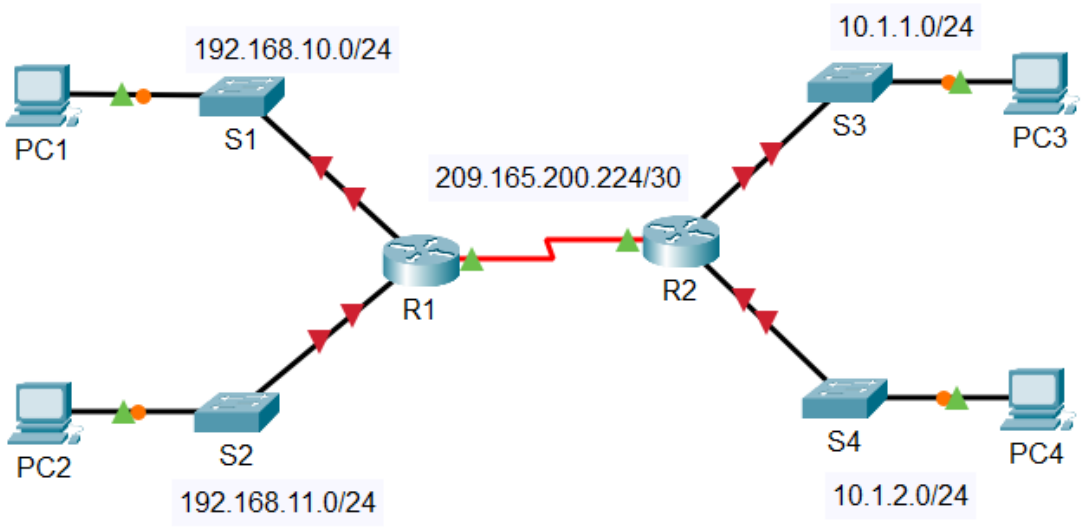
Experiment 10

Aim: To connect a router to a LAN.

Software Used:

Cisco Packet Tracer

Topology:



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

Objectives:

Part 1: Display Router Information

Part 2: Configure Router Interfaces

Part 3: Verify the Configuration

Procedure:

Part 1: Display Router Information

Step 1: Display interface information on R1.

Note: 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**.

a. Which command displays the statistics for all interfaces configured on a router?

Ans: "show run"

```
R1#show run
Building configuration...

Current configuration : 1346 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname R1
!
!
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
!
!
!
!
ip cef
no ipv6 cef
 More
```

b. Which command displays the information about the Serial 0/0/0 interface only?

Ans: “show interface Serial0/0/0”

```
R1#show interface Serial0/0/0
Serial0/0/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 209.165.200.225/30
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, 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 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 1158 kilobits/sec
  5 minute input rate 63 bits/sec, 0 packets/sec
  5 minute output rate 26 bits/sec, 0 packets/sec
     48 packets input, 3048 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     17 packets output, 1120 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
--More--
```

c. Enter the command to display the statistics for the Serial 0/0/0 interface on R1 and answer the following questions:

1) What is the IP address configured on **R1**?

Ans: 209.165.200.225/30

2) What is the bandwidth on the Serial 0/0/0 interface?

Ans:1544 kbit.

c. Enter the command to display the statistics for the GigabitEthernet 0/0 interface and answer the following questions:

```
GigabitEthernet0/0 is administratively down, line protocol is down (disabled)
  Hardware is CN Gigabit Ethernet, address is 000d.bd6c.7d01 (bia 000d.bd6c.7d01)
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is RJ45
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00,
  Last input 00:00:08, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (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 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 watchdog, 1017 multicast, 0 pause input
     0 input packets with dribble condition detected
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     0 unknown protocol drops
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

1) What is the IP address on **R1**?

Ans: None as control is down.

2) What is the MAC address of the GigabitEthernet 0/0 interface?

Ans: 000d.bd6c.07d01

3) What is the bandwidth (BW) of the GigabitEthernet 0/0 interface?

Ans: 1000000 kbit

Step 2: Display a summary list of the interfaces on R1.

```
R1#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
Serial0/0/0            209.165.200.225 YES manual up                    up
Serial0/0/1            unassigned      YES unset  administratively down down
FastEthernet0/1/0      unassigned      YES unset  administratively down down
FastEthernet0/1/1      unassigned      YES unset  administratively down down
FastEthernet0/1/2      unassigned      YES unset  administratively down down
FastEthernet0/1/3      unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

a. Which command displays a brief summary of the current interfaces, interface status, and the IP addresses assigned to them?

Ans: show ip interface brief

b. Enter the command on each router and answer the following questions:

1) How many serial interfaces are there on **R1** and **R2**?

Ans: 2 interfaces.

2) How many Ethernet interfaces are there on **R1** and **R2**?

Ans: 4 interfaces.

Step 3: Display the routing table on R1.

```
R1#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, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter ar
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C       209.165.200.224/30 is directly connected, Serial0/0/0
L       209.165.200.225/32 is directly connected, Serial0/0/0
```

a. What command displays the contents of the routing table?

b. Enter the command on **R1** and answer the following questions:

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

Ans: 1

2) Which route is listed?

Ans: Serial0/0/0.

Part 2: Configure Router Interfaces

Step 1: Configure the GigabitEthernet 0/0 interface on R1.

```
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#
R1(config)#interface gigabitethernet0/0
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)#description LAN connection to S1
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#ping 192.168.10.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.10, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms

R1#ping 192.168.10.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
```

Step 2: Configure the remaining Gigabit Ethernet Interfaces on R1 and R2.

a. Use the information in the Addressing Table to finish the interface configurations for **R1** and **R2**. For each interface, do the following:

```
R1(config)#interface gigabitethernet0/1
R1(config-if)#ip address 192.168.11.1 255.255.255.0
R1(config-if)#description OPEN LAN PORT
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)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

R2:

```
R2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#interface gigabitethernet0/0
R2(config-if)#ip address 10.1.1.1 255.255.255.0
R2(config-if)#description LAN OPEN
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)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#interface gigabitethernet0/1
           ^
% Invalid input detected at '^' marker.

R2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#interface gigabitethernet0/1
R2(config-if)#ip address 10.1.2.1
% Incomplete command.
R2(config-if)#ip address 10.1.2.1 255.255.255.0
R2(config-if)#description LAN S2
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 Serial0/0/0
R2(config-if)#ip address 209.165.200.226 255.255.255.252
R2(config-if)#descripton S1 LAN
                     ^
% Invalid input detected at '^' marker.

R2(config-if)#descripton LAN
                     ^
% Invalid input detected at '^' marker.

R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 3: Back up the configurations to NVRAM.

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

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

Part 3: Verify the Configuration

Step 1: Use verification commands to check your interface configurations.

```
R2#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     10.1.1.1        YES manual up                    up
GigabitEthernet0/1     10.1.2.1        YES manual up                    up
Serial0/0/0            209.165.200.226 YES manual up                    up
Serial0/0/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

a. Use the **show ip route** command on both **R1** and **R2** to view the current routing tables and answer the following questions:

```
R2#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, E - EGP
       i - IS-IS, 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

     10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       10.1.1.0/24 is directly connected, GigabitEthernet0/0
L       10.1.1.1/32 is directly connected, GigabitEthernet0/0
C       10.1.2.0/24 is directly connected, GigabitEthernet0/1
L       10.1.2.1/32 is directly connected, GigabitEthernet0/1
O    192.168.10.0/24 [110/65] via 209.165.200.225, 00:21:07, Serial0/0/0
O    192.168.11.0/24 [110/65] via 209.165.200.225, 00:06:28, Serial0/0/0
     209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C       209.165.200.224/30 is directly connected, Serial0/0/0
L       209.165.200.226/32 is directly connected, Serial0/0/0
```

1) How many connected routes (uses the **C** code) do you see on each router?

Ans: 3

2) How many OSPF routes (uses the **O** code) do you see on each router?

Ans: 3

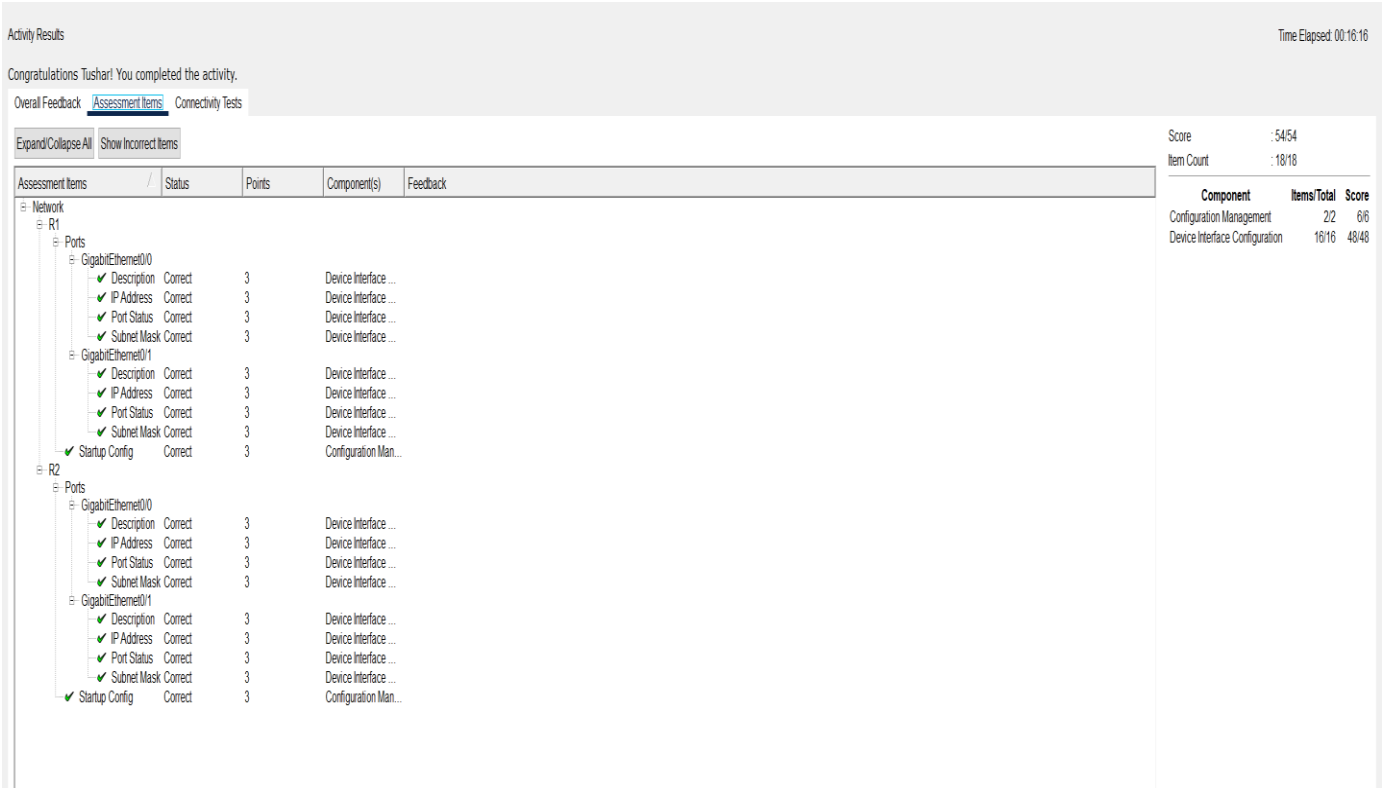
3) If the router knows all the routes in the network, then the number of connected routes and dynamically learned routes (OSPF) should equal the total number of LANs and WANs. How many LANs and WANs are in the topology?

Ans: 3

4) Does this number match the number of C and O routes shown in the routing table?

Ans: Yes

Packet Tracer Activity:



Activity Results

Time Elapsed: 00:16:16

Congratulations Tushar! You completed the activity.

Overall Feedback | Assessment Items | Connectivity Tests

Expand/Collapse All | Show Incorrect Items

Assessment Items	Status	Points	Component(s)	Feedback
Network				
R1				
Ports				
GigabitEthernet0/0				
Description	Correct	3	Device Interface ...	
IP Address	Correct	3	Device Interface ...	
Port Status	Correct	3	Device Interface ...	
Subnet Mask	Correct	3	Device Interface ...	
GigabitEthernet0/1				
Description	Correct	3	Device Interface ...	
IP Address	Correct	3	Device Interface ...	
Port Status	Correct	3	Device Interface ...	
Subnet Mask	Correct	3	Device Interface ...	
Startup Config	Correct	3	Configuration Man...	
R2				
Ports				
GigabitEthernet0/0				
Description	Correct	3	Device Interface ...	
IP Address	Correct	3	Device Interface ...	
Port Status	Correct	3	Device Interface ...	
Subnet Mask	Correct	3	Device Interface ...	
GigabitEthernet0/1				
Description	Correct	3	Device Interface ...	
IP Address	Correct	3	Device Interface ...	
Port Status	Correct	3	Device Interface ...	
Subnet Mask	Correct	3	Device Interface ...	
Startup Config	Correct	3	Configuration Man...	

Score : 54/54

Item Count : 18/18

Component	Items/Total	Score
Configuration Management	2/2	6/6
Device Interface Configuration	16/16	48/48

Conclusion:

The router was connected successfully to LAN.