Basic Router Configuration

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

- Configuring Global Parameters, page 5
- Configuring Gigabit Ethernet WAN Interfaces, page 6
- Configuring a Loopback Interface, page 7
- Configuring Command-Line Access, page 9
- Configuring Gigabit Ethernet LAN Interfaces, page 10
- Configuring Static Routes, page 11
- Configuring Dynamic Routes, page 13
- Configuring Image and Configuration Recovery Using the Push Button, page 16
- Configuring 800M Series ISR using Zero Touch Deployment, page 17

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
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`
### 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.

#### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td><strong>configure terminal</strong>&lt;br&gt;<strong>Example:</strong>&lt;br&gt;Router# configure terminal</td>
</tr>
<tr>
<td>Step 2</td>
<td><strong>interface gigabitethernet slot/port</strong>&lt;br&gt;<strong>Example:</strong>&lt;br&gt;Router(config)# interface gigabitethernet 0/8</td>
</tr>
<tr>
<td>Step 3</td>
<td><strong>ip address ip-address mask</strong>&lt;br&gt;<strong>Example:</strong>&lt;br&gt;Router(config-if)# ip address 192.168.12.2 255.255.255.0</td>
</tr>
<tr>
<td>Step 4</td>
<td><strong>no shutdown</strong>&lt;br&gt;<strong>Example:</strong>&lt;br&gt;Router(config-if)# no shutdown</td>
</tr>
<tr>
<td>Step 5</td>
<td><strong>exit</strong>&lt;br&gt;<strong>Example:</strong>&lt;br&gt;Router(config-if)# exit</td>
</tr>
</tbody>
</table>

#### SUMMARY STEPS

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

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

**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
```
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**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Router# configure terminal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>`line [aux</td>
<td>console</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Router(config)# line console 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Step</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router# <code>configure terminal</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td><code>interface gigabitethernet slot/port</code></td>
<td>Enters the configuration mode for a Gigabit Ethernet interface on the router. <strong>Note</strong> 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.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config)# <code>interface gigabitethernet 0/1</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td><code>ip address ip-address mask</code></td>
<td>Sets the IP address and subnet mask for the specified GE interface.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config-if)# <code>ip address 192.168.12.2 255.255.255.0</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td><code>no shutdown</code></td>
<td>Enables the GE interface, changing its state from administratively down to administratively up.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config-if)# <code>no shutdown</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td><code>exit</code></td>
<td>Exits configuration mode for the GE interface and returns to global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config-if)# <code>exit</code></td>
<td></td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>Router# configure terminal</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>ip route prefix mask {ip-address</td>
<td>interface-type interface-number [ip-address]}</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config)# ip route 192.168.1.0 255.255.0.0 10.10.10.2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3</th>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 3</td>
<td>end</td>
<td>Exits router configuration mode, and enters privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config)# end</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Command</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example: Router&gt; configure terminal</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>router rip</td>
<td>Enters router configuration mode, and enables RIP on the router.</td>
</tr>
<tr>
<td></td>
<td>Example: Router(config)# router rip</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>version {1</td>
<td>2}</td>
</tr>
<tr>
<td></td>
<td>Example: Router(config-router)# version 2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>network ip-address</td>
<td>Specifies a list of networks on which RIP is to be applied, using the address of the network of each directly connected network.</td>
</tr>
<tr>
<td></td>
<td>Example: Router(config-router)# network 192.168.1.1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>no auto-summary</td>
<td>Disables automatic summarization of subnet routes into network-level routes. This allows subprefix routing information to pass across classful network boundaries.</td>
</tr>
<tr>
<td></td>
<td>Example: Router(config-router)# no auto-summary</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>end</td>
<td>Exits router configuration mode, and enters privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td>Example: Router(config-router)# end</td>
<td></td>
</tr>
</tbody>
</table>

### 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.

```plaintext
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**

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>configure terminal</strong></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router&gt; configure terminal</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td><code>router eigrp as-number</code></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config)# router eigrp 109</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td><code>network ip-address</code></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config)# network 192.145.1.0</td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>ROMMON Behavior</th>
<th>IOS Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Boots using default baud rate.</td>
<td>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.</td>
</tr>
<tr>
<td>• Performs auto-boot.</td>
<td></td>
</tr>
<tr>
<td>• Loads the *.default image if available on compact flash</td>
<td></td>
</tr>
</tbody>
</table>

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.