EIGRP COMMANDS

AIM

The aim of the experiment is to implement the Enhanced Interior Gateway Routing Protocol (EIGRP) commands.

APPARATUS REQUIRED

Cisco Packet Tracer

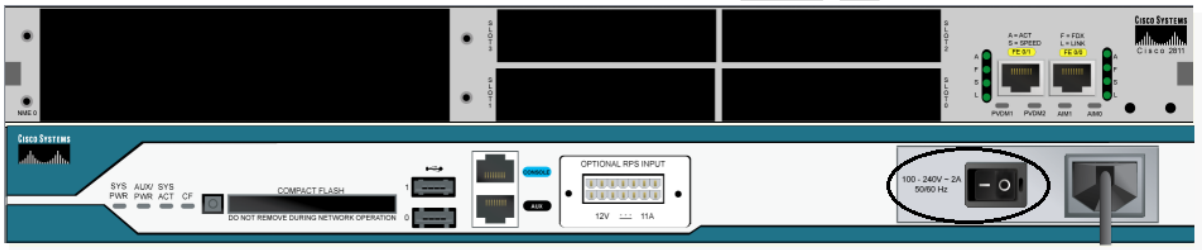
THEORY

Enhanced Interior Gateway Routing Protocol (EIGRP) is an advanced distance-vector routing protocol that is used on a computer network for automating routing decisions and configuration. The protocol was designed by Cisco Systems as a proprietary protocol, available only on Cisco routers. Partial functionality of EIGRP was converted to an open standard in 2013 and was published with informational status as RFC 7868 in 2016. EIGRP is used on a router to share routes with other routers within the same autonomous system. Unlike other well-known routing protocols, such as RIP, EIGRP only sends incremental updates, reducing the workload on the router and the amount of data that needs to be transmitted. EIGRP replaced the Interior Gateway Routing Protocol (IGRP) in 1993. One of the major reasons for this was the change to classless IPv4 addresses in the Internet Protocol, which IGRP could not support. Almost all routers contain a routing table that contains rules by which traffic is forwarded in a network. If the router does not contain a valid path to the destination, the traffic is discarded. EIGRP is a dynamic routing protocol by which routers automatically share route information. This eases the workload on a network administrator who does not have to configure changes to the routing table manually.

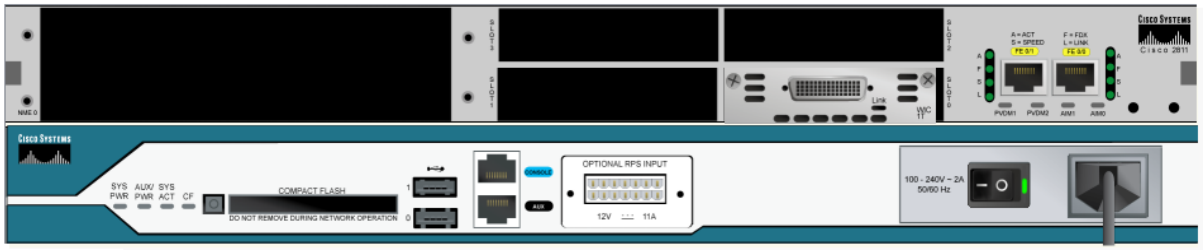
PROCEDURE

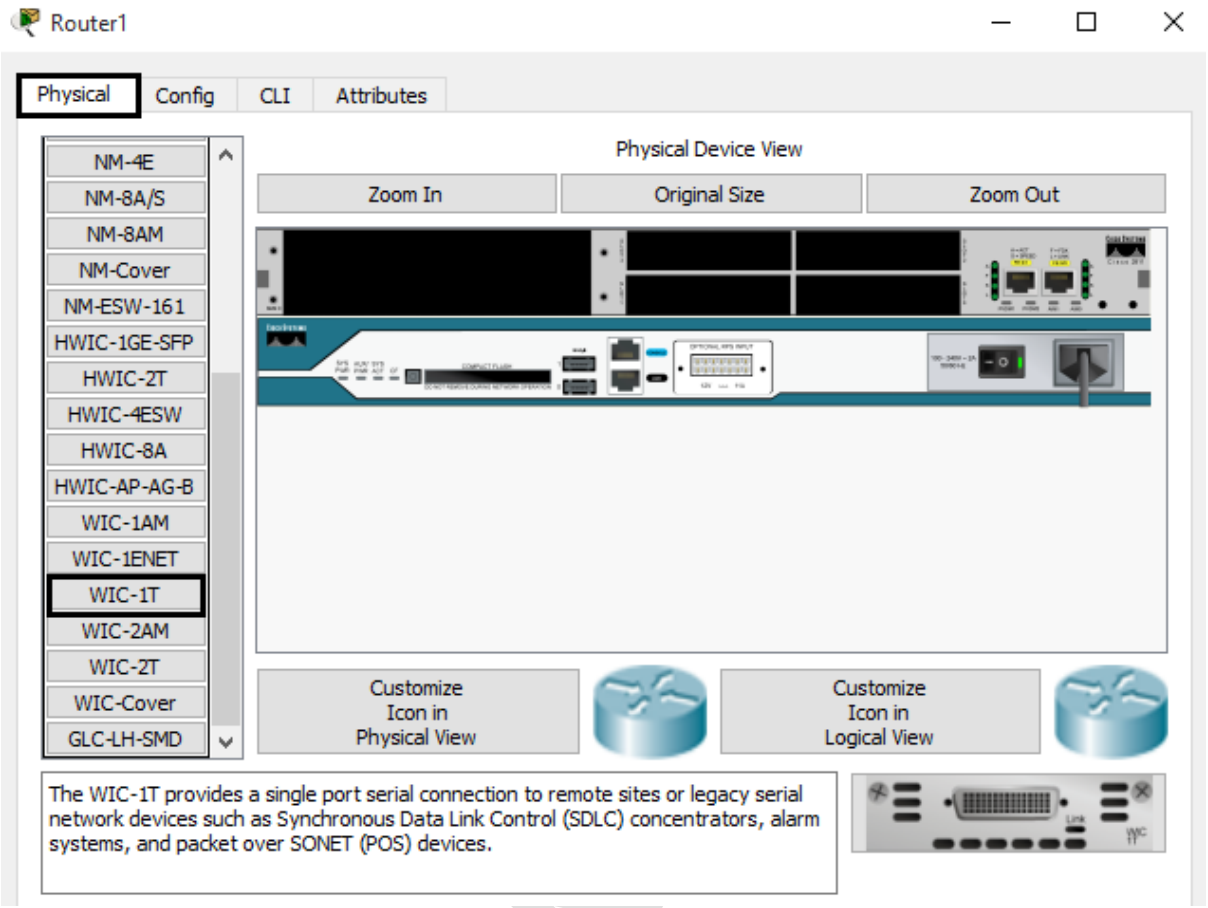
1. Press Ctrl+Alt+R to display the Routers panel and place the two 2811 routers: Router1 and Router2 as shown by dragging them from the panel and dropping them onto the window.

2. Click on the Router1. Under the Physical tab, scroll to the Physical Device View and switch off the Router by pressing once on the Rocker Switch shown.



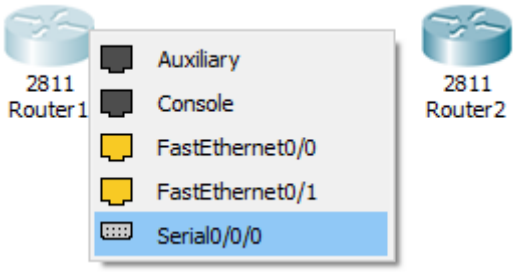
3. Under the Modules, click on the Wide Area Network (WAN) Interface Card (WIC-1T) from the list and drag and drop it onto the Router slot as shown in the figure below and then switch the Router back on by pressing the Rocker Switch once. The WIC-1T provides a single port serial connection to remote sites or legacy serial network devices such as Synchronous Data Link Control (SDLC) concentrators, alarm systems, and (POS) packet over SONET (Synchronous Optical Networking) devices.

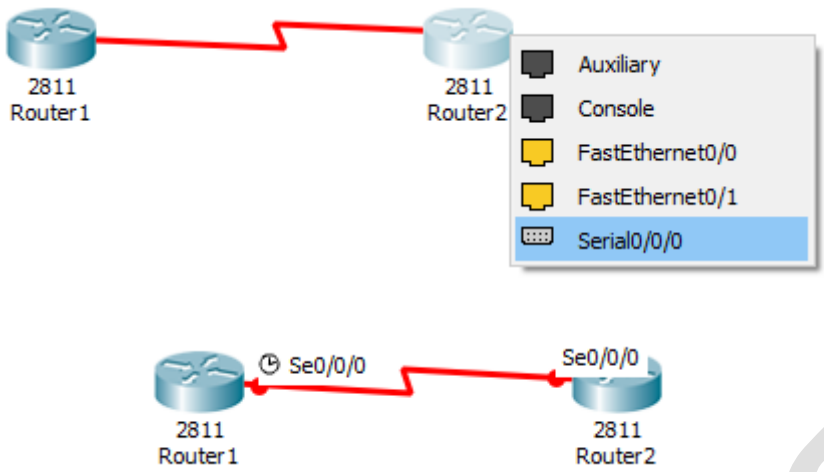




4. Repeat the procedure in steps 2 and 3 for Router2 and add the WIC-1T module to its slot.

5. Press Ctrl+Alt+O to display the connections panel. Select the Serial DCE (Data Circuit-terminating Equipment) cable. Click on the Router1 and select the Serial0/0/0 port and then click on the Router2 and also select the Serial0/0/0 port to set the connection.





6. Click on the Router1 and select the CLI (Command Line Interface) tab and enter the following commands. Type “no” or “n” when asked if you would like to enter the initial configuration dialog and press Enter twice.

```
--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/
no]: no
```

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname Router1

Router1(config)#interface Serial0/0/0

Router1(config-if)#ip address 192.168.20.1 255.255.255.0

Router1(config-if)#clock rate 128000

Router1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down

Router1(config-if)#exit

Router1(config)#exit

Router1#

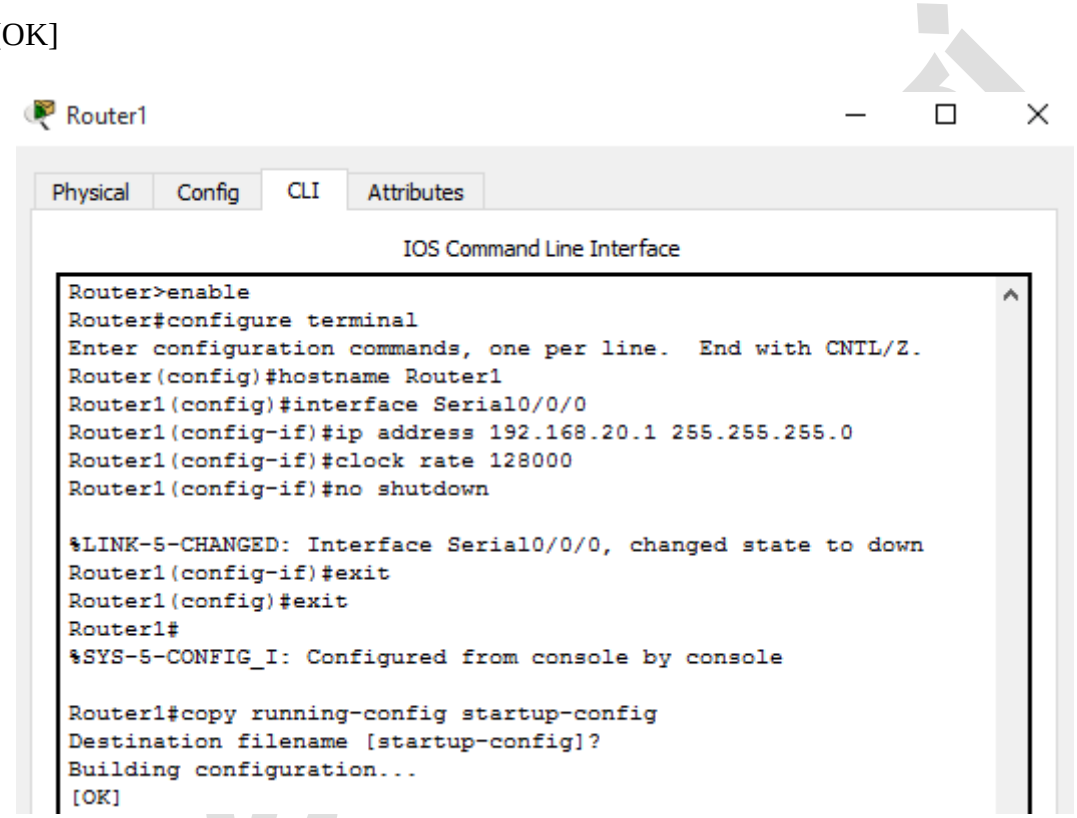
%SYS-5-CONFIG_I: Configured from console by console

Router1#copy running-config startup-config

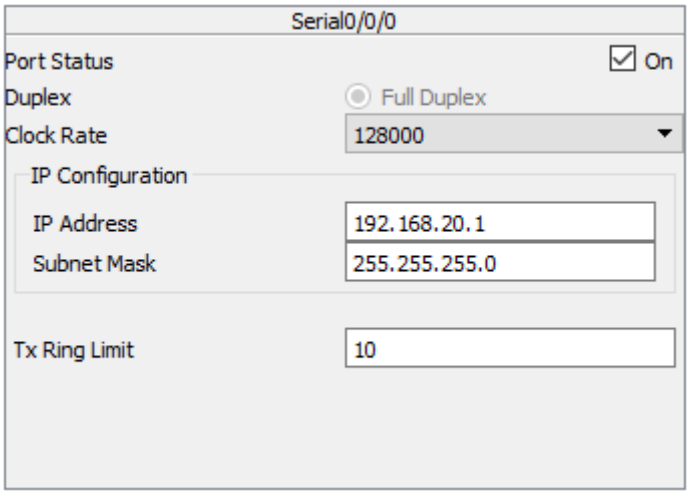
Destination filename [startup-config]?

Building configuration...

[OK]

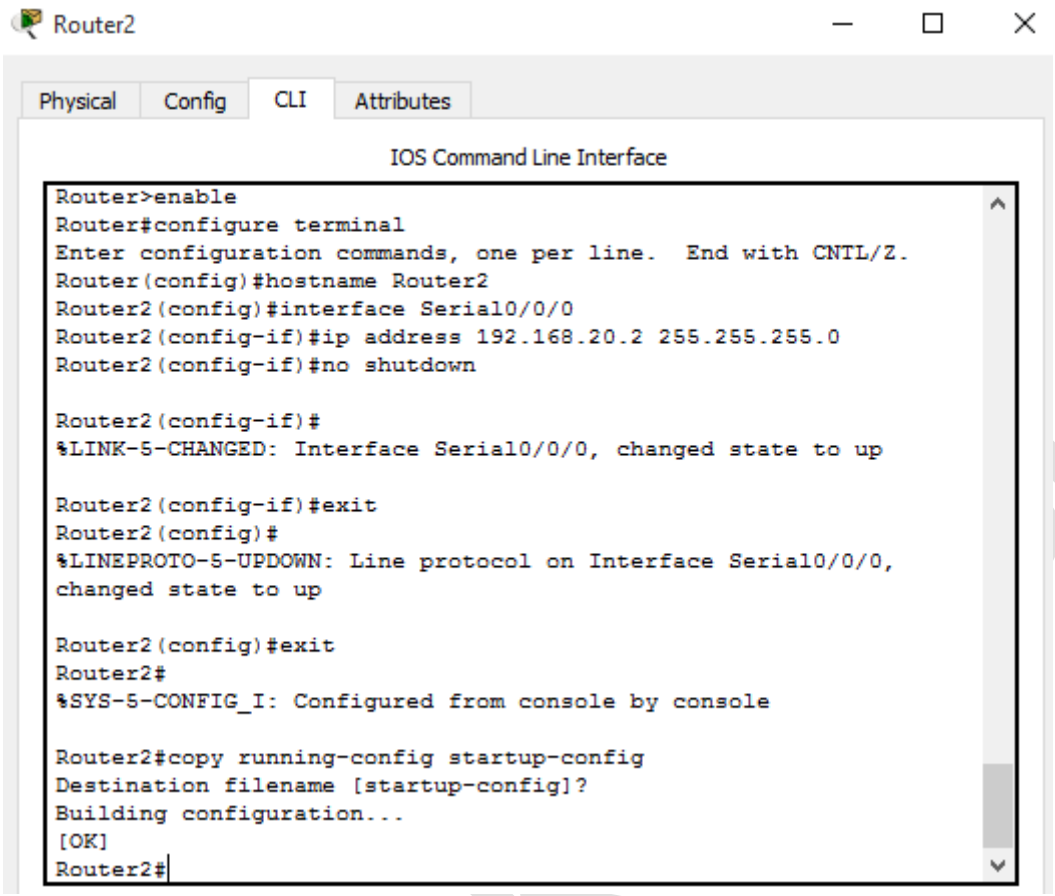


7. Click on the Router1 and select the “Config” tab. Under the Serial 0/0/0 Interface tab, verify the configuration settings.

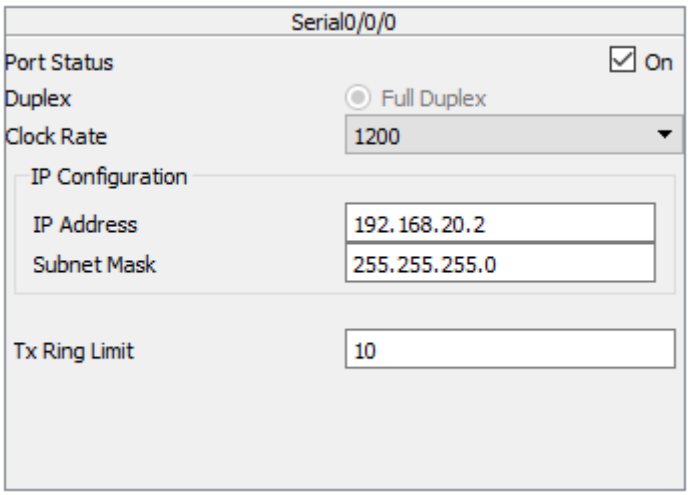


8. Click on the Router2 and select the CLI (Command Line Interface) tab and enter the commands as in the Router1.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname Router2
Router2(config)#interface Serial0/0/0
Router2(config-if)#ip address 192.168.20.2 255.255.255.0
Router2(config-if)#no shutdown

Router2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

Router2(config-if)#exit
Router2(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to
up

Router2(config)#exit
%SYS-5-CONFIG_I: Configured from console by console

Router2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```



9. Click on the Router2 and select the “Config” tab to verify the Router’s Serial Interface Settings as in step 7 for the Router1.



10. Configure the Enhanced Interior Gateway Routing Protocol for both Routers using the following CLI commands.

Router1

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#router eigrp 10

Router(config-router)#network 192.168.20.0 255.255.255.0

Router(config-router)#no auto-summary

Router(config-router)#exit

Router(config)#exit

Router#

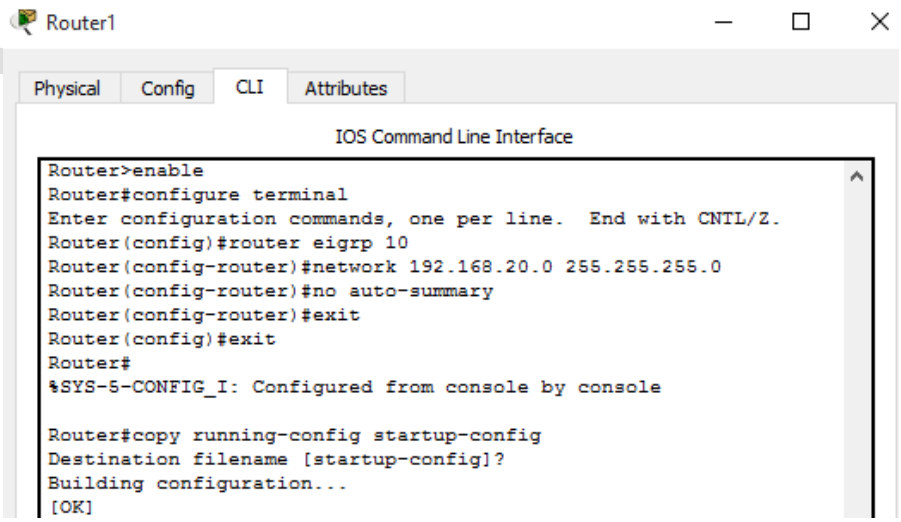
%SYS-5-CONFIG_I: Configured from console by console

Router#copy running-config startup-config

Destination filename [startup-config]?

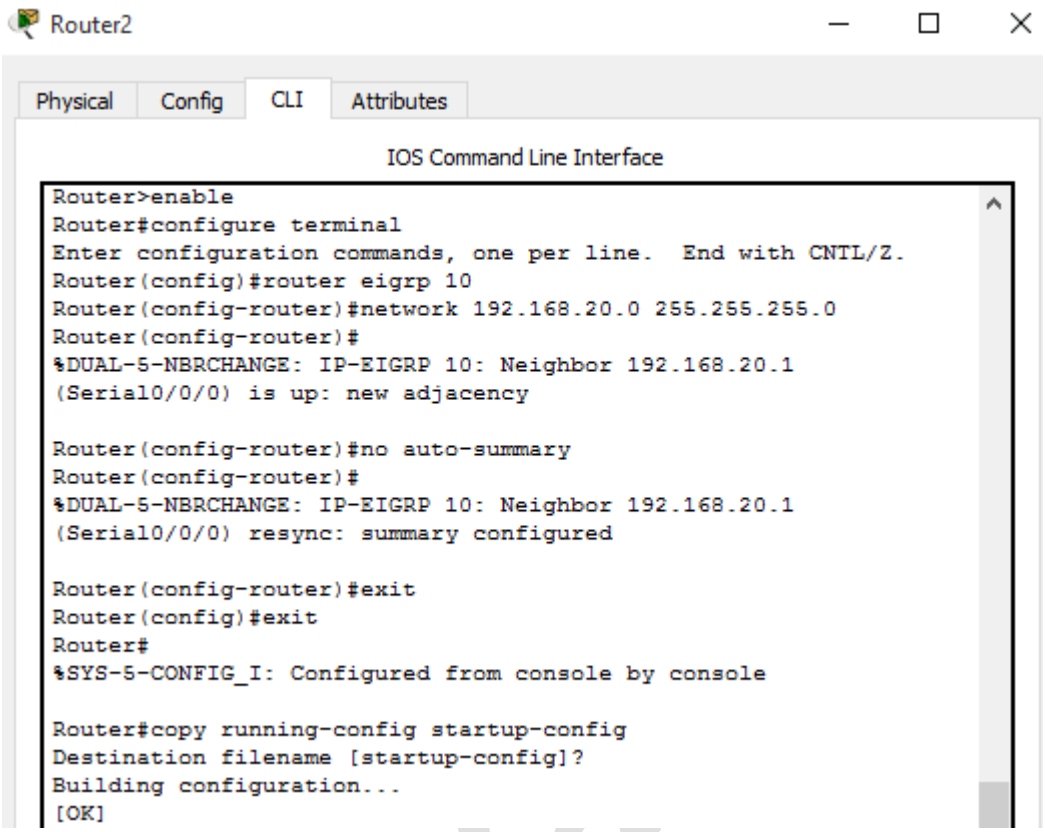
Building configuration...

[OK]



Router2

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router eigrp 10
Router(config-router)#network 192.168.20.0 255.255.255.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 10: Neighbor 192.168.20.1 (Serial0/0/0) is up:
new adjacency

Router(config-router)#no auto-summary
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 10: Neighbor 192.168.20.1 (Serial0/0/0)
resync: summary configured

Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```



Router1

%DUAL-5-NBRCHANGE: IP-EIGRP 10: Neighbor 192.168.20.2 (Serial0/0/0) is up: new adjacency

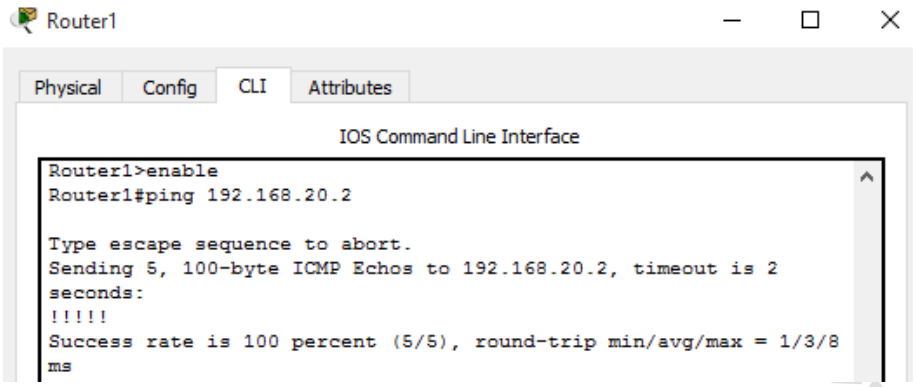
%DUAL-5-NBRCHANGE: IP-EIGRP 10: Neighbor 192.168.20.2 (Serial0/0/0) is resync: graceful restart

```
%DUAL-5-NBRCHANGE: IP-EIGRP 10: Neighbor 192.168.20.2
(Serial0/0/0) is up: new adjacency

%DUAL-5-NBRCHANGE: IP-EIGRP 10: Neighbor 192.168.20.2
(Serial0/0/0) is resync: graceful restart
```

11. Test the connection by the ping command. Select the Router1 and ping it with the IP address of the Router2 (192.168.20.2).

    Router1>enable

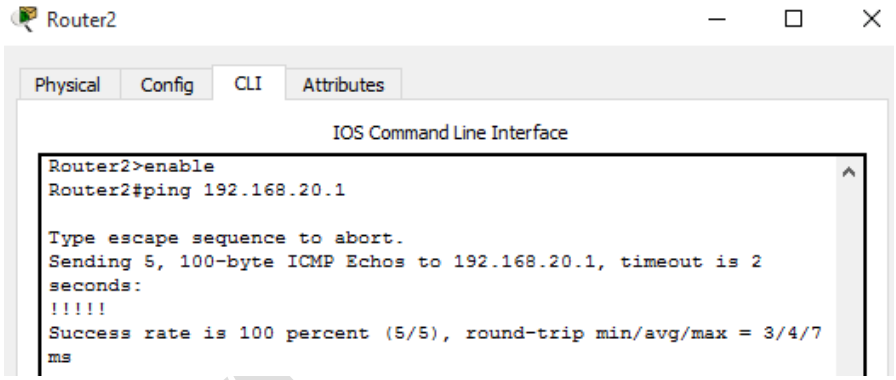
    Router1#ping 192.168.20.2



12. Select the Router2 and ping it with the IP address of the Router1 (192.168.20.1).

    Router2>enable

    Router2#ping 192.168.20.1



13. Check the Router's Configuration via the Command Line Interface.

    Router2>enable

    Router2#show running-config

    Building configuration...

    Current configuration : 672 bytes

    !

    version 12.4

    no service timestamps log datetime msec

    no service timestamps debug datetime msec

    no service password-encryption

!

hostname Router2

!

!

!

!

!

!

!

!

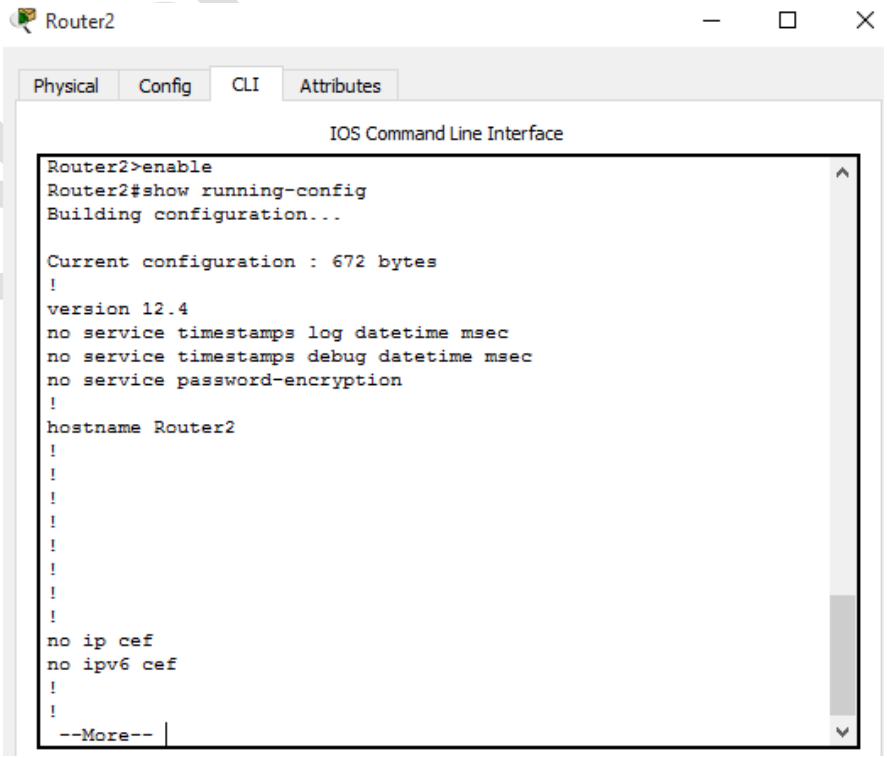
no ip cef

no ipv6 cef

!

!

--More--



14. Send a Protocol Data Unit(PDU) from the Router1 to the Router2 and from the Router2 to the Router1 to test the connection by clicking on “Add Simple PDU” or pressing “P” then clicking on the first Router followed by clicking on the next Router. Press Ctrl+Shift+O to toggle the PDU list window and view the Fire Status.

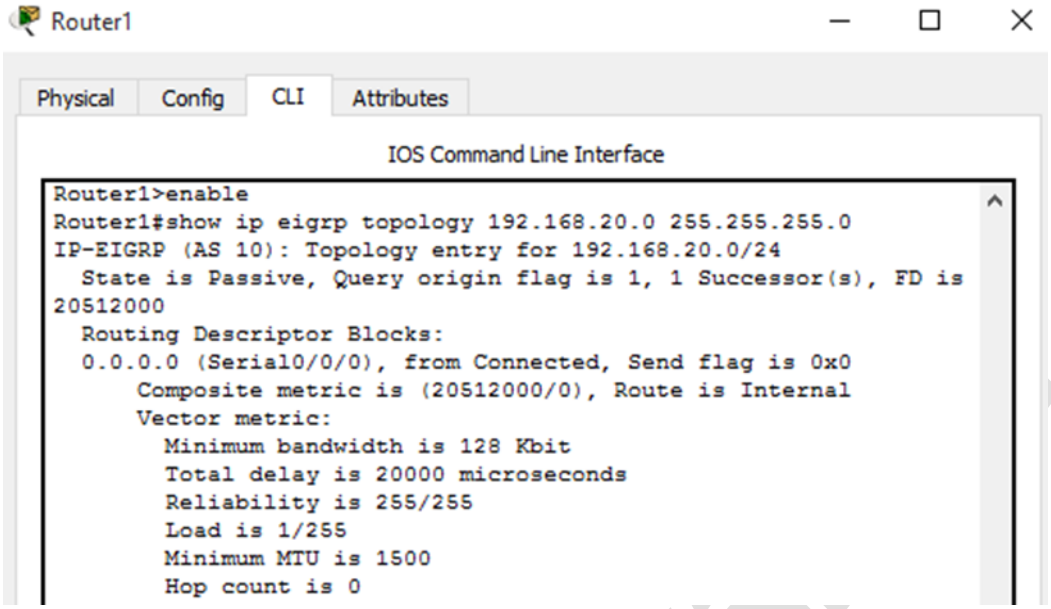
PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	Router1	Router2	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Router2	Router1	ICMP		0.000	N	1	(edit)	(delete)

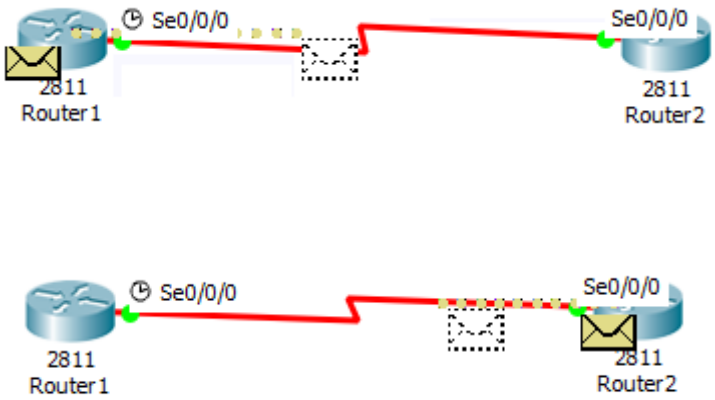
15. Verify the EIGRP topology of the network and note the EIGRP composite and vector metrics with the command executed on either of the Routers.

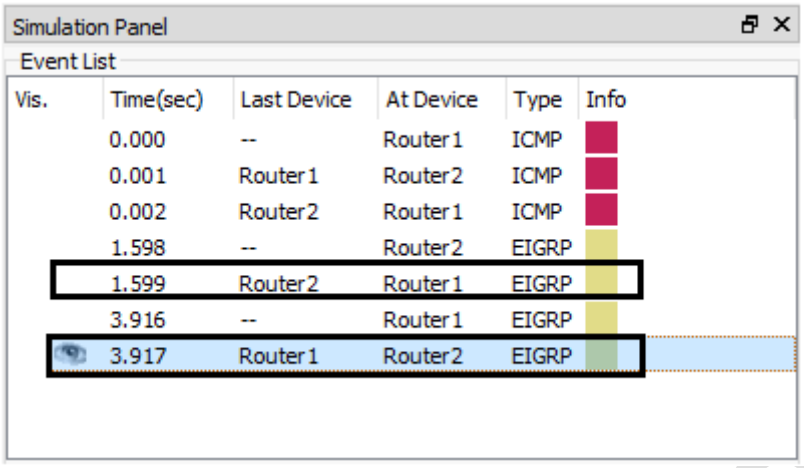
```
Router1>enable
Router1#show ip eigrp topology 192.168.20.0 255.255.255.0
IP-EIGRP (AS 10): Topology entry for 192.168.20.0/24
  State is Passive, Query origin flag is 1, 1 Successor(s), FD is 20512000
  Routing Descriptor Blocks:
  0.0.0.0 (Serial0/0/0), from Connected, Send flag is 0x0
    Composite metric is (20512000/0), Route is Internal
    Vector metric:
      Minimum bandwidth is 128 Kbit
      Total delay is 20000 microseconds
      Reliability is 255/255
      Load is 1/255
      Minimum MTU is 1500
```

Hop count is 0

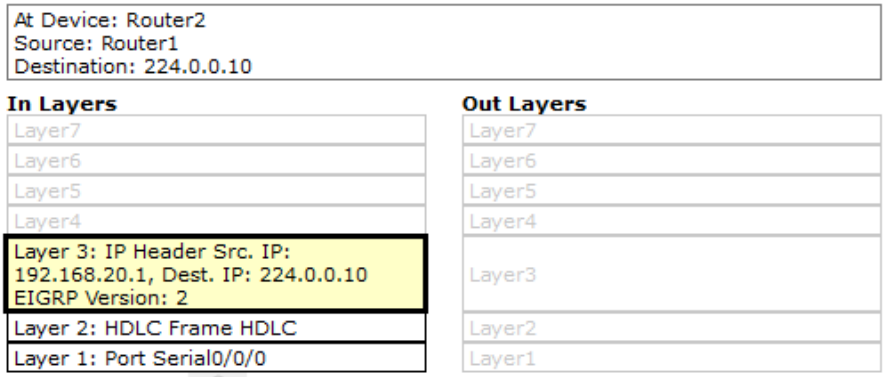


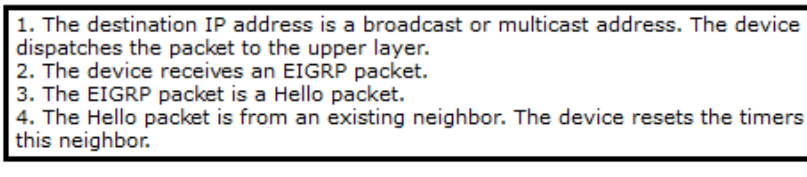
16. Press Ctrl+Shift+D to Delete the Scenario and all PDUs. Press Shift+S to enter into the Simulation Mode. Press “P” to Add a Simple PDU. Click on the Router1 then click on the Router2. Press Alt+C or on the Simulation Panel under the Play Controls click on the Capture/Forward button multiple times until you observe successful implementation of the EIGRP under the Event List on the Type Column.

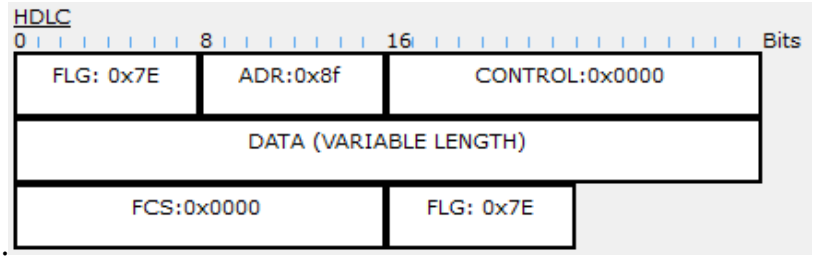


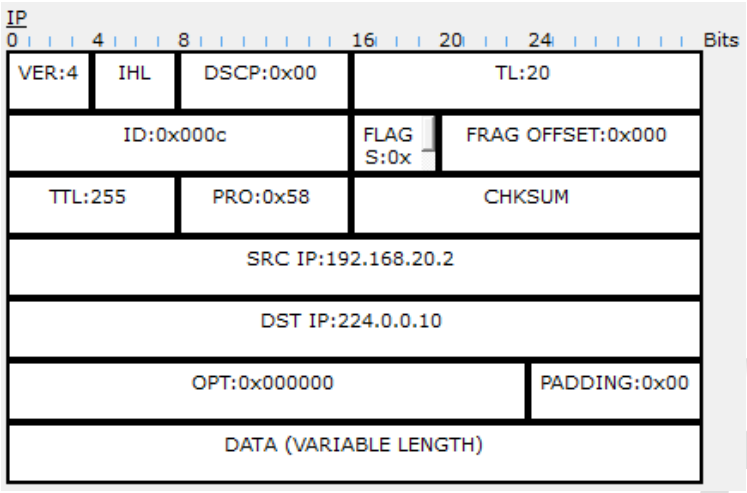


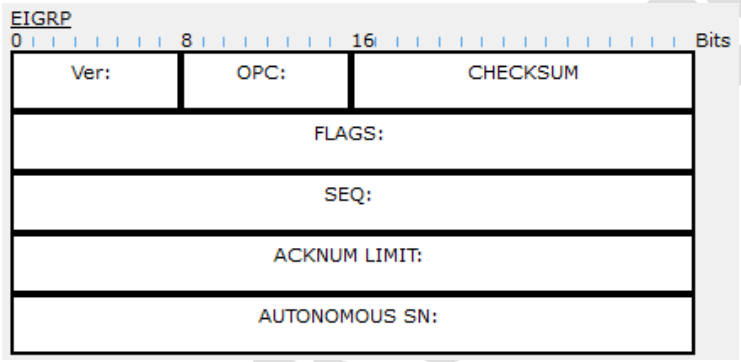
17. Observe the PDU Information at the Device by clicking on the EIGRP event in the Event List. Under the OSI Model Tab view the “In Layers” model. Click on the Next Layer Button to observe the processes taking place at each layer of an event. Under the Inbound PDU Details tab you may observe the PDU Formats i.e. (High-Level Data Link Control) HDLC, IP, EIGRP, EIGRP Parameters, EIGRP Software Version.

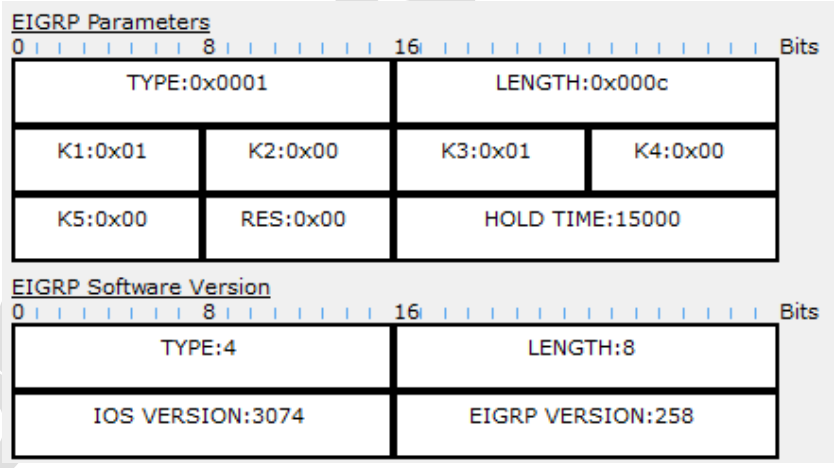




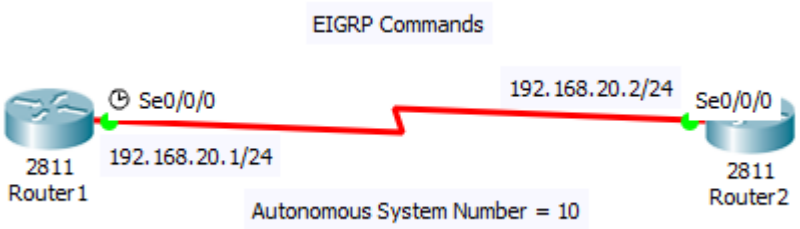








SAMPLE OUTPUT



RESULT

Thus, the experiment to implement the Enhanced Interior Gateway Routing Protocol (EIGRP) commands was executed successfully and the output is verified.