Basic Router Configuration

This module provides basic configuration procedures for the Cisco 800M Series ISR and contains the following sections.

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

	Command	Purpose

Step 1	**configure terminal**
	
	Example:
	`Router> enable`
	`Router# configure terminal`
		Enters global configuration mode, when using the console port.

Step 2	**hostname** *name* **Example:** `Router(config)# hostname Router`	Specifies the name for the router.
Step 3	**enable secret** *password* **Example:** `Router(config)# enable secret cr1ny5ho`	Specifies an encrypted password to prevent unauthorized access to the router.
Step 4	**no ip domain-lookup** **Example:** `Router(config)# no ip domain-lookup`	Disables the router from translating unfamiliar words (typos) into IP addresses.

Configuring Gigabit Ethernet WAN Interfaces

You can connect WAN interfaces either by using straight polarity connectors or reversed polarity connectors.

- **Straight Polarity**: If Mag-jack RJ45 connector has a dot or digit marked on front housing, it can be used with any type of cables.
- **Reversed Polarity**: If Mag-jack RJ45 connector has no dots or digit marked on front housing, it can be used with coupler and short cable (Cat5E UTP cable) to connect other devices which doesn't support auto polarity correction.

To configure Gigabit Ethernet (GE) WAN interfaces, follow these steps, beginning in global configuration mode.

SUMMARY STEPS

1. **configure terminal**
2. **interface gigabitethernet** *slot/port*
3. **ip address** *ip-address mask*
4. **no shutdown**
5. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 2	**interface gigabitethernet** *slot/port* **Example:** `Router(config)# interface gigabitethernet 0/8`	Enters the configuration mode for a Gigabit Ethernet interface on the router. **Note** GigabitEthernet WAN Interfaces are 0/8 and 0/9 for Cisco C841M-8X ISR and 0/4 to 0/5 for Cisco C841M-4X
Step 3	**ip address** *ip-address mask* **Example:** `Router(config-if)# ip address 192.168.12.2 255.255.255.0`	Sets the IP address and subnet mask for the specified GE interface.
Step 4	**no shutdown** **Example:** `Router(config-if)# no shutdown`	Enables the GE interface, changing its state from administratively down to administratively up.
Step 5	**exit** **Example:** `Router(config-if)# exit`	Exits configuration mode for the GE interface and returns to global configuration mode.

Configuring a Loopback Interface

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, beginning in global configuration mode.

SUMMARY STEPS

1. **configure terminal**
2. **interface** *type number*
3. **ip address** *ip-address mask*
4. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 2	**interface** *type number* **Example:** `Router(config)# interface Loopback 0`	Enters configuration mode for the loopback interface.
Step 3	**ip address** *ip-address mask* **Example:** `Router(config-if)# ip address 10.108.1.1 255.255.255.0`	Sets the IP address and subnet mask for the loopback interface.
Step 4	**exit** **Example:** `Router(config-if)# exit`	Exits configuration mode for the loopback interface and returns to global configuration mode.

Example: Configuring the Loopback Interface

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 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
ip nat outside
!
interface Virtual-Template1
ip unnumbered loopback0
no ip directed-broadcast
ip nat outside
!
```

Verifying the Loopback Interface Configuration

To verify that you have properly configured the loopback interface, enter the **show interface loopback** command as shown in 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
```

You can lso verify the loopback interface by using the **ping** command as shown in the following example.

```
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 configure parameters to control access to the router, perform the following steps.

SUMMARY STEPS

1. **configure terminal**
2. **line** [**aux** | **console** | **tty** | **vty**] *line-number*
3. **password** *password*
4. **login**
5. **exec-timeout** *minutes* [*seconds*]
6. **line** [**aux** | **console** | **tty** | **vty**] *line-number*
7. **password** *password*
8. **login**
9. **end**

DETAILED STEPS

	Command	Purpose
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 2	**line** [**aux**	**console**	**tty**	**vty**] *line-number* **Example:** `Router(config)# line console 0`	Enters line configuration mode, and specifies the type of line.

	Command	Purpose
Step 3	**password** *password* **Example:** `Router(config)# password 5dr4Hepw3`	Specifies a unique password for the console terminal line.
Step 4	**login** **Example:** `Router(config-line)# login`	Enables password verification at the terminal login session.
Step 5	**exec-timeout** *minutes* [*seconds*] **Example:** `Router(config-line)# exec-timeout 5 30`	Sets the interval that the EXEC command interpreter waits until user input is detected. The default is 10 minutes. You can also optionally add seconds to the interval value.
Step 6	**line** [**aux** | **console** | **tty** | **vty**] *line-number* **Example:** `Router(config-line)# line vty 0 4`	Specifies a virtual terminal for remote console access.
Step 7	**password** *password* **Example:** `Router(config-line)# password aldf2ad1`	Specifies a unique password for the virtual terminal line.
Step 8	**login** **Example:** `Router(config-line)# login`	Enables password verifiation at the virtual terminal login session.
Step 9	**end** **Example:** `Router(config-line)# endRouter#`	Exits line configuration mode, and returns to privileged EXEC mode.

Configuring Gigabit Ethernet LAN Interfaces

To manually configure Gigabit Ethernet (GE) LAN interfaces, follow these steps, beginning in global configuration mode.

SUMMARY STEPS

1. **configure terminal**
2. **interface gigabitethernet** *slot/port*
3. **ip address** *ip-address mask*
4. **no shutdown**
5. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 2	**interface gigabitethernet** *slot/port* **Example:** `Router(config)# interface gigabitethernet 0/1`	Enters the configuration mode for a Gigabit Ethernet interface on the router. **Note** GigabitEthernet LAN Interfaces are 0/0 to 0/7 for Cisco C841M-8X ISR and 0/0 to 0/3 for Cisco C841M-4X ISR.
Step 3	**ip address** *ip-address mask* **Example:** `Router(config-if)# ip address 192.168.12.2 255.255.255.0`	Sets the IP address and subnet mask for the specified GE interface.
Step 4	**no shutdown** **Example:** `Router(config-if)# no shutdown`	Enables the GE interface, changing its state from administratively down to administratively up.
Step 5	**exit** **Example:** `Router(config-if)# exit`	Exits configuration mode for the GE interface and returns to global configuration mode.

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, perform these steps in global configuration mode.

SUMMARY STEPS

1. **configure terminal**
2. **ip route** *prefix mask* {*ip-address* | *interface-type interface-number* [*ip-address*]}
3. **end**

DETAILED STEPS

	Command	Purpose
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 2	**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`	Specifies the static route for the IP packets.
Step 3	**end** **Example:** `Router(config)# end`	Exits router configuration mode, and enters privileged EXEC mode.

Example: Configuring Static Routes

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 need to enter the command marked "(**default**)." This command appears 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 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:

```
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 Routing Information Protocol" section on page 13
- "Configuring Enhanced Interior Gateway Routing Protocol" section on page 15

Configuring Routing Information Protocol

To configure the RIP routing protocol on the router, follow these steps, beginning in global configuration mode.

SUMMARY STEPS

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

DETAILED STEPS

	Command	Task
Step 1	**configure terminal** **Example:** `Router> configure terminal`	Enters global configuration mode.
Step 2	**router rip** **Example:** `Router(config)# router rip`	Enters router configuration mode, and enables RIP on the router.
Step 3	**version** {**1** | **2**} **Example:** `Router(config-router)# version 2`	Specifies use of RIP version 1 or 2.
Step 4	**network** *ip-address* **Example:** `Router(config-router)# network 192.168.1.1`	Specifies a list of networks on which RIP is to be applied, using the address of the network of each directly connected network.
Step 5	**no auto-summary** **Example:** `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 6	**end** **Example:** `Router(config-router)# end`	Exits router configuration mode, and enters privileged EXEC mode.

Example: RIP Configuration

The following configuration example shows RIP version 2 enabled in IP network 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
router rip
 version 2
 network 10.0.0.0
 network 192.168.1.0
 no auto-summary
!
```

Verifying RIP Configuration

To verify that you have properly configured RIP, enter the **show ip route** command and look for RIP routes signified by "R" as shown in this 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
```

Configuring Enhanced Interior Gateway Routing Protocol

To configure Enhanced Interior Gateway Routing Protocol (EGRP), perform these steps.

SUMMARY STEPS

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

DETAILED STEPS

	Command	Purpose
Step 1	**configure terminal** **Example:** `Router> configure terminal`	Enters global configuration mode.
Step 2	**router eigrp** *as-number* **Example:** `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 3	**network** *ip-address* **Example:** `Router(config)# network 192.145.1.0`	Specifies a list of networks on which EIGRP is to be applied, using the IP address of the network of directly connected networks.

	Command	Purpose

Step 4	**end**
	
	Example:
	`Router(config-router)# end`
	`Router#`
		Exits router configuration mode, and enters privileged EXEC mode.

Example: Configuring EIGRP

This 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 109.

To see this configuration use the **show running-config** command, beginning in privileged EXEC mode.

```
Router# show running-config...
!
router eigrp 109
    network 192.145.1.0
        network 10.10.12.115
!
...
```

Verifying EIGRP Configuration

To verify that you have properly configured EIGRP, enter the **show ip route** command, and look for EIGRP routes indicated by "D " as 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
D    3.0.0.0/8 [90/409600] via 2.2.2.1, 00:00:02, Ethernet0/0
```

Configuring Image and Configuration Recovery Using the Push Button

A push or reset button is available on the rear side of the Cisco 800M Series ISR and it is designed to provide a disaster recovery method for the router.

Push button can be useful for recovery during one of the two scenarios:

- During ROMMON initialization
- For loading a specific configuration file without accessing the router IOS prompt after IOS is up and running.

Push Button Behavior During ROMMON Initialization

Table 2-1 shows the high level functionality when the push button is pressed during ROMMON initialization.

Table 2-1 Push Button Functionality During ROMMON Initialization

ROMMON Behavior	IOS Behavior
• Boots using default baud rate. • Performs auto-boot. • Loads the *.default image if available on compact flash	If the configuration named *.cfg is available in NVRAM storage or flash storage, IOS will perform a backup of the original configuration and boots up using this configuration.

Push Button Behavior When IOS is up and Running

If you press the push button for more than three seconds and then release the push button after IOS is up and running, IOS detects this event and looks for configuration files in the order of priority.If the IOS finds the configuration file, it copies the configuration file to the startup configuration file. Then the router reloads itself and the new configuration takes effect. If the configuration files cannot be found, pressing reset button has no effect.

The order of priority in which the router looks for configuration file is given as follows:

1. usbflash0:customer-config.*SN*
2. usbflash0:customer-config
3. flash:customer-config.*SN*
4. flash:customer-config

Note *SN* is the hardware serial number.

Configuring 800M Series ISR using Zero Touch Deployment

The Zero Touch Deployment (ZTD) through USB feature in Cisco 800M Series ISRs is an ease-of-use feature that loads a customized configuration from a USB flash drive. This feature requires that the router has no startup configuration in its nonvolatile RAM (NVRAM). The feature also requires that a valid configuration file, with the filename extension **.cfg**, is stored in the USB flash drive. A valid configuration file can be created by saving the running configuration of a router to flash, USB flash, or to a TFTP Server.

When a router with no startup configuration boots up, it checks for a valid configuration file within the USB flash drive. The pre-requisites for deployment using the Zero Touch Deployment through USB feature are:

- Boot up router with no startup-configuration.
- Cisco USB flash drive inserted in the first available USB slot.

- A valid configuration file in ASCII text with the filename extension **.cfg**

If the USB flash drive has multiple .cfg files, the router chooses the one with the highest index number in the USB Flash drive. To avoid loading an incorrect .cfg file, ensure that there is only one .cfg file in the USB flash drive.

The Cisco 800M Series ISR uses second core and it is actively used in detecting USB flash drive if 3G Wireless WAN module is present on the router. If 3G Wireless WAN module is not present, USB flash drive is detected by the IOS. When 3G Wireless WAN module is present, USB detection is a bit delayed for the Cisco 800M series ISR due to the delay in second core initialization. While system startup is in progress and push button is pressed, a timer is started to check the completion of second core initialization. For some reason if second core takes more time, system reports an error message and continues the normal start up. After second core initialization router waits up to 10 seconds for USB detection and then complete the configuration. In case the USB flash drive does not contain a deployment configuration, router enters the configuration mode.