



## Cisco IOS CLI for Initial Configuration

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The following sections describe how to perform the initial configuration using the Cisco Internet Operating System (IOS) command line interface (CLI).

- [Prerequisites for Initial Software Configuration Using the Cisco IOS CLI, page A-1](#)
- [Using the Cisco IOS CLI to Perform Initial Configuration, page A-2](#)



### Note

We recommend using Cisco Configuration Professional Express web-based application to configure the initial router settings. See *Cisco Configuration Professional Express User Guide* at Cisco.com for detailed instructions,

[http://www.cisco.com/en/US/docs/net\\_mgmt/cisco\\_configuration\\_professional\\_express/v1\\_4/olh/ccp\\_express.html](http://www.cisco.com/en/US/docs/net_mgmt/cisco_configuration_professional_express/v1_4/olh/ccp_express.html)

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### Initial Configuration of the Wireless Access Point on Cisco 1941W Router

The embedded wireless access point (AP) runs its own version of Cisco Internet Operating System (IOS) software. Use Cisco Configuration Professional Express to perform the initial configuration of the access point software. For information on how to configure additional wireless parameters see the “[Configuring the Wireless Device](#)” module in this guide.

## Prerequisites for Initial Software Configuration Using the Cisco IOS CLI

Follow the instructions in the hardware installation guide for your router to install the chassis, connect cables, and supply power to the hardware.



### Timesaver

Before supplying power to the router, disconnect all WAN cables from the router to keep it from trying to run the AutoInstall process. The router may try to run AutoInstall if you power it up while there is a WAN connection on both ends and the router does not have a valid configuration file stored in NVRAM (for instance, when you add a new interface). It can take several minutes for the router to determine that AutoInstall is not connected to a remote TCP/IP host.

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# Using the Cisco IOS CLI to Perform Initial Configuration

This section contains the following procedures:

- [Configuring the Router Hostname, page A-2](#) (Optional)
- [Configuring the Enable and Enable Secret Passwords, page A-3](#) (Required)
- [Configuring the Console Idle Privileged EXEC Timeout, page A-5](#) (Optional)
- [Configuring Gigabit Ethernet Interfaces, page A-6](#) (Required)
- [Specifying a Default Route or Gateway of Last Resort, page A-8](#) (Required)
- [Configuring Virtual Terminal Lines for Remote Console Access, page A-11](#) (Required)
- [Configuring the Auxiliary Line, page A-13](#) (Optional)
- [Verifying Network Connectivity, page A-14](#) (Required)
- [Saving Your Router Configuration, page A-16](#) (Required)
- [Saving Backup Copies of Configuration and System Image, page A-16](#) (Optional)

## Configuring the Router Hostname

The hostname is used in CLI prompts and default configuration filenames. If you do not configure the router hostname, the router uses the factory-assigned default hostname “Router.”

Do not expect capitalization and lower casing to be preserved in the hostname. Uppercase and lowercase characters are treated as identical by many Internet software applications. It may seem appropriate to capitalize a name as you would ordinarily do, but conventions dictate that computer names appear in all lowercase characters. For more information, see RFC 1178, *Choosing a Name for Your Computer*.

The name must also follow the rules for Advanced Research Projects Agency Network (ARPANET) hostnames. They must start with a letter, end with a letter or digit, and have as interior characters only letters, digits, and hyphens. Names must be 63 characters or fewer. For more information, see RFC 1035, *Domain Names—Implementation and Specification*.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **hostname *name***
4. Verify that the router prompt displays your new hostname.
5. **end**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>hostname <i>name</i></b>  <b>Example:</b> Router(config)# hostname myrouter	Specifies or modifies the hostname for the network server.
Step 4	Verify that the router prompt displays your new hostname.  <b>Example:</b> myrouter(config)#	—
Step 5	<b>end</b>  <b>Example:</b> myrouter# end	(Optional) Returns to privileged EXEC mode.

## Configuring the Enable and Enable Secret Passwords

To provide an additional layer of security, particularly for passwords that cross the network or are stored on a TFTP server, you can use either the **enable password** command or **enable secret** command. Both commands accomplish the same thing—they allow you to establish an encrypted password that users must enter to access privileged EXEC (enable) mode.

We recommend that you use the **enable secret** command because it uses an improved encryption algorithm. Use the **enable password** command only if you boot an older image of the Cisco IOS software or if you boot older boot ROMs that do not recognize the **enable secret** command.

For more information, see the “Configuring Passwords and Privileges” chapter in *Cisco IOS Security Configuration Guide*. Also see the [Cisco IOS Password Encryption Facts](#) tech note and the [Improving Security on Cisco Routers](#) tech note.

### Restrictions

If you configure the **enable secret** command, it takes precedence over the **enable password** command; the two commands cannot be in effect simultaneously.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **enable password** *password*
4. **enable secret** *password*
5. **end**
6. **enable**
7. **end**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>enable password</b> <i>password</i>  <b>Example:</b> Router(config)# enable password pswd2	(Optional) Sets a local password to control access to various privilege levels. <ul style="list-style-type: none"> <li>• We recommend that you perform this step only if you boot an older image of the Cisco IOS software or if you boot older boot ROMs that do not recognize the <b>enable secret</b> command.</li> </ul>
Step 4	<b>enable secret</b> <i>password</i>  <b>Example:</b> Router(config)# enable secret greentree	Specifies an additional layer of security over the <b>enable password</b> command. <ul style="list-style-type: none"> <li>• Do not use the same password that you entered in <a href="#">Step 3</a>.</li> </ul>
Step 5	<b>end</b>  <b>Example:</b> Router(config)# end	Returns to privileged EXEC mode.
Step 6	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Verify that your new enable or enable secret password works.</li> </ul>
Step 7	<b>end</b>  <b>Example:</b> Router(config)# end	(Optional) Returns to privileged EXEC mode.

## Configuring the Console Idle Privileged EXEC Timeout

This section describes how to configure the console line's idle privileged EXEC timeout. By default, the privileged EXEC command interpreter waits 10 minutes to detect user input before timing out.

When you configure the console line, you can also set communication parameters, specify autobaud connections, and configure terminal operating parameters for the terminal that you are using. For more information on configuring the console line, see the "Configuring Operating Characteristics for Terminals" chapter in *Cisco IOS Configuration Fundamentals Configuration Guide*, and "Troubleshooting, Fault Management, and Logging" chapter in the *Cisco IOS Network Management Configuration Guide*.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **line console 0**
4. **exec-timeout** *minutes* [*seconds*]
5. **end**
6. **show running-config**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>line console 0</b>  <b>Example:</b> Router(config)# line console 0	Configures the console line and starts the line configuration command collection mode.
Step 4	<b>exec-timeout</b> <i>minutes</i> [ <i>seconds</i> ]  <b>Example:</b> Router(config-line)# exec-timeout 0 0	Sets the idle privileged EXEC timeout, which is the interval that the privileged EXEC command interpreter waits until user input is detected. <ul style="list-style-type: none"> <li>• The example shows how to specify no timeout. Setting the exec-timeout value to 0 causes the router to never log out once logged in. This could have security implications if you leave the console without manually logging out using the disable command.</li> </ul>

	Command or Action	Purpose
Step 5	<b>end</b>  <b>Example:</b> Router(config)# end	Returns to privileged EXEC mode.
Step 6	<b>show running-config</b>  <b>Example:</b> Router(config)# show running-config	Displays the running configuration file. <ul style="list-style-type: none"> <li>Verify that you properly configured the idle privileged EXEC timeout.</li> </ul>

## Examples

The following example shows how to set the console idle privileged EXEC timeout to 2 minutes 30 seconds:

```
line console
  exec-timeout 2 30
```

The following example shows how to set the console idle privileged EXEC timeout to 10 seconds:

```
line console
  exec-timeout 0 10
```

## Configuring Gigabit Ethernet Interfaces

This sections shows how to assign an IP address and interface description to an Ethernet interface on your router.

For comprehensive configuration information on Gigabit Ethernet interfaces, see the “Configuring LAN Interfaces” chapter of *Cisco IOS Interface and Hardware Component Configuration Guide*, [http://www.cisco.com/en/US/docs/ios/12\\_2/interface/configuration/guide/icflanin.html](http://www.cisco.com/en/US/docs/ios/12_2/interface/configuration/guide/icflanin.html)

For information on interface numbering, see *Software Configuration Guide* for your router.

### SUMMARY STEPS

- enable**
- show ip interface brief**
- configure terminal**
- interface gigabitethernet 0/port**
- description *string***
- ip address *ip-address mask***
- no shutdown**
- end**
- show ip interface brief**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>show ip interface brief</b>  <b>Example:</b> Router# show ip interface brief	Displays a brief status of the interfaces that are configured for IP. <ul style="list-style-type: none"> <li>Learn which type of Ethernet interface is on your router.</li> </ul>
Step 3	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 4	<b>interface gigabitethernet 0/port</b>  <b>Example:</b> Router(config)# interface gigabitethernet 0/0	Specifies the gigabit Ethernet interface and enters interface configuration mode.  <b>Note</b> For information on interface numbering, see <i>Software Configuration Guide</i> .
Step 5	<b>description string</b>  <b>Example:</b> Router(config-if)# description GE int to 2nd floor south wing	(Optional) Adds a description to an interface configuration. <ul style="list-style-type: none"> <li>The description helps you remember what is attached to this interface. The description can be useful for troubleshooting.</li> </ul>
Step 6	<b>ip address ip-address mask</b>  <b>Example:</b> Router(config-if)# ip address 172.16.74.3 255.255.255.0	Sets a primary IP address for an interface.
Step 7	<b>no shutdown</b>  <b>Example:</b> Router(config-if)# no shutdown	Enables an interface.
Step 8	<b>end</b>  <b>Example:</b> Router(config)# end	Returns to privileged EXEC mode.
Step 9	<b>show ip interface brief</b>  <b>Example:</b> Router# show ip interface brief	Displays a brief status of the interfaces that are configured for IP. <ul style="list-style-type: none"> <li>Verify that the Ethernet interfaces are up and configured correctly.</li> </ul>

## Examples

### Configuring the GigabitEthernet Interface: Example

```
!
interface GigabitEthernet0/0
  description GE int to HR group
  ip address 172.16.3.3 255.255.255.0
  duplex auto
  speed auto
  no shutdown
!
```

### Sample Output for the show ip interface brief Command

```
Router# show ip interface brief
```

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0	172.16.3.3	YES	NVRAM	up	up
GigabitEthernet0/1	unassigned	YES	NVRAM	administratively down	down

```
Router#
```

## Specifying a Default Route or Gateway of Last Resort

This section describes how to specify a default route with IP routing enabled. For alternative methods of specifying a default route, see the [Configuring a Gateway of Last Resort Using IP Commands](#) tech note.

The Cisco IOS software uses the gateway (router) of last resort if it does not have a better route for a packet and if the destination is not a connected network. This section describes how to select a network as a default route (a candidate route for computing the gateway of last resort). The way in which routing protocols propagate the default route information varies for each protocol.

For comprehensive configuration information about IP routing and IP routing protocols, see *Cisco IOS IP Configuration Guide*. In particular, see the “Configuring IP Addressing” chapter and all “Part 2: IP Routing Protocols” chapters.

## IP Routing

You can configure integrated routing and bridging (IRB) so the router can route and bridge simultaneously. The router will act as an IP host on the network whether routing is enabled or not. To read more about IRB see the following URL at Cisco.com:

[http://www.cisco.com/en/US/tech/tk389/tk815/tk855/tsd\\_technology\\_support\\_sub-protocol\\_home.html](http://www.cisco.com/en/US/tech/tk389/tk815/tk855/tsd_technology_support_sub-protocol_home.html)

IP routing is automatically enabled in the Cisco IOS software. When IP routing is configured, the system will use a configured or learned route to forward packets, including a configured default route.



### Note

This task section does not apply when IP routing is disabled. To specify a default route when IP routing is disabled, see the [Configuring a Gateway of Last Resort Using IP Commands](#) tech note at Cisco.com.

## Default Routes

A router might not be able to determine the routes to all other networks. To provide complete routing capability, the common practice is to use some routers as smart routers and give the remaining routers default routes to the smart router. (Smart routers have routing table information for the entire internetwork.) These default routes can be passed along dynamically, or can be configured into the individual routers.

Most dynamic interior routing protocols include a mechanism for causing a smart router to generate dynamic default information that is then passed along to other routers.

## Default Network

If a router has an interface that is directly connected to the specified default network, the dynamic routing protocols running on the router will generate or source a default route. In the case of RIP, the router will advertise the pseudo network 0.0.0.0. In the case of IGRP, the network itself is advertised and flagged as an exterior route.

A router that is generating the default for a network also may need a default of its own. One way a router can generate its own default is to specify a static route to the network 0.0.0.0 through the appropriate device.

## Gateway of Last Resort

When default information is being passed along through a dynamic routing protocol, no further configuration is required. The system periodically scans its routing table to choose the optimal default network as its default route. In the case of RIP, there is only one choice, network 0.0.0.0. In the case of IGRP, there might be several networks that can be candidates for the system default. The Cisco IOS software uses both administrative distance and metric information to determine the default route (gateway of last resort). The selected default route appears in the gateway of last resort display of the **show ip route EXEC** command.

If dynamic default information is not being passed to the software, candidates for the default route are specified with the **ip default-network** global configuration command. In this usage, the **ip default-network** command takes an unconnected network as an argument. If this network appears in the routing table from any source (dynamic or static), it is flagged as a candidate default route and is a possible choice as the default route.

If the router has no interface on the default network, but does have a route to it, it considers this network as a candidate default path. The route candidates are examined and the best one is chosen, based on administrative distance and metric. The gateway to the best default path becomes the gateway of last resort.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip routing**
4. **ip route** *dest-prefix mask next-hop-ip-address* [*admin-distance*] [**permanent**]
5. **ip default-network** *network-number*  
or  
**ip route** *dest-prefix mask next-hop-ip-address*

6. **end**
7. **show ip route**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>ip routing</b>  <b>Example:</b> Router(config)# ip routing	Enables IP routing.
Step 4	<b>ip route</b> <i>dest-prefix mask next-hop-ip-address</i> <i>[admin-distance] [permanent]</i>  <b>Example:</b> Router(config)# ip route 192.168.24.0 255.255.255.0 172.28.99.2	Establishes a static route.
Step 5	<b>ip default-network</b> <i>network-number</i> or <b>ip route</b> <i>dest-prefix mask next-hop-ip-address</i>  <b>Example:</b> Router(config)# ip default-network 192.168.24.0  <b>Example:</b> Router(config)# ip route 0.0.0.0 0.0.0.0 172.28.99.1	Selects a network as a candidate route for computing the gateway of last resort.  Creates a static route to network 0.0.0.0 0.0.0.0 for computing the gateway of last resort.
Step 6	<b>end</b>  <b>Example:</b> Router(config)# end	Returns to privileged EXEC mode.
Step 7	<b>show ip route</b>  <b>Example:</b> Router# show ip route	Displays the current routing table information. <ul style="list-style-type: none"> <li>• Verify that the gateway of last resort is set.</li> </ul>

## Examples

### Specifying a Default Route: Example

```
!  
ip routing  
!  
ip route 192.168.24.0 255.255.255.0 172.28.99.2  
!  
ip default-network 192.168.24.0  
!
```

### Sample Output for the show ip route Command

```
Router# show ip route  
  
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP  
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP  
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default  
  
Gateway of last resort is 172.28.99.2 to network 192.168.24.0  
  
    172.24.0.0 255.255.255.0 is subnetted, 1 subnets  
C       172.24.192.0 is directly connected, GigaEthernet0  
S       172.24.0.0 255.255.0.0 [1/0] via 172.28.99.0  
S*     192.168.24.0 [1/0] via 172.28.99.2  
    172.16.0.0 255.255.255.0 is subnetted, 1 subnets  
C       172.16.99.0 is directly connected, GigaEthernet1  
Router#
```

## Configuring Virtual Terminal Lines for Remote Console Access

Virtual terminal (vty) lines are used to allow remote access to the router. This section shows you how to configure the virtual terminal lines with a password, so that only authorized users can remotely access the router.

The router has five virtual terminal lines by default. However, you can create additional virtual terminal lines as described in the Cisco IOS Terminal Services Configuration Guide, Release 12.4. See the [Configuring Terminal Operating Characteristics for Dial-In Sessions](#) section.

Line passwords and password encryption is described in the Cisco IOS Security Configuration Guide, Release 12.4. See the [Security with Passwords, Privilege Levels, and Login Usernames for CLI Sessions on Networking Devices](#) section. If you want to secure the vty lines with an access list, see [Access Control Lists: Overview and Guidelines](#). Also see the [Cisco IOS Password Encryption Facts](#) tech note.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **line vty** *line-number* [*ending-line-number*]
4. **password** *password*
5. **login**
6. **end**
7. **show running-config**
8. From another network device, attempt to open a Telnet session to the router.

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>line vty</b> <i>line-number</i> [ <i>ending-line-number</i> ]  <b>Example:</b> Router(config)# line vty 0 4	Starts the line configuration command collection mode for the virtual terminal lines (vty) for remote console access. <ul style="list-style-type: none"> <li>• Make sure that you configure all vty lines on your router.</li> </ul> <p><b>Note</b> To verify the number of vty lines on your router, use the <b>line vty ?</b> command.</p>
Step 4	<b>password</b> <i>password</i>  <b>Example:</b> Router(config-line)# password <i>guessagain</i>	Specifies a password on a line.
Step 5	<b>login</b>  <b>Example:</b> Router(config-line)# login	Enables password checking at login.
Step 6	<b>end</b>  <b>Example:</b> Router(config-line)# end	Returns to privileged EXEC mode.

	Command or Action	Purpose
Step 7	<b>show running-config</b>  <b>Example:</b> Router# show running-config	Displays the running configuration file. <ul style="list-style-type: none"> <li>Verify that you properly configured the virtual terminal lines for remote access.</li> </ul>
Step 8	From another network device, attempt to open a Telnet session to the router.  <b>Example:</b> Router# 172.16.74.3 Password:	Verifies that you can remotely access the router and that the virtual terminal line password is correctly configured.

## Examples

The following example shows how to configure virtual terminal lines with a password:

```
!
line vty 0 4
  password guessagain
  login
!
```

## What to Do Next

After you configure the vty lines, follow these steps:

- (Optional) To encrypt the virtual terminal line password, see the “Configuring Passwords and Privileges” chapter in *Cisco IOS Security Configuration Guide*. Also see the [Cisco IOS Password Encryption Facts](#) tech note.
- (Optional) To secure the VTY lines with an access list, see “Part 3: Traffic Filtering and Firewalls” in the *Cisco IOS Security Configuration Guide*.

## Configuring the Auxiliary Line

This section describes how to enter line configuration mode for the auxiliary line. How you configure the auxiliary line depends on your particular implementation of the auxiliary (AUX) port. See the following documents for information on configuring the auxiliary line:

*Configuring a Modem on the AUX Port for EXEC Dialin Connectivity*, tech note  
[http://www.cisco.com/en/US/tech/tk801/tk36/technologies\\_tech\\_note09186a0080094bbc.shtml](http://www.cisco.com/en/US/tech/tk801/tk36/technologies_tech_note09186a0080094bbc.shtml)

*Configuring Dialout Using a Modem on the AUX Port*, sample configuration  
[http://www.cisco.com/en/US/tech/tk801/tk36/technologies\\_configuration\\_example09186a0080094579.shtml](http://www.cisco.com/en/US/tech/tk801/tk36/technologies_configuration_example09186a0080094579.shtml)

*Configuring AUX-to-AUX Port Async Backup with Dialer Watch*, sample configuration  
[http://www.cisco.com/en/US/tech/tk801/tk36/technologies\\_configuration\\_example09186a0080093d2b.shtml](http://www.cisco.com/en/US/tech/tk801/tk36/technologies_configuration_example09186a0080093d2b.shtml)

*Modem-Router Connection Guide*, tech note  
[http://www.cisco.com/en/US/tech/tk801/tk36/technologies\\_tech\\_note09186a008009428b.shtml](http://www.cisco.com/en/US/tech/tk801/tk36/technologies_tech_note09186a008009428b.shtml)

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **line aux 0**
4. See the tech notes and sample configurations to configure the line for your particular implementation of the AUX port.

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>line aux 0</b>  <b>Example:</b> Router(config)# line aux 0	Starts the line configuration command collection mode for the auxiliary line.
Step 4	See the tech notes and sample configurations to configure the line for your particular implementation of the AUX port.	—

## Verifying Network Connectivity

This section describes how to verify network connectivity for your router.

### Prerequisites

- Complete all previous configuration tasks in this document.
- The router must be connected to a properly configured network host.

## SUMMARY STEPS

1. **enable**
2. **ping** [*ip-address* | *hostname*]
3. **telnet** {*ip-address* | *hostname*}

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>ping</b> [ <i>ip-address</i>   <i>hostname</i> ]  <b>Example:</b> Router# ping 172.16.74.5	Diagnoses initial network connectivity. <ul style="list-style-type: none"> <li>To verify connectivity, ping the next hop router or connected host for each configured interface to.</li> </ul>
Step 3	<b>telnet</b> { <i>ip-address</i>   <i>hostname</i> }  <b>Example:</b> Router# telnet 10.20.30.40	Logs in to a host that supports Telnet. <ul style="list-style-type: none"> <li>If you want to test the vty line password, perform this step from a different network device, and use your router's IP address.</li> </ul>

## Examples

The following display shows sample output for the ping command when you ping the IP address 192.168.7.27:

```
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
```

The following display shows sample output for the ping command when you ping the IP hostname *username1*:

```
Router# ping username1

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
```

## Saving Your Router Configuration

This section describes how to avoid losing your configuration at the next system reload or power cycle by saving the running configuration to the startup configuration in NVRAM. The NVRAM provides 256KB of storage on the router.

### SUMMARY STEPS

1. **enable**
2. **copy running-config startup-config**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>copy running-config startup-config</b>  <b>Example:</b> Router# copy running-config startup-config	Saves the running configuration to the startup configuration.

## Saving Backup Copies of Configuration and System Image

To aid file recovery and minimize downtime in case of file corruption, we recommend that you save backup copies of the startup configuration file and the Cisco IOS software system image file on a server.

### SUMMARY STEPS

1. **enable**
2. **copy nvram:startup-config {ftp: | rcp: | tftp:}**
3. **show {flash0 | flash1}:**
4. **copy {flash0 | flash1}: {ftp: | rcp: | tftp:}**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>copy nvram:startup-config {ftp:   rcp:   tftp:}</b>  <b>Example:</b> Router# copy nvram:startup-config ftp:	Copies the startup configuration file to a server. <ul style="list-style-type: none"> <li>The configuration file copy can serve as a backup copy.</li> <li>Enter the destination URL when prompted.</li> </ul>
Step 3	<b>show {flash0   flash1}:</b>  <b>Example:</b> Router# show {flash0 flash1}:	Displays the layout and contents of a flash memory file system. <ul style="list-style-type: none"> <li>Learn the name of the system image file.</li> </ul>
Step 4	<b>copy {flash0   flash1}: {ftp:   rcp:   tftp:}</b>  <b>Example:</b> Router# copy {flash0 flash1}: ftp:	Copies a file from flash memory to a server. <ul style="list-style-type: none"> <li>Copy the system image file to a server to serve as a backup copy.</li> <li>Enter the filename and destination URL when prompted.</li> </ul>

## Examples

**Copying the Startup Configuration to a TFTP Server: Example**

The following example shows the startup configuration being copied to a TFTP server:

```
Router# copy nvram:startup-config tftp:

Remote host[]? 172.16.101.101

Name of configuration file to write [rtr2-config]? <cr>
Write file rtr2-config on host 172.16.101.101?[confirm] <cr>
![OK]
```

**Copying from Flash Memory to a TFTP Server: Example**

The following example shows the use of the **show {flash0|flash1}:** command in privileged EXEC to learn the name of the system image file and the use of the **copy {flash0|flash1}: tftp:** privileged EXEC command to copy the system image (c3900-2is-mz) to a TFTP server. The router uses the default username and password.

```
Router# show {flash0|flash1}:

System flash directory:
File Length Name/status
1 4137888 c3900-c2is-mz
[4137952 bytes used, 12639264 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)\

Router# copy {flash0|flash1}: tftp:

IP address of remote host [255.255.255.255]? 172.16.13.110
```

```
filename to write on tftp host? c3600-c2is-mz  
writing c3900-c2is-mz !!!!!...  
successful ftp write.
```