

## CHAPTER 3

# Configuring a Router

This chapter provides information and commands concerning the following topics:

- Configuring a router, specifically:
  - Names
  - Passwords
  - Interfaces
  - MOTD banners
  - IP host tables
  - Saving and erasing your configurations
- **show** commands to verify the router configurations

### Router Modes

Router>	User mode
Router#	Privileged mode
Router(config)#	Global configuration mode
Router(config-if)#	Interface mode
Router(config-subif)#	Subinterface mode
Router(config-line)#	Line mode
Router(config-router)#	Router configuration mode

**TIP:** There are other modes than these. Not all commands work in all modes. Be careful. If you type in a command that you know is correct—**show run**, for example—and you get an error, make sure that you are in the correct mode.

## Global Configuration Mode

Router>	Can see config, but not change
Router#	Can see config and move to make changes
Router# <b>config t</b> Router(config)#	Moves to global config mode This prompt indicates that you can start making changes

## Configuring a Router Name

This command works on both routers and switches.

Router(config)# <b>hostname Cisco</b> Cisco(config)#	Name can be any word you choose
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## Configuring Passwords

Works on both routers and switches.

Router(config)# <b>enable password cisco</b>	Sets enable password
Router(config)# <b>enable secret class</b>	Sets enable secret password
Router(config)# <b>line con 0</b>	Enters console-line mode
Router(config-line)# <b>password console</b>	Sets console-line mode password to <b>console</b>
Router(config-line)# <b>login</b>	Enables password checking at login
Router(config)# <b>line vty 0 4</b>	Enters vty line mode for all 5 vty lines
Router(config-line)# <b>password telnet</b>	Sets vty password to <b>telnet</b>
Router(config-line)# <b>login</b>	Enables password checking at login

Router(config)# <b>line aux 0</b>	Enters auxiliary line mode
Router(config-line)# <b>password</b> backdoor	Sets auxiliary line mode password to <b>backdoor</b>
Router(config-line)# <b>login</b>	Enables password checking at login

**CAUTION:** Enable secret password is encrypted by default. Enable password is not. For this reason, recommended practice is that you *never* use the enable password. Use only the enable secret password in a router configuration.

**CAUTION:** You cannot set both enable secret and enable password to the same password. Doing so defeats the use of encryption.

## Password Encryption

Router(config)# <b>service password-encryption</b>	Applies a weak encryption to passwords
Router(config)# <b>enable password cisco</b>	Sets enable password to <b>cisco</b>
Router(config)# <b>line con 0</b>	...
Router(config-line)# <b>password Cisco</b>	Continue setting passwords as above
	...
Router(config)# <b>no service password-encryption</b>	Turns off password encryption

**CAUTION:** If you have turned on service password encryption, used it, and then turned it off, any passwords that you have encrypted will stay encrypted. New passwords will remain unencrypted

## show Commands

Router# <b>show ?</b>	Lists all <b>show</b> commands available
Router# <b>show interfaces</b>	Displays statistics for all interfaces
Router# <b>show interface serial 0</b>	Displays statistics for a specific interface, in this case Serial 0
Router# <b>show ip interface brief</b>	Displays a summary of all interfaces, including status and IP address assigned

Router# <b>show controllers serial 0</b>	Displays statistics for interface hardware. Statistics display if the clock rate is set and if the cable is DCE, DTE, or not attached
Router# <b>show clock</b>	Displays time set on device
Router# <b>show hosts</b>	Displays local host-to-IP address cache. These are the names and addresses of hosts on the network to which you can connect
Router# <b>show users</b>	Displays all users connected to device
Router# <b>show history</b>	Displays history of commands used
Router# <b>show flash</b>	Displays info about Flash memory
Router# <b>show version</b>	Displays info about loaded software version
Router# <b>show arp</b>	Displays the ARP table
Router# <b>show protocols</b>	Displays status of configured Layer 3 protocols
Router# <b>show startup-config</b>	Displays configuration saved in NVRAM
Router# <b>show running-config</b>	Displays configuration currently running in RAM

## Interface Names

One of the biggest problems that new administrators face is the names of the interfaces on the different models of routers. The following chart lists the names of the Ethernet, Fast Ethernet, and Serial interfaces on the 2500, 1700, and 2600 series of routers.

Fixed Interfaces (2500 Series)	Modular (Removable) Interfaces (1700 Series)	Modular (Removable) Interfaces (2600 Series)
Router(config)# <b>interface</b> <i>type port</i>	Router(config)# <b>interface</b> <i>type port</i>	Router(config)# <b>interface</b> <i>type slot/port</i>
Router(config)# <b>interface serial0 (s0)</b>	Router(config)# <b>interface serial 0</b>	Router(config)# <b>interface serial 0/0 (s0/0)</b>
Router(config)# <b>interface ethernet 0 (e0)</b>	Router(config)# <b>interface fastethernet 0</b>	Router(config)# <b>interface fastethernet 0/0 (fa0/0)</b>

## Moving Between Interfaces

What happens in Column 1 is the same thing as is occurring in Column 2.

Router(config)# <b>int s0</b>	Router(config)# <b>int s0</b>	Moves to interface S0 mode
Router(config-if)# <b>exit</b>	Router(config-if)# <b>int e0</b>	In int S0, move to E0
Router(config)# <b>int e0</b>	Router(config-if)#	In E0 mode now
Router(config-if)#		Prompt does not change; be <i>careful</i>

## Configuring a Serial Interface

Router(config)# <b>int s0/0</b>	Moves to interface Serial 0/0 mode
Router(config-if)# <b>description Link to ISP</b>	Optional descriptor of the link is locally significant
Router(config-if)# <b>ip address 192.168.10.1 255.255.255.0</b>	Assigns address and subnet mask to interface
Router(config-if)# <b>clock rate 56000</b>	Assigns a clock rate for the interface
Router(config-if)# <b>no shut</b>	Turns interface on

**TIP:** The **clock rate** command is used *only* on a *serial* interface that has a *DCE* cable plugged into it. There must be a clock rate set on every serial link between routers. It does not matter which router has the DCE cable plugged into it, or which interface the cable is plugged into. Serial 0 on one router can be plugged into Serial 1 on another router.

## Configuring an Ethernet/Fast Ethernet Interface

Router(config)# <b>int fa0/0</b>	Moves to Fast Ethernet 0/0 interface mode
Router(config-if)# <b>description Accounting LAN</b>	Optional descriptor of the link is locally significant

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Router(config-if)# <b>ip address 192.168.20.1 255.255.255.0</b>	Assigns address and subnet mask to interface
Router(config-if)# <b>no shut</b>	Turns interface on

### Creating a MOTD Banner

Router(config)# <b>banner motd # This is a secure system. Authorized Personnel Only! #</b> Router(config)#	# is known as a <i>delimiting character</i> . The delimiting character must surround the banner message and can be any character so long as it is not a character used within the body of the message
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### Setting the Clock Time Zone

Router(config)# <b>clock timezone EST -5</b>	Sets the time zone for display purposes. Based on coordinated universal time (Eastern Standard Time is 5 hours behind UTC)
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### Assigning a Local Host Name to an IP Address

Router(config)# <b>ip host london 172.16.1.3</b>	Assigns a host name to the IP address. After this assignment, you can use the host name instead of an IP address when trying to Telnet or ping to that address
Router# <b>ping london</b> = Router# <b>ping 172.16.1.3</b>	

**TIP:** The default port number in the **ip host** command is 23, or Telnet. If you want to Telnet to a device, just enter the IP host name itself:

Router#**london** = Router#**telnet london** = Router#**telnet 172.16.1.3**

## no ip domain-lookup Command

Router(config)#no ip domain-lookup Router(config)#	Turns off trying to automatically resolve an unrecognized command to a local host name
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**TIP:** Ever type in a command incorrectly and left having to wait for a minute or two as the router tries to *translate* your command to a domain server of 255.255.255.255? The router is set by default to try to resolve any word that is not a command to a DNS server at address 255.255.255.255. If you are not going to set up DNS, turn this feature off to save you time as you type, especially if you are a poor typist.

## logging synchronous Command

Router(config)#line con 0  Router(config-line)#logging synchronous	Turns on synchronous logging. Information items sent to console will not interrupt the command you are typing. The command will be moved to a new line
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**TIP:** Ever try to type in a command and an informational line appears in the middle of what you were typing? Lose your place? Do not know where you are in the command, so you just press [↵Enter](#) and start all over? The **logging synchronous** command will tell the router that if any informational items get displayed on the screen, your prompt and command line should be moved to a new line, so as not to confuse you.

The informational line does not get inserted into the middle of the command you are trying to type. If you were to continue typing, the command would execute properly, even though it looks wrong on the screen

## exec-timeout Command

Router(config)#line con 0  Router(config-line)#exec-timeout 0 0  Router(config-line)#	Sets time limit when console automatically logs off. Set to <b>0 0</b> (minutes seconds) means console never logs off
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**TIP:** `exec-timeout 0 0` is great for a lab because the console never logs out. This is very dangerous in the real world (bad security).

### Saving Configurations

Router# <b>copy run start</b>	Saves the running-config to local NVRAM
Router# <b>copy run tftp</b>	Saves the running-config remotely to TFTP server

### Erasing Configurations

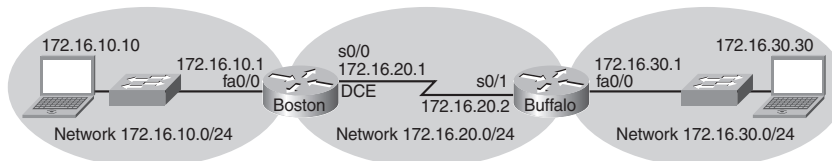
Router# <b>erase start</b>	Deletes the startup-config file from NVRAM
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**TIP:** Running-config is still in dynamic memory. Reload the router to clear the running-config.

### Configuration Example: Basic Router Configuration

Figure 3-1 shows the network topology for the configuration that follows, which shows a basic router configuration using the commands covered in this chapter.

Figure 3-1 Network Topology for Basic Router Configuration



#### Boston Router

Router> <b>en</b>	Enters privileged mode
Router# <b>clock set 18:30:00 15 Nov 2004</b>	Sets local time on router
Router# <b>config t</b>	Enters global config mode



Router(config)# <b>hostname Boston</b>	Sets router name to <b>Boston</b>
Boston(config)# <b>no ip domain-lookup</b>	Turns off name resolution on unrecognized commands (spelling mistakes)
Boston(config)# <b>banner motd # This is the Boston Router. Authorized Access Only #</b>	Creates an MOTD banner
Boston(config)# <b>clock timezone EST -5</b>	Sets time zone to Eastern Standard Time (-5 from UTC)
Boston(config)# <b>enable secret cisco</b>	Enable secret password set to <b>cisco</b>
Boston(config)# <b>service password-encryption</b>	Passwords will be given weak encryption
Boston(config)# <b>line con 0</b>	Enters line console mode
Boston(config-line)# <b>logging sync</b>	Commands will not be interrupted by unsolicited messages
Boston(config-line)# <b>password class</b>	Sets password to <b>class</b>
Boston(config-line)# <b>login</b>	Enables password checking at login
Boston(config-line)# <b>line vty 0 4</b>	Moves to virtual Telnet lines 0 through 4
Boston(config-line)# <b>password class</b>	Sets password to <b>class</b>
Boston(config-line)# <b>login</b>	Enables password checking at login
Boston(config-line)# <b>line aux 0</b>	Moves to line auxiliary mode
Boston(config-line)# <b>password class</b>	Sets password to <b>class</b>
Boston(config-line)# <b>login</b>	Enables password checking at login
Boston(config-line)# <b>exit</b>	Moves back to global config mode

<code>Boston(config)#no service password-encryption</code>	Turns off password encryption
<code>Boston(config)#int fa 0/0</code>	Moves to Fast Ethernet 0/0 mode
<code>Boston(config-if)#desc Engineering LAN</code>	Sets locally significant description of the interface
<code>Boston(config-if)#ip address 172.16.10.1 255.255.255.0</code>	Assigns IP address and subnet mask to the interface
<code>Boston(config-if)#no shut</code>	Turns on the interface
<code>Boston(config-if)#int s0/0</code>	Moves directly to Serial 0/0 mode
<code>Boston(config-if)#desc Link to Buffalo Router</code>	Sets locally significant description of the interface
<code>Boston(config-if)#ip address 172.16.20.1 255.255.255.0</code>	Assigns IP address and subnet mask to the interface
<code>Boston(config-if)#clock rate 56000</code>	Sets a clock rate for serial transmission (DCE cable must be plugged into this interface)
<code>Boston(config-if)#no shut</code>	Turns on the interface
<code>Boston(config-if)#exit</code>	Moves back to global config mode
<code>Boston(config)#ip host buffalo 172.16.20.2</code>	Sets a local host name resolution to IP address 172.16.20.2
<code>Boston(config)#exit</code>	Moves back to privileged mode
<code>Boston#copy run start</code>	Saves running-config to NVRAM