

# Default Configuration

When you boot up the router, the router looks for a default file name-the PID of the router. For example, the Cisco 1100 Terminal Server Gateway look for a file named c1100.cfg. The device looks for this file before finding the standard files-router-confg or the ciscortr.cfg.

The device looks for the c1100.cfg file in the bootflash. If the file is not found in the bootflash, the router then looks for the standard files-router-confg and ciscortr.cfg. If none of the files are found, the router then checks for any inserted USB that may have stored these files in the same particular order.

**Note** If there is a configuration file with the PID as its name in an inserted USB, but one of the standard files are in bootflash, the system finds the standard file for use.

Use the **show running-config** command to view the initial configuration, as shown in the following example:

```
Router# show running-config
Building configuration... Current configuration : 977 bytes !
                   version 15.3
                   service timestamps debug datetime msec
                   service timestamps log datetime msec
                   no platform punt-keepalive disable-kernel-core
                   !
page21image1612800
hostname Router
!
boot-start-marker
boot-end-marker
!
!
vrf definition Mgmt-intf
!
address-family ipv4
exit-address-family
!
address-family ipv6
exit-address-family
!
!
no aaa new-model
!
ipv6 multicast rpf use-bgp
!
!
multilink bundle-name authenticated
```

```
!
!
redundancy
mode none
!
interface GigabitEthernet0/0/0
no ip address
negotiation auto
!
interface GigabitEthernet0/0/1
no ip address
negotiation auto
!
interface GigabitEthernet0/0/2
no ip address
negotiation auto
!
interface GigabitEthernet0/0/3
no ip address
negotiation auto
!
interface GigabitEthernet0/0/4
no ip address
negotiation auto
interface GigabitEthernet0/0/5
no ip address
negotiation auto

!

ip forward-protocol nd
!
no ip http server
no ip http secure-server
!
!
control-plane
!
!
line con 0
stopbits 1
line vty 0 4
login

end
```


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# Configuring Global Parameters

To configure the global parameters for your router, follow these steps.

### SUMMARY STEPS

1. **configure terminal**
2. **hostname** *name*
3. **enable secret** *password*
4. **no ip domain-lookup**

### DETAILED STEPS

**Procedure**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **configure terminal**<br>**Example:**<br>`Router> enable`<br>`Router# configure terminal`<br>`Router(config)#` | Enters global configuration mode when using the console port.<br>Use the following to connect to the router with a remote terminal:<br>`telnet router-name or address`<br>`Login: login-id`<br>`Password: *********`<br>`Router> enable` |
| **Step 2** | **hostname** *name*<br>**Example:**<br>`Router(config)# hostname Router` | Specifies the name for the router. |
| **Step 3** | **enable secret** *password*<br>**Example:**<br>`Router(config)# enable secret cr1ny5ho` | Specifies an encrypted password to prevent unauthorized access to the router. |
| **Step 4** | **no ip domain-lookup**<br>**Example:**<br>`Router(config)# no ip domain-lookup` | Disables the router from translating unfamiliar words (typos) into IP addresses.<br>For complete information on global parameter commands, see the Cisco IOS Release Configuration Guide documentation set. |

# Configuring Gigabit Ethernet Interfaces

To manually define onboard Gigabit Ethernet interfaces, follow these steps, beginning from global configuration mode.

### SUMMARY STEPS

1. **interface gigabitethernet** *slot/bay/port*
2. **ip address** *ip-address mask*
3. **ipv6 address** *ipv6-address/prefix*

4. **no shutdown**
5. **exit**

**DETAILED STEPS**

**Procedure**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **interface gigabitethernet** *slot/bay/port*<br>**Example:**<br>`Router(config)# interface gigabitethernet 0/0/1` | Enters the configuration mode for a Gigabit Ethernet interface on the router. |
| **Step 2** | **ip address** *ip-address mask*<br>**Example:**<br>`Router(config-if)# ip address 192.168.12.2 255.255.255.0` | Sets the IP address and subnet mask for the specified Gigabit Ethernet interface. Use this Step if you are configuring an IPv4 address. |
| **Step 3** | **ipv6 address** *ipv6-address/prefix*<br>**Example:**<br>`Router(config-if)# ipv6 address 2001.db8::ffff:1/128` | Sets the IPv6 address and prefix for the specified Gigabit Ethernet interface. Use this step instead of Step 2, if you are configuring an IPv6 address. |
| **Step 4** | **no shutdown**<br>**Example:**<br>`Router(config-if)# no shutdown` | Enables the Gigabit Ethernet interface and changes its state from administratively down to administratively up. |
| **Step 5** | **exit**<br>**Example:**<br>`Router(config-if)# exit` | Exits configuration mode for the Gigabit Ethernet interface and returns to privileged EXEC mode. |

# Configuring a Loopback Interface

**Before you begin**

The loopback interface acts as a placeholder for the static IP address and provides default routing information.

To configure a loopback interface, follow these steps.

**SUMMARY STEPS**

1. **interface** *type number*
2. (Option 1) **ip address** *ip-address mask*

3. (Option 2) **ipv6 address** *ipv6-address/prefix*
4. **exit**

## DETAILED STEPS

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **interface** *type number*<br>**Example:**<br>`Router(config)# interface Loopback 0` | Enters configuration mode on the loopback interface. |
| **Step 2** | (Option 1) **ip address** *ip-address mask*<br>**Example:**<br>`Router(config-if)# ip address 10.108.1.1 255.255.255.0` | Sets the IP address and subnet mask on the loopback interface. (If you are configuring an IPv6 address, use the **ipv6 address** *ipv6-address/prefix* command described below. |
| **Step 3** | (Option 2) **ipv6 address** *ipv6-address/prefix*<br>**Example:**<br>`Router(config-if)# 2001:db8::ffff:1/128` | Sets the IPv6 address and prefix on the loopback interface. |
| **Step 4** | **exit**<br>**Example:**<br>`Router(config-if)# exit` | Exits configuration mode for the loopback interface and returns to global configuration mode. |

### Example

#### Verifying Loopback Interface Configuration

The loopback interface in this sample configuration is used to support Network Address Translation (NAT) on the virtual-template interface. This configuration example shows the loopback interface configured on the Gigabit Ethernet interface with an IP address of 192.0.2.0/24, which acts as a static IP address. The loopback interface points back to virtual-template1, which has a negotiated IP address.

```
!
interface loopback 0
ip address 192.0.2.0 255.255.255.0 (static IP address)
ip nat outside
!
interface Virtual-Template1
ip unnumbered loopback0
no ip directed-broadcast
ip nat outside
```

Enter the **show interface loopback** command. You should see an output similar to the following example:

```
Router# show interface loopback 0
Loopback0 is up, line protocol is up
  Hardware is Loopback
  Internet address is 200.200.100.1/24
  MTU 1514 bytes, BW 8000000 Kbit, DLY 5000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation LOOPBACK, loopback not set
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/0, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

Alternatively, use the **ping** command to verify the loopback interface, as shown in the following example:

```
Router# ping 192.0.2.0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.0.2.0, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
```

# Configuring Module Interfaces

For detailed information about configuring service modules, see "Service Modules" in the "Service Module Management" section of the Cisco Service Module Configuration Guide.

# Enabling Cisco Discovery Protocol

Cisco Discovery Protocol (CDP) is enabled by default on the router.

For more information on using CDP, see Cisco Discovery Protocol Configuration Guide.

# Configuring Command-Line Access

To configure parameters to control access to the router, follow these steps.

### SUMMARY STEPS

1. **line** [| **console** | **tty** | **vty**] *line-number*
2. **password** *password*
3. **login**
4. **exec-timeout** *minutes* [*seconds*]
5. **exit**

6. **line** [| **console** | **tty** | **vty**] *line-number*
7. **password** *password*
8. **login**
9. **end**

## DETAILED STEPS

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **line** [| **console** | **tty** | **vty**] *line-number*<br>**Example:**<br>`Router(config)# line console 0` | Enters line configuration mode, and specifies the type of line.<br>The example provided here specifies a console terminal for access. |
| **Step 2** | **password** *password*<br>**Example:**<br>`Router(config-line)# password 5dr4Hepw3` | Specifies a unique password for the console terminal line. |
| **Step 3** | **login**<br>**Example:**<br>`Router(config-line)# login` | Enables password checking at terminal session login. |
| **Step 4** | **exec-timeout** *minutes* [*seconds*]<br>**Example:**<br>`Router(config-line)# exec-timeout 5 30`<br>`Router(config-line)#` | Sets the interval during which the EXEC command interpreter waits until user input is detected. The default is 10 minutes. Optionally, adds seconds to the interval value.<br>The example provided here shows a timeout of 5 minutes and 30 seconds. Entering a timeout of **0 0** specifies never to time out. |
| **Step 5** | **exit**<br>**Example:**<br>`Router(config-line)# exit` | Exits line configuration mode to re-enter global configuration mode. |
| **Step 6** | **line** [| **console** | **tty** | **vty**] *line-number*<br>**Example:**<br>`Router(config)# line vty 0 4`<br>`Router(config-line)#` | Specifies a virtual terminal for remote console access. |
| **Step 7** | **password** *password*<br>**Example:**<br>`Router(config-line)# password aldf2ad1` | Specifies a unique password for the virtual terminal line. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 8** | **login**<br>**Example:**<br>`Router(config-line)# login` | Enables password checking at the virtual terminal session login. |
| **Step 9** | **end**<br>**Example:**<br>`Router(config-line)# end` | Exits line configuration mode, and returns to privileged EXEC mode. |

### Example

The following configuration shows the command-line access commands.

You do not have to input the commands marked **default**. These commands appear automatically in the configuration file that is generated when you use the **show running-config** command.

```
!
line console 0
exec-timeout 10 0
password 4youreyesonly
login
transport input none (default)
stopbits 1 (default)
line vty 0 4
password secret
login
!
```

# Configuring Static Routes

Static routes provide fixed routing paths through the network. They are manually configured on the router. If the network topology changes, the static route must be updated with a new route. Static routes are private routes unless they are redistributed by a routing protocol.

To configure static routes, follow these steps.

### SUMMARY STEPS

1. (Option 1) **ip route** *prefix mask* {*ip-address* | *interface-type interface-number* [*ip-address*]}
2. (Option 2) **ipv6 route** *prefix/mask* {*ipv6-address* | *interface-type interface-number* [*ipv6-address*]}
3. **end**

## DETAILED STEPS

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | (Option 1) **ip route** *prefix mask* {*ip-address* \| *interface-type interface-number* [*ip-address*]}<br>**Example:**<br>`Router(config)# ip route 192.168.1.0 255.255.0.0 10.10.10.2` | Specifies a static route for the IP packets. (If you are configuring an IPv6 address, use the **ipv6 route** command described below.) |
| **Step 2** | (Option 2) **ipv6 route** *prefix/mask* {*ipv6-address* \| *interface-type interface-number* [*ipv6-address*]}<br>**Example:**<br>`Router(config)# ipv6 route 2001:db8:2::/64` | Specifies a static route for the IP packets. |
| **Step 3** | **end**<br>**Example:**<br>`Router(config)# end` | Exits global configuration mode and enters privileged EXEC mode. |

### Verifying Configuration

In the following configuration example, the static route sends out all IP packets with a destination IP address of 192.168.1.0 and a subnet mask of 255.255.255.0 on the Gigabit Ethernet interface to another device with an IP address of 10.10.10.2. Specifically, the packets are sent to the configured PVC.

You do not have to enter the command marked **default**. This command appears automatically in the configuration file generated when you use the **running-config** command.

```
!
ip classless (default)
ip route 192.168.1.0 255.255.255.0
```

To verify that you have configured static routing correctly, enter the **show ip route** command (or **show ipv6 route** command) and look for static routes marked with the letter S.

When you use an IPv4 address, you should see verification output similar to the following:

```
Router# show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set
```

```
     10.0.0.0/24 is subnetted, 1 subnets
C       10.108.1.0 is directly connected, Loopback0
S*   0.0.0.0/0 is directly connected, FastEthernet0
```

When you use an IPv6 address, you should see verification output similar to the following:

```
Router# show ipv6 route
IPv6 Routing Table - default - 5 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, R - RIP, H - NHRP, I1 - ISIS L1
       I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP
       EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE -
Destination
       NDr - Redirect, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1
       OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       ls - LISP site, ld - LISP dyn-EID, a - Application

C   2001:DB8:3::/64 [0/0]
       via GigabitEthernet0/0/2, directly connected
S   2001:DB8:2::/64 [1/0]
       via 2001:DB8:3::1
```

# Configuring Dynamic Routes

In dynamic routing, the network protocol adjusts the path automatically, based on network traffic or topology. Changes in dynamic routes are shared with other routers in the network.

A router can use IP routing protocols, such as Routing Information Protocol (RIP) or Enhanced Interior Gateway Routing Protocol (EIGRP), to learn about routes dynamically.

- Configuring Routing Information Protocol, on page 10
- Configuring Enhanced Interior Gateway Routing Protocol, on page 13

# Configuring Routing Information Protocol

To configure the RIP on a router, follow these steps.

### SUMMARY STEPS

1. **router rip**
2. **version** {**1** | **2**}
3. **network** *ip-address*
4. **no auto-summary**
5. **end**

## DETAILED STEPS

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **router rip**<br>**Example:**<br>`Router(config)# router rip` | Enters router configuration mode, and enables RIP on the router. |
| **Step 2** | **version** {**1** \| **2**}<br>**Example:**<br>`Router(config-router)# version 2` | Specifies use of RIP version 1 or 2. |
| **Step 3** | **network** *ip-address*<br>**Example:**<br>`Router(config-router)# network 192.168.1.1`<br>`Router(config-router)# network 10.10.7.1` | Specifies a list of networks on which RIP is to be applied, using the address of the network of each directly connected network. |
| **Step 4** | **no auto-summary**<br>**Example:**<br>`Router(config-router)# no auto-summary` | Disables automatic summarization of subnet routes into network-level routes. This allows subprefix routing information to pass across classful network boundaries. |
| **Step 5** | **end**<br>**Example:**<br>`Router(config-router)# end` | Exits router configuration mode, and enters privileged EXEC mode. |

### Example

#### Verifying Configuration

The following configuration example shows RIP Version 2 enabled in IP networks 10.0.0.0 and 192.168.1.0. To see this configuration, use the **show running-config** command from privileged EXEC mode.

```
!
Router# show running-config
Building configuration... Current configuration : 977 bytes !
                  version 15.3
                  service timestamps debug datetime msec
                  service timestamps log datetime msec
                  no platform punt-keepalive disable-kernel-core
                  !
page21image1612800
hostname Router
!
```

```
boot-start-marker
boot-end-marker
!
!
vrf definition Mgmt-intf
!
address-family ipv4
exit-address-family
!
address-family ipv6
exit-address-family
!
!
no aaa new-model
!
ipv6 multicast rpf use-bgp
!
!
multilink bundle-name authenticated
!
!
redundancy
mode none
!
interface GigabitEthernet0/0/0
no ip address
negotiation auto
!
interface GigabitEthernet0/0/1
no ip address
negotiation auto
!
interface GigabitEthernet0/0/2
no ip address
negotiation auto
!
interface GigabitEthernet0/0/3
no ip address
negotiation auto
!
interface GigabitEthernet0/0/4
no ip address
negotiation auto
interface GigabitEthernet0/0/5
no ip address
negotiation auto

!

ip forward-protocol nd
!
no ip http server
no ip http secure-server
!
!
control-plane
!
!
line con 0
stopbits 1
line vty 0 4
login

end
```

To verify that you have configured RIP correctly, enter the **show ip route** command and look for RIP routes marked with the letter R. You should see an output similar to the one shown in the following example:

```
Router# show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 1 subnets
C       10.108.1.0 is directly connected, Loopback0
R    3.0.0.0/8 [120/1] via 2.2.2.1, 00:00:02, Ethernet0/0/0
```

# Configuring Enhanced Interior Gateway Routing Protocol

To configure Enhanced Interior Gateway Routing Protocol (EIGRP), follow these steps.

### SUMMARY STEPS

1. **router eigrp** *as-number*
2. **network** *ip-address*
3. **end**

### DETAILED STEPS

**Procedure**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **router eigrp** *as-number*<br>**Example:**<br>`Router(config)# router eigrp 109` | Enters router configuration mode, and enables EIGRP on the router. The autonomous-system number identifies the route to other EIGRP routers and is used to tag the EIGRP information. |
| **Step 2** | **network** *ip-address*<br>**Example:**<br>`Router(config)# network 192.168.1.0`<br>`Router(config)# network 10.10.12.115` | Specifies a list of networks on which EIGRP is to be applied, using the IP address of the network of directly connected networks. |
| **Step 3** | **end**<br>**Example:**<br>`Router(config-router)# end` | Exits router configuration mode, and enters privileged EXEC mode. |

### Example

### Verifying the Configuration

The following configuration example shows the EIGRP routing protocol enabled in IP networks 192.168.1.0 and 10.10.12.115. The EIGRP autonomous system number is 109. To see this configuration, use the **show running-config** command.

```
Router# show running-config
.
.
.
!
router eigrp 109
 network 192.168.1.0
  network 10.10.12.115
!
.
.
.
```

To verify that you have configured IP EIGRP correctly, enter the **show ip route** command, and look for EIGRP routes marked by the letter D. You should see verification output similar to the following:

```
Router# show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 1 subnets
C       10.108.1.0 is directly connected, Loopback0
D     3.0.0.0/8 [90/409600] via 2.2.2.1, 00:00:02, Ethernet0/0
```