CO513 - Lab Assignment
Dynamic Routing - RIP

1. SPECIFY THE DIFFERENCES BETWEEN RIPV1 AND RIPV2

RIPV1

- Supports Classful networks only

- It use broadcast 255.255.255.255

- Not send subnet mask information along with routing updates

- Does not support for VLSM

- Does not support for authentication

- Less Secure than RIPV2

- Does not support manual route summarization

RIPV2

- Supports Class full and class less networks also

- It use multicast 224.0.0.9

- Send subnet mask information along with routing updates

- Supports VLSM

- Support for authentication

- More secure than the RIPV1

- Support for manual route summarization

2. DRAW SIMILAR NETWORK TOPOLOGY GIVEN IN FIGURE 01, USING PACKET TRACER AND DO THE IP CONFIGURATIONS FOR EACH OF THE DEVICES (PCS, ROUTER PORTS) CONSIDERING TABLE 01.
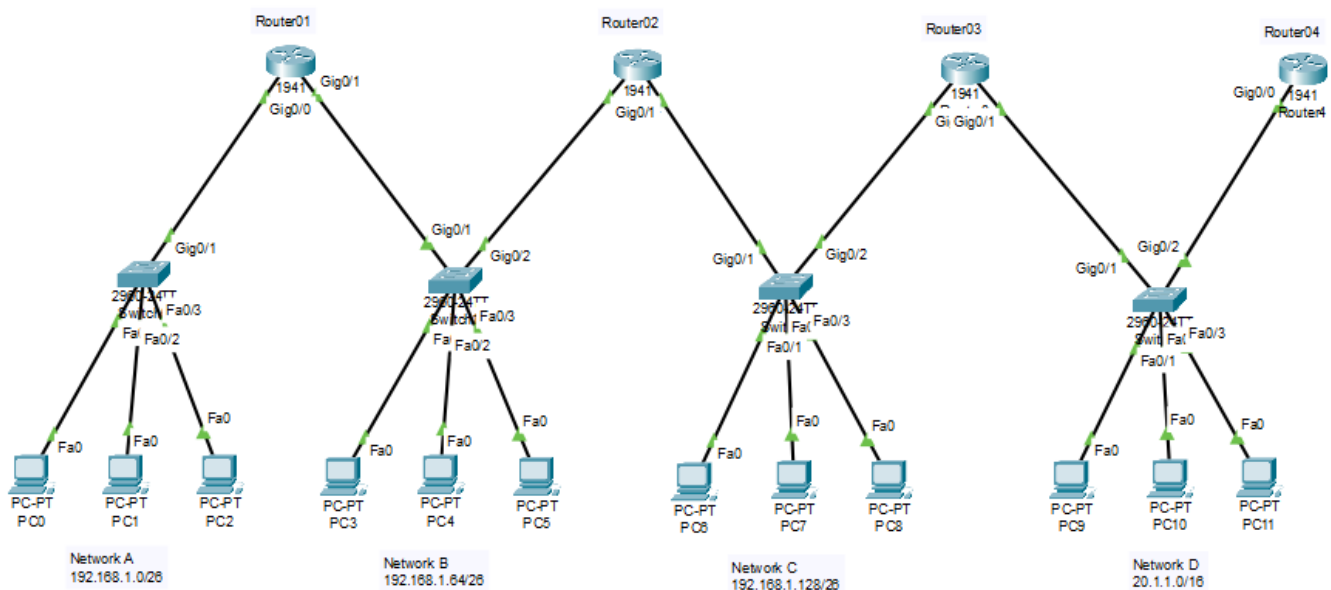

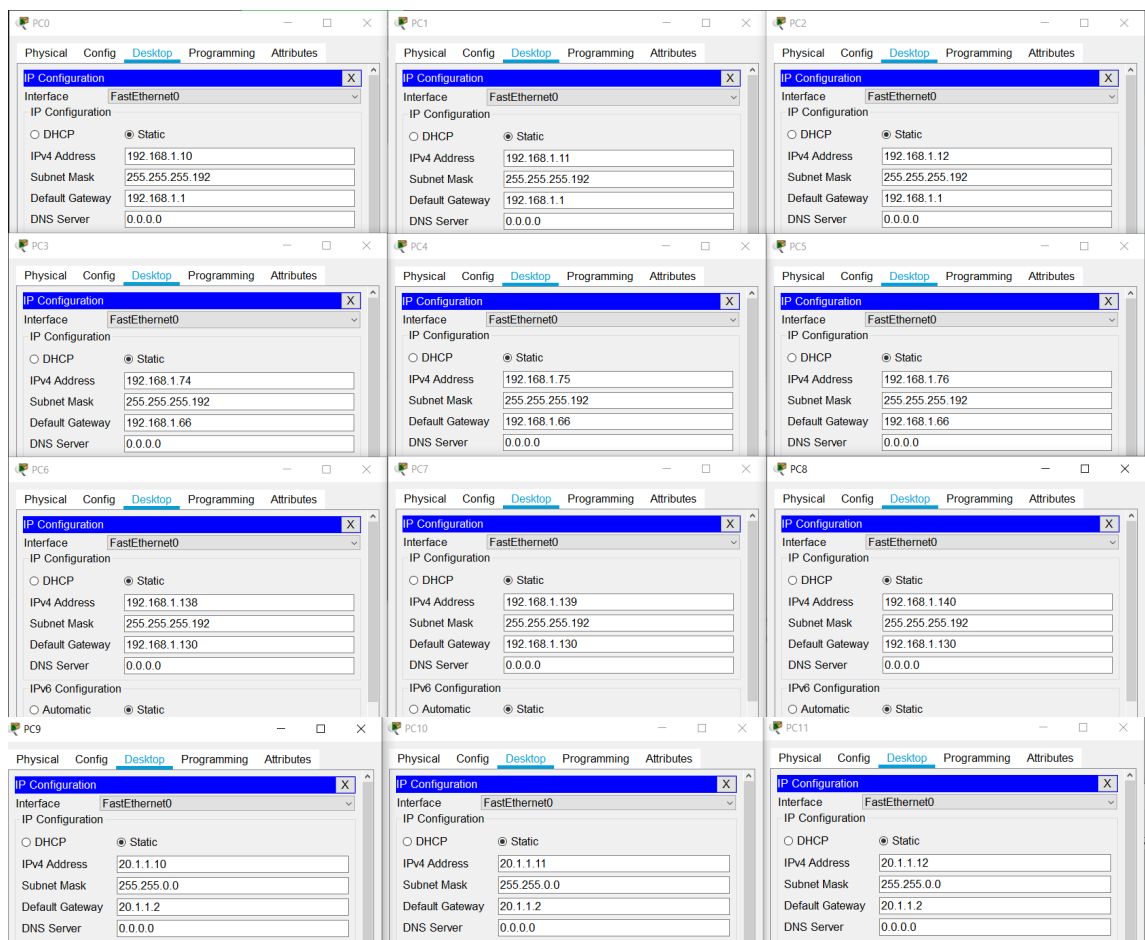FIGURE 1 :   IP Configured Network Topology Diagram

FIGURE 2 : All the PC IP Addressing, Subnet Mask, Default Gateway identification

Network	Device	IP address	Subnet Mask	Default Gateway Address
Network A	PC0	192.168.1.10	255.255.255.192	192.168.1.1
	PC1	192.168.1.11	255.255.255.192	
	PC2	192.168.1.12	255.255.255.192	
Network B	PC3	192.168.1.74	255.255.255.192	192.168.1.66
	PC4	192.168.1.75	255.255.255.192	
	PC5	192.168.1.76	255.255.255.192	
Network C	PC6	192.168.1.138	255.255.255.192	192.168.1.130
	PC7	192.168.1.139	255.255.255.192	
	PC8	192.168.1.140	255.255.255.192	
Network E	PC9	20.1.1.10	255.255.0.0	20.1.1.2
	PC10	20.1.1.11	255.255.0.0	
	PC11	20.1.1.12	255.255.0.0	

TABLE 2 : IP Configuration Table for PC

Router	Interface 0/0 IP	Interface 0/1 IP	RIPV2 Network Added
Router01	192.168.1.1	192.168.1.65	192.168.1.0 192.168.1.64
Router02	192.168.1.66	192.168.1.129	192.168.1.64 192.168.1.128
Router03	192.168.1.130	20.1.1.1	192.168.1.128 20.1.1.0
Router04	20.1.1.2	Not Assigned	20.1.1.0

TABLE 3 :   Router Configuration Table

Following steps are taken in order to configure all the routers defined in table 3 except RIP Configuration which identified later

```
Router>enable
Router#show clock
*1:17:2.213 UTC Mon Mar 1 1993
Router#clock set 23:13:00 6 July 2021
Router#show clock
23:13:4.109 UTC Tue Jul 6 2021
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname Router01
Router01(config)#enable password router1pwd
Router01(config)#banner motd *
Enter TEXT message.  End with the character '*'.


                    CO 513 Lab Assignment - Dynamic Routing (RIP)
                    Hostname : Router01
                    Password : router1pwd


*

Router01(config)#
```

FIGURE 3 :   Configure Clock, Hostname, Password, Banner for Router01

```
Router01>enable
Password:
Router01#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router01(config)#interface GigabitEthernet 0/0
Router01(config-if)#ip address 192.168.1.1 255.255.255.192
Router01(config-if)#no shutdown

Router01(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

Router01(config-if)#exit
Router01(config)#interface GigabitEthernet 0/1
Router01(config-if)#ip address 192.168.1.65 255.255.255.192
Router01(config-if)#no shutdown

Router01(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

Router01(config-if)#
```

FIGURE 4 :   Configure Interface IPs and Changed the state to up state from down

```
Router01(config-if)#exit
Router01(config)#exit
Router01#
%SYS-5-CONFIG_I: Configured from console by console

Router01#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router01#
```

FIGURE 5 : Saving the Router Configurations

03. CONFIGURE RIP FOR EACH OF THE ROUTERS. INCLUDE SCREENSHOTS OF YOUR CLI WINDOWS INTO THE REPORT (CLEARLY INDICATE THE NETWORK CONFIGURATIONS).

```
            CO 513 Lab Assignment - Dynamic Routing (RIP)
            Hostname : Router01
            Password : router1pwd

Router01>enable
Password:
Router01#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router01(config)#router rip
Router01(config-router)#version 2
Router01(config-router)#network 192.168.1.0
Router01(config-router)#network 192.168.1.64
Router01(config-router)#exit
Router01(config)#exit
Router01#exit
```

```
            CO513 Lab Assignment - Dynamic Routing (RIP)
            Hostname : Router02
            Password : router2pwd

Router02>enable
Password:
Router02#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router02(config)#router rip
Router02(config-router)#version 2
Router02(config-router)#network 192.168.1.64
Router02(config-router)#network 192.168.1.128
Router02(config-router)#exit
Router02(config)#exit
Router02#
```

```
            CO513 Lab Assignment - Dynamic Routing (RIP)
            Hostname : Router03
            Password : router3pwd

Router03>enable
Password:
Router03#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router03(config)#router rip
Router03(config-router)#version 2
Router03(config-router)#network 192.168.1.128
Router03(config-router)#network 20.1.1.0
Router03(config-router)#exit
Router03(config)#exit
Router03#
%SYS-5-CONFIG_I: Configured from console by console

Router03#
```

```
            CO513 Lab Assignment - Dynamic Routing (RIP)
            Hostname : Router04
            Password : router4pwd

Router04>enable
Password:
Router04#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router04(config)#router rip
Router04(config-router)#version 2
Router04(config-router)#network 20.1.1.0
Router04(config-router)#exit
Router04(config)#exit
Router04#
```

FIGURE 6 : RIP Configuration in Each router defining the network each router has

4. PRINT THE ROUTING TABLE IN THE ROUTER R1. EXPLAIN EACH PARAMETER INDICATED IN THE ROUTING TABLE FOR THE ROUTES THAT IT HAS LEARNT THROUGH RIP.

```
Router01#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

R    20.0.0.0/8 [120/2] via 192.168.1.66, 00:00:01, GigabitEthernet0/1
     192.168.1.0/24 is variably subnetted, 5 subnets, 2 masks
C       192.168.1.0/26 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
C       192.168.1.64/26 is directly connected, GigabitEthernet0/1
L       192.168.1.65/32 is directly connected, GigabitEthernet0/1
R       192.168.1.128/26 [120/1] via 192.168.1.66, 00:00:01, GigabitEthernet0/1

Router01#
```

FIGURE 7 : IP Routes in Router01

Following are included in the routing table of the Router01

- Routing table consists directly connected networks as letter C

  - Network 192.168.1.0/26 connected to the GigabitEthernet interface 0/0
  - Network 192.168.1.64/26 connected to the GigabitEthernet interface 0/1

- L represents how the network what IP connected to the corresponding interface

  - IP 192.168.1.1/32 which is an single IP address connected to the interface 0/0
  - IP 192.168.1.65/32 connected to the interface 0/1

- R represents the networks connected via RIP. As a result Router01 have the ability to identify the other networks which are not connected directly to this network. Then map them by defining paths can access those networks.

  - Identified 20.0.0.0/8 network connected via the 192.168.1.66 in the interface 0/1
  - Identified 192.168.1.128/26 is connected via 192.168.1.66 in the interface 0/1

05. EXPLAIN THE "AUTO SUMMARIZATION" ISSUE OF RIP USING THE ROUTING TABLE OF R4 ROUTER. MENTION UNDER WHAT KIND OF SITUATIONS THIS OCCURS AND SUGGEST A SOLUTION TO RESOLVE THIS ISSUE IN RIP. RECONFIGURE R3 WITH YOUR SUGGESTED SOLUTION. OBSERVE THE NEW ROUTING TABLE AT R4.

Route Summarization

- Creating a one summary route for multiple subnets which also refers to route aggregation or route supernetting. This aggregation saves a lot of memory in the routing table.

- But the subnet should be in the same subnet is a must in order for auto summarization.

- If there are other networks recedes few hopes away those destinations cannot be reached.

- This issue can be fixed by desabling the auto-summary feature in the configure router user interface
- Following figure will explains how the to remove the auto summarization. And after that operations it will shows how the new routes are defined.
- In the following route table it define separate subnets. After desabling the auto summarization.

```
Router03>enable
Password:
Router03#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router03(config)#router rip
Router03(config-router)#no auto-summary
Router03(config-router)#exit
Router03(config)#exit
Router03#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

     20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       20.1.0.0/16 is directly connected, GigabitEthernet0/1
L       20.1.1.1/32 is directly connected, GigabitEthernet0/1
     192.168.1.0/24 is variably subnetted, 4 subnets, 2 masks
R       192.168.1.0/26 [120/2] via 192.168.1.129, 00:00:06, GigabitEthernet0/0
R       192.168.1.64/26 [120/1] via 192.168.1.129, 00:00:06, GigabitEthernet0/0
C       192.168.1.128/26 is directly connected, GigabitEthernet0/0
L       192.168.1.130/32 is directly connected, GigabitEthernet0/0
```

FIGURE 8 : Disabled the auto-summary feature then Shows new IP routes separating two subnets.

06. MENTION TWO OTHER LIMITATIONS OF RIP (EXCEPT AUTO SUMMARIZATION).

- Increased Network Traffic RIP continuously check for neighboring routers every 30 secs which increases the network traffic
- Maximum Hop Count RIP contains the maximum hop count of 15, therefore larger networks if RIP is using it unable to reach other remote routers if hop count is reached its maximum count.