Experiment-11

Aim: To connect a router to a LAN

Devices Used: Router, PCs, and Cables.

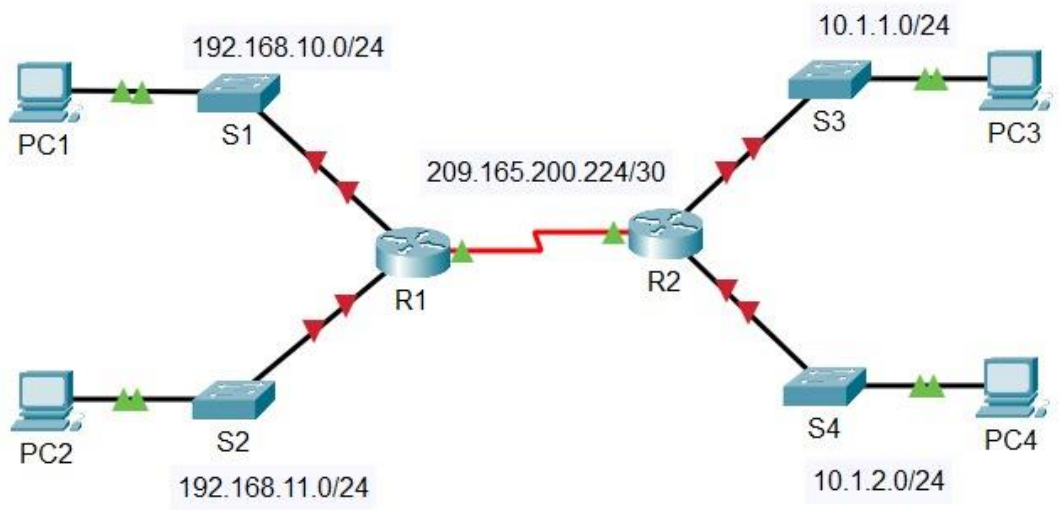
Objectives:
Part 1: Display Router Information
Part 2: Configure Router Interfaces
Part 3: Verify the Configuration

Background:
In this activity, you will use various show commands to display the current state of the router. You will then use the Addressing Table to configure router Ethernet interfaces. Finally, you will use commands to verify and test your configurations.

Addressing Table:

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	192.168.10.1	255.255.255.0	N/A
	G0/1	192.168.11.1	255.255.255.0	N/A
	S0/0/0 (DCE)	209.165.200.225	255.255.255.252	N/A
R2	G0/0	10.1.1.1	255.255.255.0	N/A
	G0/1	10.1.2.1	255.255.255.0	N/A
	S0/0/0	209.165.200.226	255.255.255.252	N/A
PC1	NIC	192.168.10.10	255.255.255.0	192.168.10.1
PC2	NIC	192.168.11.10	255.255.255.0	192.168.11.1
PC3	NIC	10.1.1.10	255.255.255.0	10.1.1.1
PC4	NIC	10.1.2.10	255.255.255.0	10.1.2.1

Network Topology(Figure):



Procedure:

Part 1: Display Router Information

Step 1: Display interface information on R1.
Click a device and then click the CLI tab to access the command line directly. The console password is cisco. The privileged EXEC password is class. Enter the command to display the statistics for the Serial 0/0/0 interface on R1.

Step 2: Display a summary list of the interfaces on R1
Enter the router configuration commands along with commands for Ethernet Interfaces. Use command show ip interface brief for the same.

Step 3: Display the routing table on R1
Use command show ip route to display the routing table on R1.

Part 2: Configure Router Interfaces

Step 1: Configure the GigabitEthernet 0/0 interface on R1
R1(config)# interface gigabitethernet 0/0
R1(config-if)# ip address 192.168.10.1 255.255.255.0
R1(config-if)# no shutdown
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0, changed state to up

Step 2: Configure the remaining Gigabit Ethernet Interfaces on R1 and R2.
Use the information in the Addressing Table to finish the interface configurations for R1 and R2.

Step 3: Back up the configurations to NVRAM
For this use the command copy running config startup config to back up the configurations.

Part 3: Verify the Configuration

Step 1: Use verification commands to check your interface configurations.
a. Use the show ip interface brief command on both R1 and R2 to quickly verify that the interfaces are configured with the correct IP address and are active.

Step 2: Test end-to-end connectivity across the network.
You should now be able to ping from any PC to any other PC on the network. In addition, you should be able to ping the active interfaces on the routers. For example, the following tests should be successful:
• From the command line on PC1, ping PC4.
• From the command line on R2, ping PC2.

```
R1#config terminal
R1(config)#interface gigabitethernet 0/0
R1(config-if)#ip address 192.168.10.1
255.255.255.0 R1(config-if)#no
shutdown
R1(config-if)#description LAN
connection to S1
R1(config-if)#exit
R1(config)#interface gigabitEthernet 0/1
R1(config-if)#ip address 192.168.11.1
255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#description LAN
connection to S2
R1(config-if)#end

R1#copy running-config startup-config
```

R2:

```
R2>enable
Password: class
R2#conf terminal

R2(config)#interface gigabitEthernet 0/0
R2(config-if)#ip add 10.1.1.1
255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#description LAN
connection to S3

R2(config-if)#interface gigabitEthernet
0/1
R2(config-if)#ip address 10.1.2.1
255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#description LAN
connection to S4
R2(config-if)#end

R2#copy running-config startup-config
```

Questions:

Q) Which command displays the statistics for all interfaces configured on a router? Ans) R1#show interfaces

Q) Which command displays the information about the Serial 0/0/0 interface only? Ans) R1#show interfaces serial 0/0/0

Q) What is the IP address configured on R1?
Ans) 209.165.200.225/30

Q) What is the bandwidth on the Serial 0/0/0 interface?
Ans) 1544k bits

Q) What is the IP address on R1?
Ans) There is no IP address configured on the GigabitEthernet 0/0 interface.

Q) What is the MAC address of the GigabitEthernet 0/0 interface? Ans) 000d.bd6c.7d01

Q) What is the bandwidth on the GigabitEthernet 0/0 interface? Ans) 1000000 kbits

Q) How many serial interfaces are there on R1 and R2? Ans)Each router has 2 serial interfaces

Q) How many Ethernet interfaces are there on R1 and R2?
Ans)R1 has 6 Ethernet interfaces and R2 has 2 Ethernet interfaces.

Q) Are all the Ethernet interfaces on R1 the same? If no, explain the difference(s).
Ans)No, they are not. There are two Gigabit Ethernet interfaces and 4 Fast Ethernet interfaces. Gigabit Ethernet interfaces support speeds of up to 1,000,000,000 bits per second and Fast Ethernet interfaces support speeds of up to 1,000,000 bits per second.

Q) How many connected routes are there (uses the C code)? Ans) 1

Q) How does a router handle a packet destined for a network that is not listed in the routing table?
Ans)A router will only send packets to a network listed in the routing table. If a network is not listed, the packet will be dropped.

Q) Save the configuration files on both routers to NVRAM. What command did you use? Ans)copy running-config startup -config

Q) How many interfaces on R1 and R2 are configured with IP addresses and in the “up” and “up” state? Ans) Three on each of the router/

Q) What part of the interface configuration is NOT displayed in the command output? Ans)The subnet mask.

Q) What commands can you use to verify this part of the configuration? Ans) show run, show interfaces, show ip protocols

Q) How many OSPF routes (uses the O code) do you see on each router? Ans) Both R1 and R2 show 2 OSPF routes.

Q) If the router knows all the routes in the network, then the number of connected routes and dynamically learned routes (OSPF) should equal the total number of LANs and WANs. How many LANs and WANs are in the topology?
Ans) 5

Q) Does this number match the number of C and O routes shown in the routing table? Ans) Yes, they do.

Result:

```
User Access Verification

Password:

R2>enable
Password:
R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#iinterface G0/0
           ^
% Invalid input detected at '^' marker.

R2(config)#interface G0/0
R2(config-if)#ip address 10.1.1.1 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

R2(config-if)#exit
R2(config)#
R2(config)#interface G0/1
R2(config-if)#ip address 10.1.2.1 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

R2(config-if)#exit
R2(config)#interface G0/0
R2(config-if)#description Connection to S3 LAN Green Box Network
R2(config-if)#exit
R2(config)#interface G0/
                       ^
% Invalid input detected at '^' marker.

R2(config)#interface G0/1
R2(config-if)#description Connection to S3 LAN0 Box Network^Z
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#interface G0/0
R2(config-if)#description Connection to S3 LAN Pink Box Network
R2(config-if)#exit
R2(config)#interface G0/1
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, ch


S1>enable
S1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)#ip default-gateway 192.168.10.1
S1(config)#




S1 con0 is now available




Press RETURN to get started.
```

```
User Access Verification

Password:

R1>enable
Password:
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface G0/0
R1(config-if)#ip address 192.168.10.1 255.255.255.0
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

R1(config-if)#exit
R1(config)#interface G0/1
R1(config-if)#ip address 192.168.11.1 255.255.255.0
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

R1(config-if)#exit
R1(config)#interface G0/0
R1(config-if)#description Connection to S1 LAN Blue Box Network
R1(config-if)#exit
R1(config)#interface G0/1
R1(config-if)#description Connection to S2 LAN Red Box Network
R1(config-if)#exit
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R1#
```

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.1.2.10

Pinging 10.1.2.10 with 32 bytes of data:

Request timed out.
Reply from 10.1.2.10: bytes=32 time=15ms TTL=126
Reply from 10.1.2.10: bytes=32 time=18ms TTL=126
Reply from 10.1.2.10: bytes=32 time=1ms TTL=126

Ping statistics for 10.1.2.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 18ms, Average = 11ms

C:\>ping 10.1.2.10

Pinging 10.1.2.10 with 32 bytes of data:

Reply from 10.1.2.10: bytes=32 time=27ms TTL=126
Reply from 10.1.2.10: bytes=32 time=1ms TTL=126
Reply from 10.1.2.10: bytes=32 time=19ms TTL=126
Reply from 10.1.2.10: bytes=32 time=7ms TTL=126

Ping statistics for 10.1.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 27ms, Average = 13ms

C:\>
```

```
R2(config-if)#exit
R2(config)#interface G0/1
R2(config-if)#description Connection to S3 LAN Green Box Network
R2(config-if)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
```

```
S3>enable
S3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#ip default-gateway 10.1.1.1
S3(config)#
```

```
S3 con0 is now available

Press RETURN to get started.
```

```
S4>enable
S4#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S4(config)#ip default-gateway 10.1.2.1
S4(config)#









S4 con0 is now available




Press RETURN to get started.
```

```
S2>enable
S2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#ip default-gateway 192.168.11.1 255.255.255.0
                                           ^
% Invalid input detected at '^' marker.

S2(config)#ip default-gateway 192.168.11.1
S2(config)#









S2 con0 is now available




Press RETURN to get started.
```

Result: Connected a router to a LAN.