Basic Router Configuration

This chapter provides procedures for configuring the basic parameters of your Cisco router, including global parameter settings, routing protocols, interfaces, and command-line access. It also describes the default configuration on startup. Note that individual router models may not support every feature described throughout this guide. Features not supported by a particular router are indicated whenever possible.

This chapter contains the following sections:

Each section includes a configuration example and verification steps, as available.

For complete information on how to access global configuration mode, see the "Entering Global Configuration Mode" section in Appendix A, "Cisco IOS Basic Skills." For more information on the commands used in the following tables, see the Cisco IOS Release 12.3 documentation set.

Interface Port Labels

Table 1 lists the interfaces supported for each router and their associated port labels on the equipment.

Table 1 Supported Interfaces and Associated Port Labels by Cisco Router

Router	Interface	Port Label
Cisco 1801	Fast Ethernet LANs	SWITCH and FE8–FE5 (top), FE x and FE4–FE1 (bottom)
	Fast Ethernet WANs	FE0
	ATM WAN	ADSLoPOTS
	Wireless LAN	LEFT, RIGHT/PRIMARY
	BRI	ISDN S/T

Table 1 Supported Interfaces and Associated Port Labels by Cisco Router (continued)

Router	Interface	Port Label
Cisco 1802	Fast Ethernet LANs	SWITCH and FE8–FE5 (top), FE x and FE4–FE1 (bottom)
	Fast Ethernet WANs	FE0
	ATM WAN	ADSLoISDN
	Wireless LAN	LEFT, RIGHT/PRIMARY
	BRI	ISDN S/T
Cisco 1803	Fast Ethernet LANs	SWITCH and FE8–FE5 (top), FE x and FE4–FE1 (bottom)
	Fast Ethernet WANs	FE0
	ATM WAN	G.SHDSL
	Wireless LAN	LEFT, RIGHT/PRIMARY
	BRI	ISDN S/T
Cisco 1811	Fast Ethernet LANs	SWITCH and FE9–FE6 (top), FE x and FE5–FE2 (bottom)
	Fast Ethernet WANs	FE0–FE1
	Wireless LAN	LEFT, RIGHT/PRIMARY
	USB	1–0
	V.92	MODEM
Cisco 1812	Fast Ethernet LANs	SWITCH and FE9–FE6 (top), FE x and FE5–FE2 (bottom)
	Fast Ethernet WANs	FE0–FE1
	Wireless LAN	LEFT, RIGHT/PRIMARY
	BRI	ISDN S/T
	USB	1–0

Viewing the Default Configuration

When you first boot up your Cisco router, some basic configuration has already been performed. All of the LAN and WAN interfaces have been created, console and VTY ports are configured, and the inside interface for Network Address Translation has been assigned. Use the **show running-config** command to view the initial configuration, as shown in Example 1.

Note If you are unable to view the initial configuration and you get a No Password Set error message, you must reset the initial password. For details, see the "Recovering a Lost Password" section in Chapter 14, "Troubleshooting".

Example 1 Cisco 1812 Default Configuration on Startup

```
version 12.3
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
no aaa new-model
ip subnet-zero
!
ip cef
!
ip ips po max-events 100
no ftp-server write-enable
!
interface BRI0
 no ip address
 shutdown
!
interface FastEthernet0
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface FastEthernet1
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface FastEthernet2
 no ip address
 shutdown
!
interface FastEthernet3
 no ip address
 shutdown
!
interface FastEthernet4
 no ip address
 shutdown
!
interface FastEthernet5
 no ip address
 shutdown
!
interface FastEthernet6
 no ip address
 shutdown
!
interface FastEthernet7
 no ip address
 shutdown
!
```

```
interface FastEthernet8
 no ip address
 shutdown
!
interface FastEthernet9
 no ip address
 shutdown
!
interface Vlan1
 no ip address
!
ip classless
!
no ip http server
no ip http secure-server
!
control-plane
!
line con 0
line aux 0
line vty 0 4
!
no scheduler allocate
end
```

Information Needed for Configuration

You need to gather some or all of the following information, depending on your planned network scenario, prior to configuring your network

- If you are setting up an Internet connection, gather the following information:
  - Point-to-Point Protocol (PPP) client name that is assigned as your login name
  - PPP authentication type: Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP)
  - PPP password to access your Internet service provider (ISP) account
  - DNS server IP address and default gateways
- If you are setting up a connection to a corporate network, you and the network administrator must generate and share the following information for the WAN interfaces of the routers:
  - PPP authentication type: CHAP or PAP
  - PPP client name to access the router
  - PPP password to access the router
- If you are setting up IP routing:
  - Generate the addressing scheme for your IP network.
  - Determine the IP routing parameter information, including IP address, and ATM permanent virtual circuits (PVCs). These PVC parameters are typically virtual path identifier (VPI), virtual circuit identifier (VCI), and traffic shaping parameters.
  - Determine the number of PVCs that your service provider has given you, along with their VPIs and VCIs.
  - For each PVC determine the type of AAL5 encapsulation supported. It can be one of the following:

AAL5SNAP—This can be either routed RFC 1483 or bridged RFC 1483. For routed RFC 1483, the service provider must provide you with a static IP address. For bridged RFC 1483, you may use DHCP to obtain your IP address, or you may obtain a static IP address from your service provider.

AAL5MUX PPP—With this type of encapsulation, you need to determine the PPP-related configuration items.

- If you plan to connect over an ADSL or G.SHDSL line:
  - Order the appropriate line from your public telephone service provider.

    For ADSL lines—Ensure that the ADSL signaling type is DMT (also called ANSI T1.413) or DMT Issue 2.

    For G.SHDSL lines—Verify that the G.SHDSL line conforms to the ITU G.991.2 standard and supports Annex A (North America) or Annex B (Europe).

    Once you have collected the appropriate information, you can perform a full configuration on your router, beginning with the tasks in the "Configuring Basic Parameters" section.

Configuring Basic Parameters

To configure the router, perform one or more of these tasks:

- Configure Global Parameters
- Configure Fast Ethernet LAN Interfaces
- Configure WAN Interfaces
- Configuring a Loopback Interface
- Configuring Command-Line Access to the Router

A configuration example is presented with each task to show the network configuration following completion of that task.

Configure Global Parameters

Perform these steps to configure selected global parameters for your router:

	Command	Purpose

Step 1	**configure terminal**
	
	Example:
	`Router> enable`
	`Router# configure terminal`
	`Router(config)#`
		Enters global configuration mode, when using the console port.
		
		If you are connecting to the router using a remote terminal, use the following:
		`telnet router name or address`
		`Login: login id`
		`Password: *********`
		`Router> enable`

Step 2	**hostname** *name*
	
	Example:
	`Router(config)# hostname Router`
	`Router(config)#`
		Specifies the name for the router.

Step 3	**enable secret** *password*
	
	Example:
	`Router(config)# enable secret cr1ny5ho`
	`Router(config)#`
		Specifies an encrypted password to prevent unauthorized access to the router.

Step 4	**no ip domain-lookup**
	
	Example:
	`Router(config)# no ip domain-lookup`
	`Router(config)#`
		Disables the router from translating unfamiliar words (typos) into IP addresses.

For complete information on the global parameter commands, see the Cisco IOS Release 12.3 documentation set.

Configure Fast Ethernet LAN Interfaces

The Fast Ethernet LAN interfaces on your router are automatically configured as part of the default VLAN and as such, they are not configured with individual addresses. Access is afforded through the VLAN. You may assign the interfaces to other VLANs if desired. For more information about creating VLANs, see Chapter 5, “Configuring a LAN with DHCP and VLANs.”

Configure WAN Interfaces

The Cisco 1811 and Cisco 1812 routers each have two Fast Ethernet interfaces for WAN connection. The Cisco 1801, Cisco 1802, and Cisco 1803 routers each have one ATM interface for WAN connection.

Based on the router model you have, configure the WAN interface(s) using one of the following procedures:

- Configure the Fast Ethernet WAN Interface
- Configure the ATM WAN Interface

Configure the Fast Ethernet WAN Interface

This procedure applies only to the Cisco 1811 and Cisco 1812 router models. Perform these steps to configure the Fast Ethernet interfaces, beginning in global configuration mode.

	Command	Purpose

Step 1	**interface** *type number*
	
	Example:
	`Router(config)#interface fastethernet 0`
	`Router(config-int)#`
		Enters the configuration mode for a Fast Ethernet WAN interface on the router.
		
		Note Fast Ethernet WAN ports are numbered 0–1 on the Cisco 1800 series routers.

Step 2	**ip address** *ip-address mask*
	
	Example:
	`Router(config-int)# ip address 192.1.12.2 255.255.255.0`
	`Router(config-int)#`
		Sets the IP address and subnet mask for the specified Fast Ethernet interface.

Step 3	**no shutdown**
	
	Example:
	`Router(config-int)# no shutdown`
	`Router(config-int)#`
		Enables the Ethernet interface, changing its state from administratively down to administratively up.

Step 4	**exit**
	
	Example:
	`Router(config-int)# exit`
	`Router(config)#`
		Exits interface configuration mode and returns to global configuration mode.

Repeat these steps for the other Fast Ethernet WAN interface if desired.

Configure the ATM WAN Interface

This procedure applies only to the Cisco 1801, Cisco 1802, and Cisco 1803 models.

Perform these steps to configure the ATM interface, beginning in global configuration mode:

	Command	Purpose

Step 1	***For the Cisco 1803 only:***
	controller dsl 0
	mode atm
	exit
	
	Example:
	`Router(config)# controller dsl 0`
	`Router(config-controller)# mode atm`
	`Router(config-controller)# exit`
	`Router(config)#`
		For routers using the G.SHDSL signaling, perform these commands. Ignore this step for routers using ADSL signaling.

Step 2	**interface** *type number*
	
	Example:
	`Router(config)# interface atm0`
	`Router(config-int)#`
		Enters interface configuration mode.

Step 3	**ip address** *ip-address mask*
	
	Example:
	`Router(config-int)# ip address 200.200.100.1 255.255.255.0`
	`Router(config-int)#`
		Sets the IP address and subnet mask for the ATM interface.

Step 4	**no shutdown**
	
	Example:
	`Router(config-int)# no shutdown`
	`Router(config-int)#`
		Enables the ATM 0 interface.

Step 5	**exit**
	
	Example:
	`Router(config-int)# exit`
	`Router(config)#`
		Exits interface configuration mode and returns to global configuration mode.

Configure the Wireless Interface

The wireless interface enables connection to the router through a wireless LAN connection. For more information about configuring a wireless connection, see Chapter 9, "Configuring a Wireless LAN Connection" and the *Cisco Access Router Wireless Configuration Guide*.

Configuring a Loopback Interface

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

For complete information on the loopback commands, see the Cisco IOS Release 12.3 documentation set.

Perform these steps to configure a loopback interface:

	Command	Purpose

Step 1	**interface** *type number*
	
	Example:
	`Router(config)# interface Loopback 0`
	`Router(config-int)#`
		Enters interface configuration mode.

Step 2	**ip address** *ip-address mask*
	
	Example:
	`Router(config-int)# ip address 10.108.1.1 255.255.255.0`
	`Router(config-int)#`
		Sets the IP address and subnet mask for the loopback interface.

Step 3	**exit**
	
	Example:
	`Router(config-int)# exit`
	`Router(config)#`
		Exits configuration mode for the loopback interface and returns to global configuration mode.

Configuration Example

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 Fast Ethernet interface with an IP address of 200.200.100.1/24, 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 200.200.100.1 255.255.255.0 (static IP address)
ip nat outside
!
interface Virtual-Template1
ip unnumbered loopback0
no ip directed-broadcast
ip nat outside
```

Verifying Your Configuration

To verify that you have properly configured the loopback interface, enter the **show interface loopback** command. You should see verification 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
```

Another way to verify the loopback interface is to ping it:

```
Router# ping 200.200.100.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.100.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
```

Configuring Command-Line Access to the Router

Perform these steps to configure parameters to control access to the router, beginning in global configuration mode:

	Command	Purpose

Step 1	**line** [**aux** | **console** | **tty** | **vty**] *line-number*
	
	Example:
	`Router(config)# line console 0`
	`Router(config)#`
		Enters line configuration mode, and specifies the type of line.
		
		This example specifies a console terminal for access.

Step 2	**password** *password*
	
	Example:
	`Router(config)# password 5dr4Hepw3`
	`Router(config)#`
		Specifies a unique password for the console terminal line.

	Command	Purpose

Step 3	**login**
	
	Example:
	`Router(config)# login`
	`Router(config)#`
		Enables password checking at terminal session login.

Step 4	**exec-timeout** *minutes* [*seconds*]
	
	Example:
	`Router(config)# exec-timeout 5 30`
	`Router(config)#`
		Sets the interval that the EXEC command interpreter waits until user input is detected. The default is 10 minutes. Optionally, add seconds to the interval value.
		
		This example shows a timeout of 5 minutes and 30 seconds. Entering a timeout of 0 0 specifies never to time out.

Step 5	**line** [**aux** | **console** | **tty** | **vty**] *line-number*
	
	Example:
	`Router(config)# line vty 0 4`
	`Router(config)#`
		Specifies a virtual terminal for remote console access.

Step 6	**password** *password*
	
	Example:
	`Router(config)# password aldf2ad1`
	`Router(config)#`
		Specifies a unique password for the virtual terminal line.

Step 7	**login**
	
	Example:
	`Router(config)# login`
	`Router(config)#`
		Enables password checking at the virtual terminal session login.

Step 8	**end**
	
	Example:
	`Router(config)# end`
	`Router#`
		Exits line configuration mode, and returns to privileged EXEC mode.

For complete information about the command line commands, see the Cisco IOS Release 12.3 documentation set.

Configuration Example

The following configuration shows the command-line access commands.

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

```
!
line con 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. Configuring static routes on the Cisco 1800 series routers is optional.

Perform these steps to configure static routes, beginning in global configuration mode:

	Command	Purpose

Step 1	**ip route** *prefix mask* {*ip-address* | *interface-type interface-number* [*ip-address*]}
	
	Example:
	`Router(config)# ip route 192.168.1.0 255.255.0.0 10.10.10.2`
	`Router(config)#`
		Specifies the static route for the IP packets.
		
		For details about this command and additional parameters that can be set, see the *Cisco IOS IP Command Reference, Volume 2 of 4: Routing Protocols*.

Step 2	**end**
	
	Example:
	`Router(config)# end`
	`Router#`
		Exits router configuration mode, and enters privileged EXEC mode.

For complete information on the static routing commands, see the Cisco IOS Release 12.3 documentation set. For more general information on static routing, see Appendix B, "Concepts."

Configuration Example

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 Fast 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 need to enter the commands marked "(**default**)." These commands appear automatically in the configuration file generated when you use the **show running-config** command.

```
!
ip classless (default)
ip route 192.168.1.0 255.255.255.0 10.10.10.2!
```

Verifying Your Configuration

To verify that you have properly configured static routing, enter the **show ip route** command and look for static routes signified by the "S."

You should see verification output similar to 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
S* 0.0.0.0/0 is directly connected, FastEthernet0
```

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.

The Cisco routers can use IP routing protocols, such as Routing Information Protocol (RIP) or Enhanced Interior Gateway Routing Protocol (EIGRP), to learn routes dynamically. You can configure either of these routing protocols on your router.

Configuring RIP

Perform these steps to configure the RIP routing protocol on the router, beginning in global configuration mode:

	Command	Task

Step 1	**router rip**
	
	Example:
	`Router> configure terminal`
	`Router(config)# router rip`
	`Router(config-router)#`
		Enters router configuration mode, and enables RIP on the router.

Step 2	**version** {**1** | **2**}
	
	Example:
	`Router(config-router)# version 2`
	`Router(config-router)#`
		Specifies use of RIP version 1 or 2.

Step 3	**network** *ip-address*
	
	Example:
	`Router(config-router)# network 192.168.1.1`
	`Router(config-router)# network 10.10.7.1`
	`Router(config-router)#`
		Specifies a list of networks on which RIP is to be applied, using the address of the network of directly connected networks.

Step 4	**no auto-summary**
	
	Example:
	`Router(config-router)# no auto-summary`
	`Router(config-router)#`
		Disables automatic summarization of subnet routes into network-level routes. This allows subprefix routing information to pass across classful network boundaries.

Step 5	**end**
	
	Example:
	`Router(config-router)# end`
	`Router#`
		Exits router configuration mode, and enters privileged EXEC mode.

For complete information on the dynamic routing commands, see the Cisco IOS Release 12.3 documentation set. For more general information on RIP, see Appendix B, “Concepts.”

Configuration Example

The following configuration example shows RIP version 2 enabled in IP network 10.0.0.0 and 192.168.1.0.

Execute the **show running-config** command from privileged EXEC mode to see this configuration.

```
!
router rip
 version 2
 network 10.0.0.0
 network 192.168.1.0
 no auto-summary
!
```

Verifying Your Configuration

To verify that you have properly configured RIP, enter the **show ip route** command and look for RIP routes signified by "R." You should see a verification output like the example shown below.

```
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
```

Configuring Enhanced IGRP

Perform these steps to configure Enhanced IGRP (EIGRP), beginning in global configuration mode:

	Command	Purpose

Step 1	**router eigrp** *as-number*
	
	Example:
	`Router(config)# router eigrp 109`
	`Router(config)#`
		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.

	Command	Purpose

Step 2	**network** *ip-address*
	
	Example:
	`Router(config)# network 192.145.1.0`
	`Router(config)# network 10.10.12.115`
	`Router(config)#`
		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**
	
	Example:
	`Router(config-router)# end`
	`Router#`
		Exits router configuration mode, and enters privileged EXEC mode.

For complete information on the IP EIGRP commands, see the Cisco IOS Release 12.3 documentation set. For more general information on EIGRP concepts, see Appendix B, "Concepts."

Configuration Example

The following configuration example shows the EIGRP routing protocol enabled in IP networks 192.145.1.0 and 10.10.12.115. The EIGRP autonomous system number is assigned as 109.

Execute the **show running-config** command from privileged EXEC mode to see this configuration.

```
!
router eigrp 109
    network 192.145.1.0
        network 10.10.12.115
!
```

Verifying Your Configuration

To verify that you have properly configured IP EIGRP, enter the **show ip route** command, and look for EIGRP routes indicated by "D." You should see verification output similar to 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
D    3.0.0.0/8 [90/409600] via 2.2.2.1, 00:00:02, Ethernet0/0
```