

BGP COMMANDS

AIM

The aim of the experiment is to implement the Border Gateway Protocol (BGP) commands.

APPARATUS REQUIRED

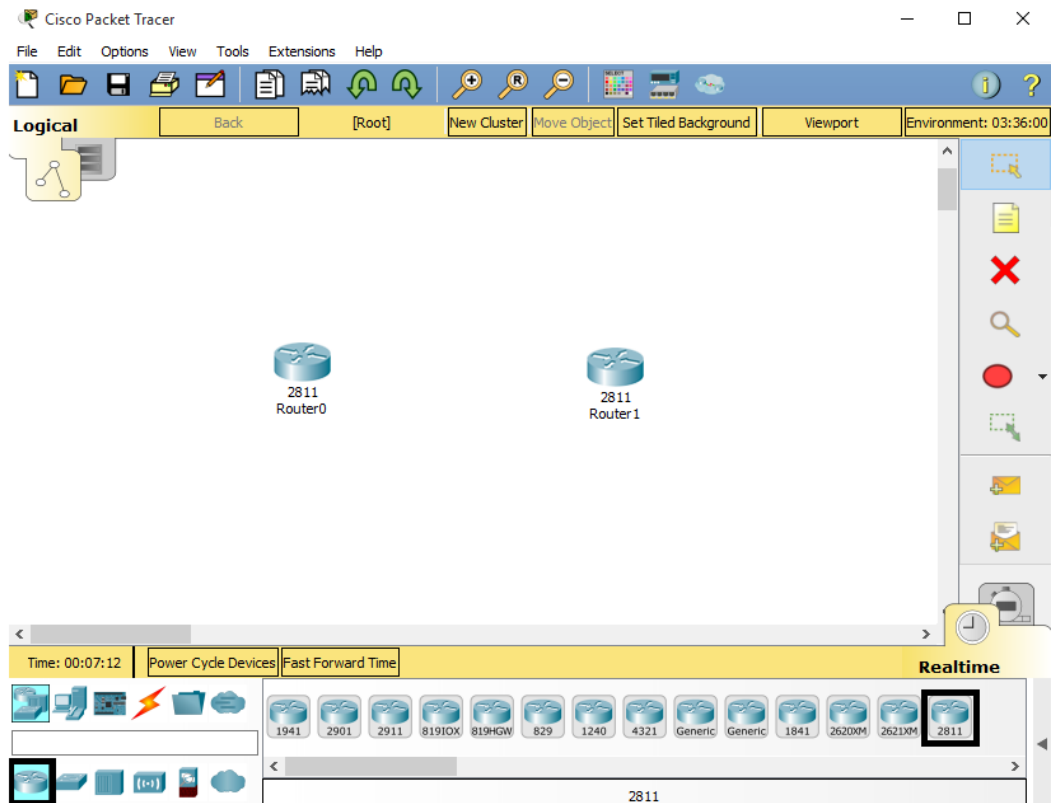
Cisco Packet Tracer

THEORY

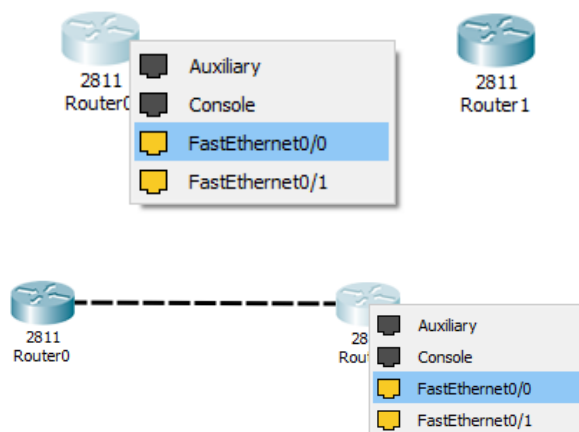
Border Gateway Protocol (BGP) is a standardized exterior gateway protocol designed to exchange routing and reachability information among autonomous systems (AS) on the Internet. The protocol is often classified as a path vector protocol but is sometimes also classed as a distance-vector routing protocol. The Border Gateway Protocol makes routing decisions based on paths, network policies, or rule-sets configured by a network administrator and is involved in making core routing decisions. BGP may be used for routing within an autonomous system. In this application it is referred to as Interior Border Gateway Protocol, Internal BGP, or iBGP. In contrast, the Internet application of the protocol may be referred to as Exterior Border Gateway Protocol, External BGP, or eBGP.

PROCEDURE

1. Press Ctrl+Alt+R to display the Routers panel and place the two 2811 routers: i.e. Router0 and Router1 as shown by dragging them from the panel and dropping them onto the window.



2. Press Ctrl+Alt+O to display the connections panel. Select the copper cross-over cable because we are connecting similar devices. Click on the Router0 and select the FastEthernet0/0 interface and then click on the Router1 and also select the FastEthernet0/0 interface to set the connection.



- Click on the Router0 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

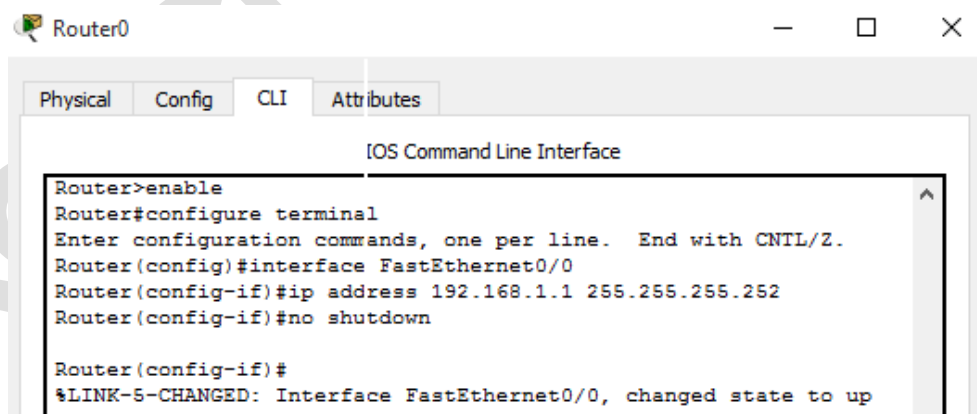
Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#interface FastEthernet0/0

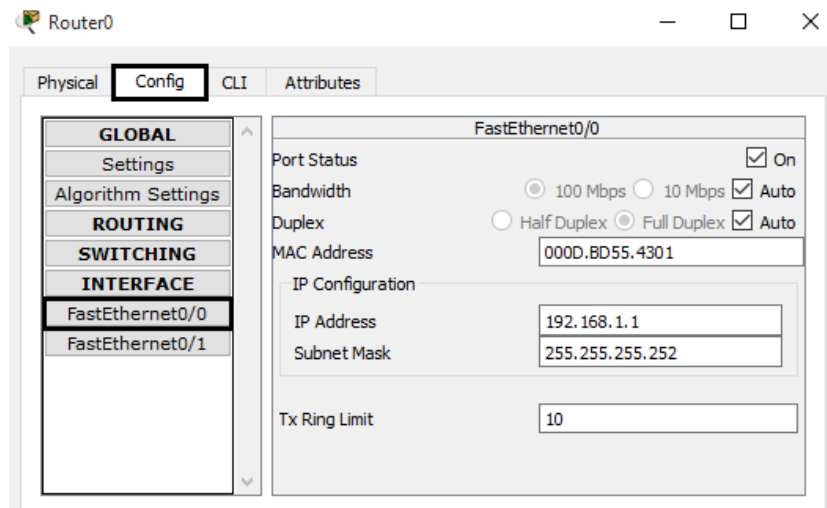
Router(config-if)#ip address 192.168.1.1 255.255.255.252

Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up



- Click on the Router0 and select the “Config” tab. Under the FastEthernet0/0 tab, verify the configured properties of the Router.



- Click on the Router1 and select the CLI (Command Line Interface) tab and enter the commands as in the Router0.

Router>enable

Router#configure terminal

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

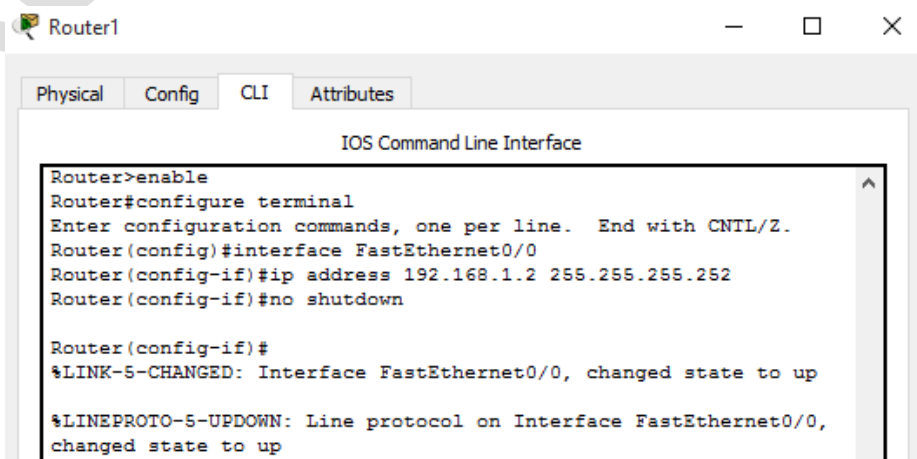
Router(config)#interface FastEthernet0/0

Router(config-if)#ip address 192.168.1.2 255.255.255.252

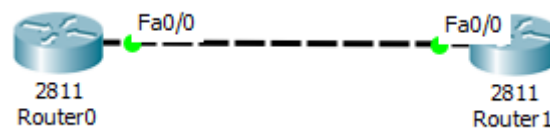
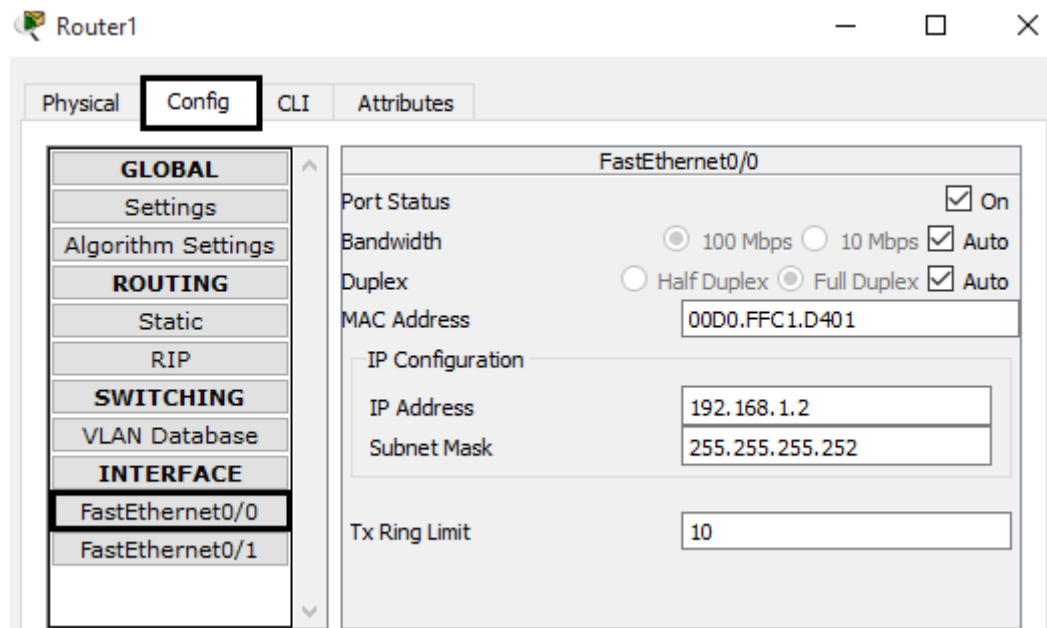
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up



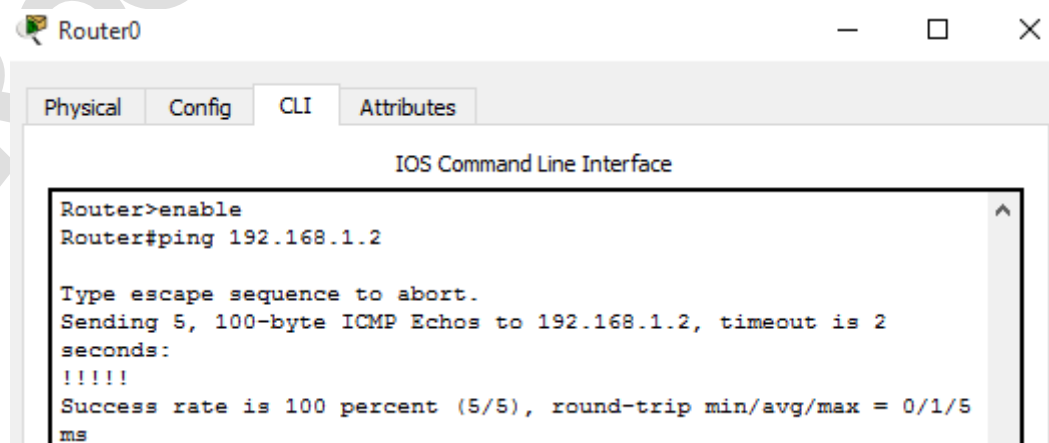
6. Click on the Router1 and select the “Config” tab. Under the FastEthernet0/0 tab, verify the configured properties of the Router.



7. Test the connection by the ping command. Select the Router0 and ping it with the IP address of the Router1 (192.168.1.2).

Router>enable

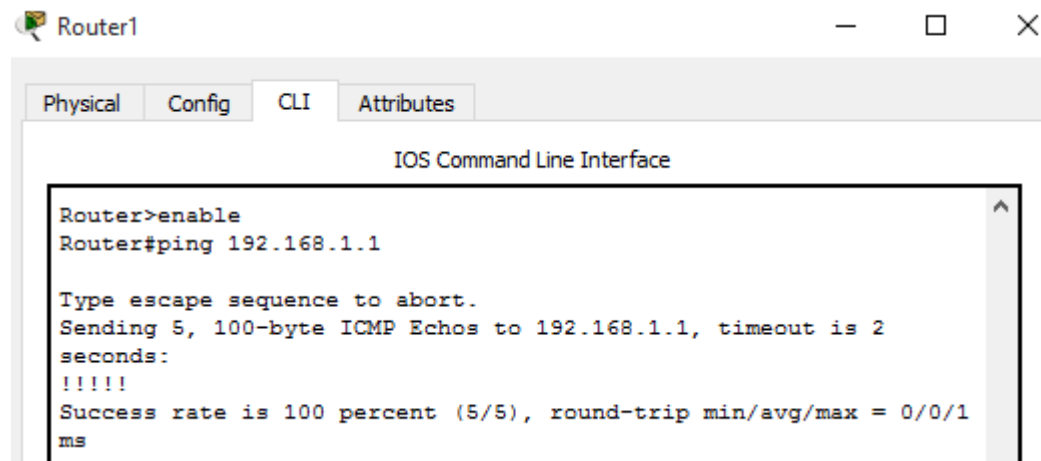
Router#ping 192.168.1.2



8. Select the Router1 and ping it with the IP address of the Router0 (192.168.1.1).

```
Router>enable
```

```
Router#ping 192.168.1.1
```



9. Configure the border gateway protocol for both the Routers using the commands shown. Set the Autonomous System Number of the Router0 and the Router1 as 65001 and 65002 respectively. An autonomous system (AS) is a collection of connected Internet Protocol (IP) routing prefixes under the control of one or more network operators on behalf of a single administrative entity or domain that presents a common, clearly defined routing policy to the Internet. A unique Autonomous System Number is allocated to each Autonomous System and they are important because they uniquely identify each network on the Internet.

Router0

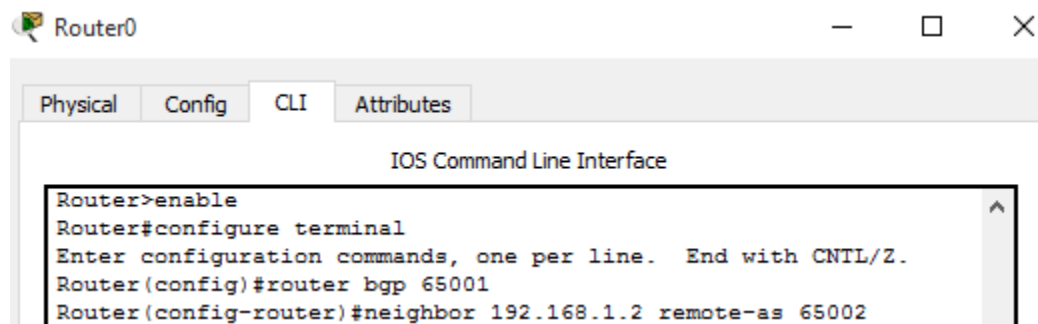
```
Router>enable
```

```
Router#configure terminal
```

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

```
Router(config)#router bgp 65001
```

```
Router(config-router)#neighbor 192.168.1.2 remote-as 65002
```



Router1

Router>enable

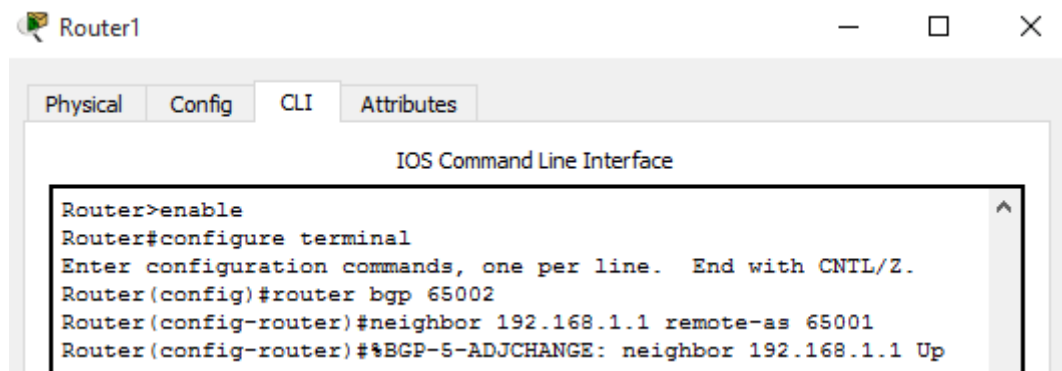
Router#configure terminal

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

Router(config)#router bgp 65002

Router(config-router)#neighbor 192.168.1.1 remote-as 65001

Router(config-router)%%BGP-5-ADJCHANGE: neighbor 192.168.1.1 Up



Router0

%BGP-5-ADJCHANGE: neighbor 192.168.1.2 Up

%BGP-5-ADJCHANGE: neighbor 192.168.1.2 Up

10. Test the connection by pinging as in step 6.

11. Check the Routers' Configuration via the Command Line Interface.

Router>enable

Router#show running-config

Building configuration...

Current configuration : 682 bytes

!

version 12.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

!

hostname Router

!

!

!

!

!

!

!

!

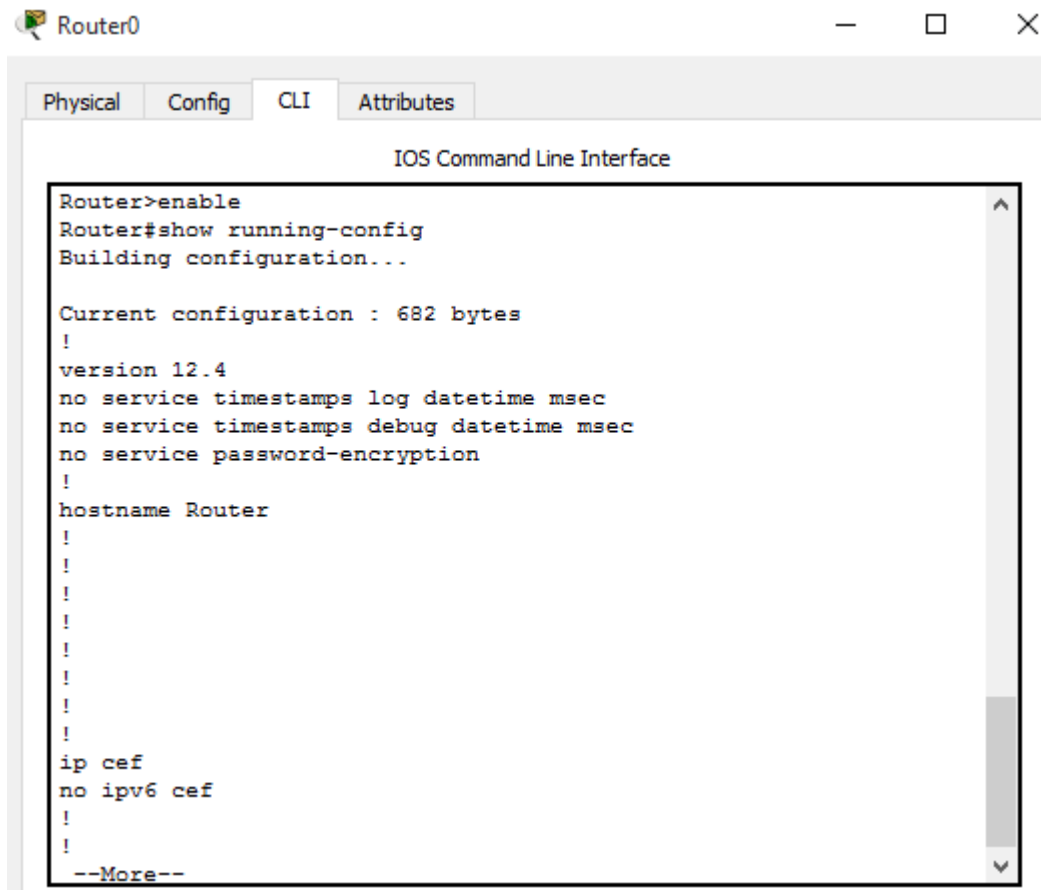
ip cef

no ipv6 cef

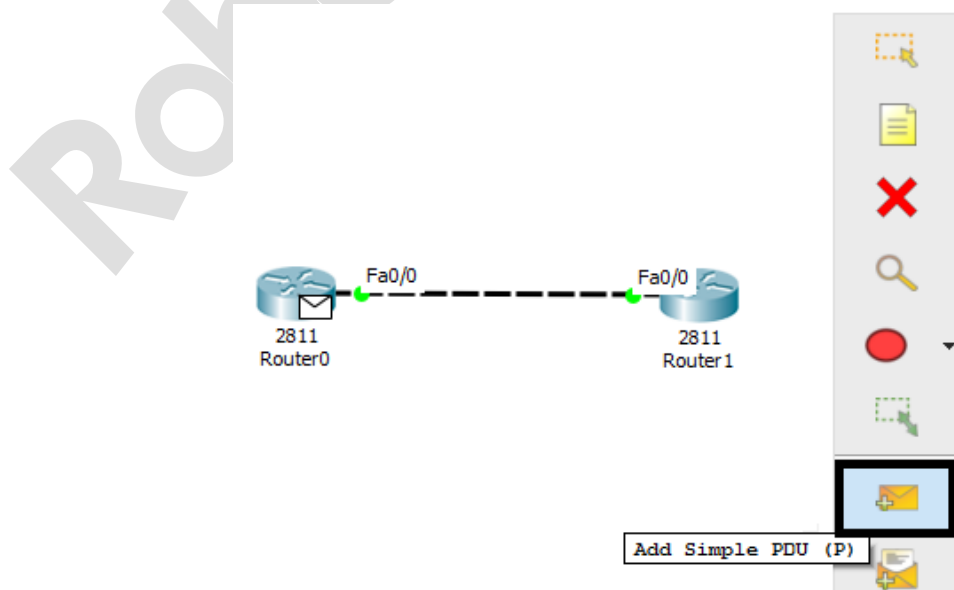
!

!

--More--

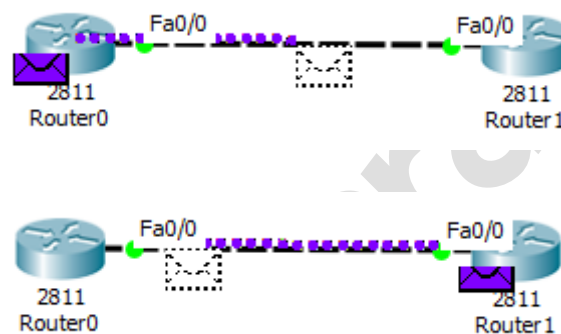


12. Send a Protocol Data Unit (PDU) from the Router0 to the Router1 and from the Router1 to the Router0 to test the connection by clicking on "Add Simple PDU" or pressing "P" then clicking on the first Router followed by clicking on the next Router. Press Ctrl+Shift+O to toggle the PDU list window and view the Fire Status.



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	Router0	Router1	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Router1	Router0	ICMP		0.000	N	1	(edit)	(delete)

13. 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 Router0 then click on the Router1. 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 BGP under the Event List on the Type Column.



Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.002	Router1	Router0	ICMP	
	41.783	--	Router1	CDP	
	41.784	Router1	Router0	CDP	
	41.786	--	Router0	CDP	
	41.787	Router0	Router1	CDP	
	42.590	--	Router1	BGP	
	42.590	--	Router0	BGP	
	42.591	Router1	Router0	BGP	
	42.591	Router0	Router1	BGP	

Reset Simulation

☒ Constant Delay

Captured to: 42.591 s

Play Controls

Back

Auto Capture / Play

Capture / Forward

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAP, POP3, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters

Show All/None

Event List

Simulation

14. Observe the PDU Information at the Device by clicking on the BGP 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. EthernetII, IP and (Transmission Control Protocol) TCP.

PDU Information at Device: Router0

OSI Model Inbound PDU Details

At Device: Router0
Source: Router1
Destination: 192.168.1.1

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer3	Layer3
Layer2	Layer2
Layer1	Layer1

Layer 5:
Layer 4: TCP Src Port: 1025, Dst Port: 179
Layer 3: IP Header Src. IP: 192.168.1.2, Dest. IP: 192.168.1.1
Layer 2: Ethernet II Header 00D0.FFC1.D401 >> 00D0.BD55.4301
Layer 1: Port FastEthernet0/0

1. The BGP process has received a KEEPALIVE message from neighbor 192.168.1.2.

Challenge Me << Previous Layer Next Layer >>

PDU Information at Device: Router0

OSI Model Inbound PDU Details

PDU Formats

EthernetII

Bytes	
PREAMBLE: 101010..10	DEST ADDR:00D0.BD55.4301
SRC ADDR:00D0.FFC1.D4	TYP E:0x
DATA (VARIABLE LENGTH)	FCS:0x00000000

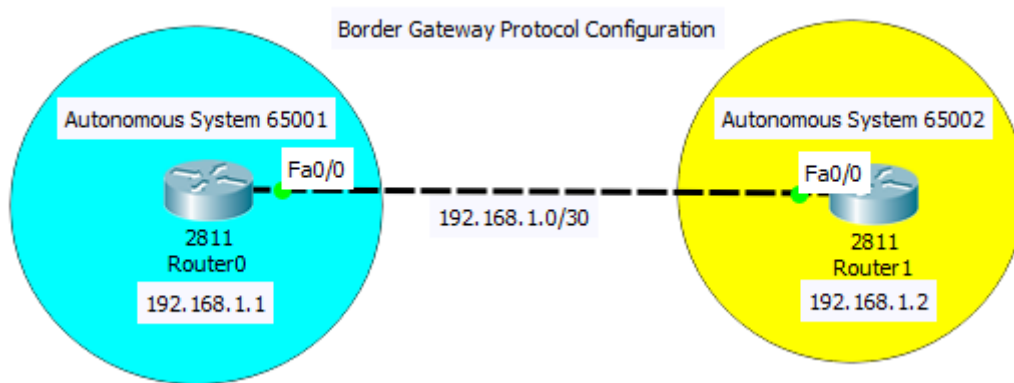
IP

Bits	
VER:4	IHL
DSCP:0x00	TL:59
ID:0x000a	FLAG S:0x
FRAG OFFSET:0x000	
TTL:255	PRO:0x06
CHKSUM	
SRC IP:192.168.1.2	
DST IP:192.168.1.1	
OPT:0x000000	
PADDING:0x00	
DATA (VARIABLE LENGTH)	

TCP

Bits	
SOURCE PORT:1025	DESTINATION PORT:179

SAMPLE OUTPUT



Robert Karamagi

RESULT

Thus, the experiment to implement the Border Gateway Protocol commands was executed successfully and the output is verified.