



Basic Router Configuration

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This document provides basic configuration procedures for the Cisco Connected Grid Router 2010. It also includes configuration examples and verification steps, when possible.

Basic Configuration

- [Default Configuration, page 34](#)
- [Configuring Basic Parameters, page 35](#)

Interface Configuration

- [Interface Ports, page 36](#)
- [Configuring Gigabit Ethernet Interfaces, page 36](#)
- [Configuring a Loopback Interface, page 37](#)

Routing Configuration

- [Configuring Command-Line Access, page 39](#)
- [Configuring Static Routes, page 40](#)
- [Configuring Dynamic Routes, page 42](#)
- [Typical Example of a Cisco CGR 2010 Configuration, page 44](#)



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Default Configuration

When you boot up your Cisco router for the first time, you will notice a default configuration has already been performed. 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 : 961 bytes
!
! Last configuration change at 20:41:11 UTC Thu Mar 1 1900
!
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service internal
!
hostname Router
!
boot-start-marker
boot-end-marker
!
!
no aaa new-model
!
no ipv6 cef
ip source-route
ip cef
!
!
!
!
multilink bundle-name authenticated
!
!
!
!
license udi pid CISCOGR2010/K9 sn FHH1338P007
!
!
!
!
!
!
interface GigabitEthernet0/0
ip address 172.25.212.39 255.255.255.128
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
!
ip default-gateway 172.25.212.1
ip forward-protocol nd
!
no ip http server
!
```

```

!
ip route 0.0.0.0 0.0.0.0 172.19.164.1
ip route 0.0.0.0 0.0.0.0 172.25.212.1
!
!
!
!
control-plane
!
!
line con 0
exec-timeout 2 30
line aux 0
line vty 0 4
login
transport input all
!
exception data-corruption buffer truncate
scheduler allocate 20000 1000
end
Router#

```

Configuring Basic Parameters

To configure the basic parameters on the router, perform one or more of the following tasks:

- [Configuring Global Parameters, page 35](#)
- [Interface Ports, page 36](#)
- [Configuring Gigabit Ethernet Interfaces, page 36](#)
- [Configuring Grid Router WAN Interface Cards, page 37](#)
- [Configuring a Loopback Interface, page 37](#)

Configuring Global Parameters

To configure the following global parameters for your router, perform these steps:

	Command	Purpose
Step 1	<p>configure terminal</p> <p>Example:</p> <pre>Router> enable Router# configure terminal Router(config)#</pre>	<p>Enters global configuration mode, when using the console port.</p> <p>Use the following to connect to the router with a remote terminal:</p> <pre>telnet <i>router name or address</i> Login: <i>login id</i> Password: <i>*****</i> Router> enable</pre>
Step 2	<p>hostname <i>name</i></p> <p>Example:</p> <pre>Router(config)# hostname Router Router(config)#</pre>	<p>Specifies the name for the router.</p>

	Command	Purpose
Step 3	enable secret <i>password</i> 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.

Interface Ports

Table 1 lists the interfaces that are supported on the Cisco CGR 2010.

Table 1 Interfaces by Cisco CGR 2010 Router

Slots, Ports, Logical Interface, Interfaces	Cisco CGR 2010
Onboard GE ports	Gi0/0,Gi0/1
Interfaces on GRWIC	<i>interface0/0/port</i> <i>interface0/1/port</i>
Interfaces on GRWIC	<i>interface0/1/port</i>

Configuring Gigabit Ethernet Interfaces

To manually define onboard Gigabit Ethernet interfaces, complete the following steps, in global configuration mode.

	Command	Purpose
Step 1	interface gigabitethernet <i>slot/port</i> Example: Router(config)# interface gigabitethernet 0/1 Router(config-if)#	Enters the configuration mode for a Gigabit Ethernet interface on the router.
Step 2	ip address <i>ip-address mask</i> Example: Router(config-if)# ip address 192.168.12.2 255.255.255.0 Router(config-if)#	Sets the IP address and subnet mask for the specified Gigabit Ethernet interface.

	Command	Purpose
Step 3	media-type {rj45 sfp} Example: Router(config-if)# media-type sfp Router(config-if)# Example: Router(config-if)# media-type rj45 Router(config-if)#	Designates SFP port as the primary media. or Designates RJ45 as the primary media.
Step 4	no shutdown Example: Router(config-if)# no shutdown Router(config-if)#	Enables the Gigabit Ethernet interface, changing its state from administratively down to administratively up.
Step 5	exit Example: Router(config-if)# exit Router(config)#	Exits configuration mode for the Gigabit Ethernet interface and returns to global configuration mode.

Configuring Grid Router WAN Interface Cards

The Cisco Connected Grid Router 2010 supports RS-232 low-speed serial Grid Router WAN Interface Cards (GRWICs) and T1/E1 channelized and clear channel GRWICs.

Configuring the 8-Port RS-232 Serial GRWICs

To configure the 8-port RS-232-8 asynchronous/synchronous serial GRWICs inserted in the GRWIC slots, see the [Configuring Serial Interfaces](#) section of *Cisco IOS Interface and Hardware Component Configuration Guide, Release 15.0*.

Configuring T1/E1 GRWICs

To configure the one- and two-port channelized T1/E1 GRWICs inserted in the GRWIC slots, see [Configuring 1- and 2-Port T1/E1 GRWICs Guide](#).

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 perform these steps, beginning in global configuration mode:

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

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 with an IP address of 200.200.100.1/32, which acts as a static IP address. The loopback interface points back to virtual-template1, which has a negotiated IP address.

```
!
interface Loopback0
 ip address 200.200.100.1 255.255.255.255
!
```

Verifying 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 interfaces loopback 0
Loopback0 is up, line protocol is up
  Hardware is Loopback
  Internet address is 200.200.100.1/32
  MTU 1514 bytes, BW 8000000 Kbit/sec, DLY 5000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation LOOPBACK, loopback not set
  Keepalive set (10 sec)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/0 (size/max)
  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 IP multicasts)
    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 unknown protocol drops
    0 output buffer failures, 0 output buffers swapped out
Router#

```

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 = 1/1/1 ms
Router#

```

Configuring Command-Line Access

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

	Command	Purpose
Step 1	line [aux console tty vty] <i>line-number</i> Example: Router(config)# line console 0 Router(config-line)#	Enters line configuration mode, and specifies the type of line. This example specifies a console terminal for access.
Step 2	password <i>password</i> Example: Router(config)# password 5dr4Hepw3 Router(config-line)#	Specifies a unique password for the console terminal line.
Step 3	login Example: Router(config-line)# login Router(config-line)#	Enables password checking at terminal session login.
Step 4	exec-timeout <i>minutes [seconds]</i> Example: Router(config-line)# exec-timeout 5 30 Router(config-line)#	Sets the interval wherein the EXEC command interpreter waits until user input is detected. The default is 10 minutes. Following entry of the minutes variable, you can 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] <i>line-number</i> Example: Router(config-line)# line vty 0 4 Router(config-line)#	Specifies a virtual terminal for remote console access.

	Command	Purpose
Step 6	<p>password <i>password</i></p> <p>Example:</p> <pre>Router(config-line)# password aldf2ad1 Router(config-line)#</pre>	Specifies a unique password for the virtual terminal line.
Step 7	<p>login</p> <p>Example:</p> <pre>Router(config-line)# login Router(config-line)#</pre>	Enables password checking at the virtual terminal session login.
Step 8	<p>end</p> <p>Example:</p> <pre>Router(config-line)# end Router#</pre>	Exits line configuration mode, and returns to privileged EXEC mode.

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.

To configure static routes, perform these steps, beginning in global configuration mode:

	Command	Purpose
Step 1	<pre>ip route prefix mask {ip-address interface-type interface-number [ip-address]}</pre> <p>Example:</p> <pre>Router(config)# ip route 192.168.1.0 255.255.0.0 10.10.10.2</pre>	<p>Specifies the static route for the IP packets.</p> <p>For details about this command and about additional parameters that can be set, see Cisco IOS IP Command Reference, Volume 2 of 4: Routing Protocols, Release 12.3</p>
Step 2	<pre>end</pre> <p>Example:</p> <pre>Router(config)# end Router#</pre>	<p>Exits router configuration mode, and enters privileged EXEC mode.</p>

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 Gigabit Ethernet interface to another device with an IP address of 10.10.10.2. Specifically, the packets are sent to the configured permanent virtual circuit.

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 172.168.1.0 255.255.255.0 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: L - local, 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, + - replicated route

Gateway of last resort is 172.25.212.1 to network 0.0.0.0

S*    0.0.0.0/0 [1/0] via 172.25.212.1
      172.25.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      172.25.212.0/25 is directly connected, GigabitEthernet0/0
L      172.25.212.39/32 is directly connected, GigabitEthernet0/0
      200.200.100.0/32 is subnetted, 1 subnets
C      200.200.100.1 is directly connected, Loopback0
Router#
```

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 IGRP (EIGRP), to learn routes dynamically. You can configure either of these routing protocols on your router.

- [Configuring Routing Information Protocol](#)
- [Configuring Enhanced Interior Gateway Routing Protocol](#)

Configuring Routing Information Protocol

To configure the RIP routing protocol on the router perform these steps, 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 each directly connected network.
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.

Example

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 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 Interior Gateway Routing Protocol

To configure EIGRP perform these steps, beginning in global configuration mode:

	Command	Purpose
Step 1	router eigrp <i>as-number</i> 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.
Step 2	network <i>ip-address</i> 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.

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 109.

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

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

Verifying 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:

```
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
```

Typical Example of a Cisco CGR 2010 Configuration

Use the **show running-config** command to view the configuration of the Cisco CGR 2010 after the Gigabit Ethernet and serial GRWIC ports have been configured. The following is an example of a typical Cisco CGR 2010 router that is only minimally configured:

```
Router# show running-config
Building configuration...

Current configuration : 1795 bytes
!
! Last configuration change at 03:11:17 UTC Sat Jul 7 1900
!
version 15.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
!
no aaa new-model
!
```

```
no ipv6 cef
ip source-route
ip cef
!
!
!
!
multilink bundle-name authenticated
!
!
crypto pki token default removal timeout 0
!
!
license feature snasw
license udi pid CGR-2010/K9 sn FHH1338P00S
license boot module cgr2010 technology-package datak9
!
!
!
redundancy
!
!
!
!
bstun peer-name 192.168.1.2
bstun protocol-group 1 async-generic
!
!
!
interface GigabitEthernet0/0
 ip address 192.168.1.2 255.255.255.0
 shutdown
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
!
interface Serial0/0/1
 no ip address
 shutdown
!
interface Serial0/0/2
 no ip address
 shutdown
!
interface Serial0/0/3
 no ip address
 shutdown
!
interface Serial0/0/4
 no ip address
 shutdown
 clock rate 128000
!
interface Serial0/0/5
 no ip address
 shutdown
 clock rate 128000
!
interface Serial0/0/6
 no ip address
```

```
shutdown
clock rate 128000
!
interface Serial0/0/7
no ip address
shutdown
clock rate 128000
!
interface Serial0/0/0
physical-layer async
no ip address
encapsulation bstun
bstun group 1
bstun route all tcp 192.168.1.1
asp role secondary
asp addr-offset 0
!
!
ip forward-protocol nd
!
no ip http server
no ip http secure-server
!
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0
!
!
!
!
!
snmp-server community public RW
!
control-plane
!
!
line con 0
line aux 0
line 0/0/0
no activation-character
stopbits 1
line vty 0 4
login
transport input all
!
exception data-corruption buffer truncate
scheduler allocate 20000 1000
end
```