

Cisco IOS Basic Skills

This chapter describes what you need to know before you begin configuring your router with Cisco IOS software (the software that runs your router).

This chapter contains the following sections:

- Configuring the Router from a PC
- Getting Help
- Understanding Command Modes
- Entering Configuration Mode
- Using Commands
- Saving Configuration Changes
- Using Debug Commands

Understanding these concepts saves you time when you are configuring your router. If you have never used the Cisco IOS software or need a refresher, take a few minutes to read this chapter before you proceed to the next chapter.

If you are already familiar with the Cisco IOS software, you can proceed to the configuration chapter that is appropriate for your network.

Configuring the Router from a PC

If you are configuring your router from a PC (not a dumb terminal), you need a type of communications software called *terminal emulation* software. The PC uses this software to send commands to your router. Table 2-1 lists some common names for this software, based on the type of PC you are using.

Table 2-1 Terminal Emulation Software

PC Operating System	Software
Windows 95, Windows NT	HyperTerminal (included with Windows software)
Windows 3.1	Terminal (included with Windows software)
Macintosh	ProComm, VersaTerm (supplied separately)

You can use the terminal emulation to change settings for the type of device that is connected to the PC, in this case a router. Configure the software to the following settings, so that your PC can communicate with your router:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit
- No flow control

You can now configure your router using your PC.

Understanding Command Modes

This section describes the Cisco IOS command mode structure. Each command mode supports specific Cisco IOS commands. For example, the **interface** *type_number* command is used only when in global configuration mode.

You use the following Cisco IOS command modes when configuring the scenarios described in this document:

- User EXEC
- Privileged EXEC
- Global configuration
- Interface configuration
- Router configuration
- Line configuration

Note Throughout the examples in this guide, there are steps for verifying your router configuration by using different Cisco IOS commands. If you plan to use these verification steps, you must understand how to change from one command mode to another, as summarized in Table 2-2.

Table 2-2 lists the command modes that are used in this guide, how to access each mode, the prompt you see in that mode, and how to exit that mode. The examples in the table use the host name *1700*.

Table 2-2 Command Modes Summary

Mode	Access Method	Prompt	Exit Method	About This Mode ¹
User EXEC	Begin a session with your router.	1700>	Enter the logout command.	A subset of the commands available in this mode. Use this mode to <ul style="list-style-type: none"> • Change terminal settings. • Perform basic tests. • Display system information.
Privileged EXEC	Enter the enable command while in user EXEC mode.	1700#	<ul style="list-style-type: none"> • To exit to user EXEC mode, enter the disable command. • To enter global configuration mode, enter the configure command. 	Use this mode to <ul style="list-style-type: none"> • Configure your router operating parameters. • Perform the verification steps shown in this guide. <p>You should configure your router with an enable password to prevent anyone from making unauthorized changes to the router configuration.</p>
Global configuration	Enter the configure command while in privileged EXEC mode.	1700(config)#	<ul style="list-style-type: none"> • To exit to privileged EXEC mode, enter the exit or end command, or press Ctrl-Z. • To enter interface configuration mode, enter the interface command. 	Use this mode to configure parameters that apply to your router as a whole.
Interface configuration	Enter the interface command (with a specific interface) while in the global configuration mode.	1700(config-if)#	<ul style="list-style-type: none"> • To exit to global configuration mode, enter the end command. • To exit to privileged EXEC mode, enter the exit command, or press Ctrl-Z. • To enter subinterface configuration mode, specify a subinterface with the interface command. 	Use this mode to configure parameters for the various LAN and WAN interfaces of your router, including the <ul style="list-style-type: none"> • Ethernet interface. • Serial interface. • ISDN interface.
Router configuration	Enter your router command followed by the appropriate keyword while in global configuration mode.	1700(config-router)#	<ul style="list-style-type: none"> • To exit to global configuration mode, enter the end command. • To exit to privileged EXEC mode, enter the exit command, or press Ctrl-Z. 	Use this mode to configure an IP routing protocol.
Line configuration	Specify a line with the line vty command while in the global configuration mode.	1700(config-line)#	<ul style="list-style-type: none"> • To exit to global configuration mode, enter the exit command. • To enter privileged EXEC mode, enter the end command, or press Ctrl-Z. 	Use this mode to configure parameters for the terminal line.

1. For any of the modes, you can see a comprehensive list of the available commands by entering a question mark (?) at the prompt.

Getting Help

You can use the question mark (?) and arrow keys to help you enter commands. Here are some ways to get help while in any command mode:

- 1 Enter a question mark to list the commands that are available in the current mode. You can restrict the list to all commands starting with a specific letter by entering that letter, followed by a question mark (no space):

```
Router (config-if)# s?  
shutdown  
snapshot  
snmp  
standby
```

- 2 Enter a command, a space, and a question mark to list the available keywords (and a short definition of the keywords) that can be used with the command:

```
Router (config-if)# snapshot ?  
client Enable client control of Snapshot routing  
server Send routing updates out this link when updates are received
```

- 3 Enter a command, a keyword, a space, and a question mark to list the range of values (and a short definition of the values) that you can enter with the command:

```
Router (config-if)# snapshot client ?  
<5-1000> duration, in minutes, of each active period
```

- 4 Enter a few known characters to have the router complete the command. In this example, the command is **show hosts**:

```
Router> sh ho  
Default domain is not set  
Name/address lookup uses domain service  
Name servers are 255.255.255.25
```

- 5 To redisplay a command you previously entered, press the up arrow key. You can continue to press the up arrow key for more commands. The commands are shown in the reverse order that they were entered.

Enable Secret and Enable Passwords

Because many privileged-level EXEC commands are used to set operating parameters, you should password-protect these commands to prevent unauthorized use.

You use two commands to do this:

- **enable secret** *password* (a very secure, encrypted password)
- **enable password** (a less secure, unencrypted password)

You must enter an enable secret password to gain access to privileged EXEC mode commands.

For maximum security, the passwords should be different. If you enter the same password for both during the setup process, your router accepts the passwords, but warns you that they should be different.

An enable secret password can contain from 1 to 25 uppercase and lowercase alphanumeric characters. An enable password can contain any number of uppercase and lowercase alphanumeric characters. In both cases, a number cannot be the first character. Spaces are also valid password characters; for example, “two words” is a valid password. Leading spaces are ignored; trailing spaces are recognized.

If you lose or forget your enable password, refer to the “Troubleshooting” appendix in the *Cisco 1700 Router Hardware Installation Guide* that came with your router.

Entering Configuration Mode

To make any configuration changes to your router, you must be in configuration mode. This section describes how to enter configuration mode while using a terminal or PC that is connected to your router CONSOLE port.

To enter configuration mode:

Step 1 After your router boots up, answer no when the following question displays:

```
Would you like to enter the initial configuration dialog [yes]: no
```

Step 2 If you have configured your router with an enable password, enter the **enable** command, and enter the enable password when you are prompted for it.

The enable password does not show on the screen when you enter it. This example shows how to enter configuration mode on a Cisco 1700 router:

```
1603> enable
Password: <enable_password>
Router#
```

Enable mode is indicated by the # in the prompt. You can now make changes to your router configuration.

Step 3 Enter the **configure terminal** command to enter configuration mode, indicated by the (config)# in the prompt:

```
Router# configure terminal
Router (config)#
```

You can now make changes to your router configuration.

Using Commands

This section provides some tips about entering Cisco IOS commands at the command-line interface (CLI).

Abbreviating Commands

You only have to enter enough characters for the router to recognize the command as unique. This example shows how to enter the **show configuration** command:

```
1603# show conf
Using 385 out of 7506 bytes
!
version 11.2
no service udp-small-servers
no service tcp-small-servers
.
.
.
```

Command-Line Error Messages

Table 2-3 lists some error messages that you might encounter while using the CLI to configure your router.

Table 2-3 Common CLI Error Messages

Error Message	Meaning	How to Get Help
% Ambiguous command: "show con"	You did not enter enough characters for your router to recognize the command.	Re-enter the command followed by a question mark (?) with no space between the command and the question mark. The possible keywords that you can enter with the command are displayed.
% Incomplete command.	You did not enter all of the keywords or values required by this command.	Re-enter the command followed by a question mark (?) with no space between the command and the question mark. The possible keywords that you can enter with the command are displayed.
% Invalid input detected at '^' marker.	You entered the command incorrectly. The error occurred where the caret mark (^) appears.	Enter a question mark (?) to display all of the commands that are available in this command mode.

Undoing Commands

If you want to disable a feature or undo a command you entered, you can enter the keyword **no** before most commands, for example, **no ip routing**.

Saving Configuration Changes

You need to enter the **copy running-config startup-config** command to save your configuration changes to nonvolatile random-access memory (NVRAM) so that they are not lost if there is a system reload or power outage. This example shows how use this command to save your changes:

```
Router# copy running-config startup-config
Building configuration...
```

It might take a minute or two to save the configuration to NVRAM. After the configuration has been saved, the following appears:

```
[OK]
Router#
```

Using Debug Commands

Debug command are provided for most of the configurations in this document. You can use the debug commands to troubleshoot any configuration problems that you might be having on your network. Debug commands provide extensive, informative displays to help you interpret any possible problems.

Table 2-4 contains important information about debug commands.



Caution Debugging is assigned a high priority in your router CPU process, and it can render your router unusable. For this reason, use debug commands only to troubleshoot specific problems. The best time to use debug commands is during periods of low network traffic and few users to decrease the likelihood that the debug command processing overhead affects network users.

Table 2-4 Important Information About Debug Commands

What	Information
Additional documentation	You can find additional information and documentation about the debug commands in the <i>Debug Command Reference</i> document on the Cisco IOS software documentation CD-ROM that came with your router. If you are not sure where to find this document on the CD-ROM, use the Search function in the Verity Mosaic browser that comes with the CD-ROM.
Disabling debugging	To turn off any debugging, enter the undebug all command.
Telnet sessions	If you want to use debug commands during a Telnet session with your router, you must first enter the terminal monitor command.

Where to Go Next

Now that you have learned some Cisco IOS software basics, you can begin to configure your router.

Remember that

- You can use the question mark (?) and arrow keys to help you enter commands.
- Each command mode restricts you to a set of commands. If you are having difficulty entering a command, check the prompt, and then enter the question mark (?) for a list of available commands. You might be in the wrong command mode or using the wrong syntax.
- If you want to disable a feature, enter the keyword **no** before the command, for example, **no ip routing**.
- You need to save your configuration changes to NVRAM so that they are not lost if there is a system reload or power outage.

Proceed to any one of the configuration chapters to begin configuring your router.

