings.

To connect through a terminal server, escape to the Telnet prompt, and enter the **send break** command to break back to the ROM-monitor mode.

Operating the ROM Monitor CLI

The ROM monitor commands are used to load and copy system images, microcode images, and configuration files. System images contain the system software. Microcode images contain microcode to be downloaded to various hardware devices. Configuration files contain commands to customize Catalyst 6000 family software.

The manual **boot** command has the following syntax:

Note Enter the **copy** *file-id* {**tftp** | **flash** | *file-id*} command to obtain an image from the network.

- **boot**—Boot from ROM
- **boot** [*-xv*] [*device***:**][*imagename*]—Boot from the local device. If you do not specify an image name, the system defaults to the first valid file in the device. The image name is case sensitive.

Once you are in ROM-monitor mode, the prompt changes to rommon 1>. While you are in ROM-monitor mode, each time you enter a command, the number in the prompt increments by one.