Lab-5: Objective:
Part A: Configure Routing Information Protocol (RIP) version 1
Part B: Configure Routing Information Protocol (RIP) version 2
Part C: Configure RIPv2 on physical router

Lab-5
Routing Information Protocol (RIP) version 1& 2

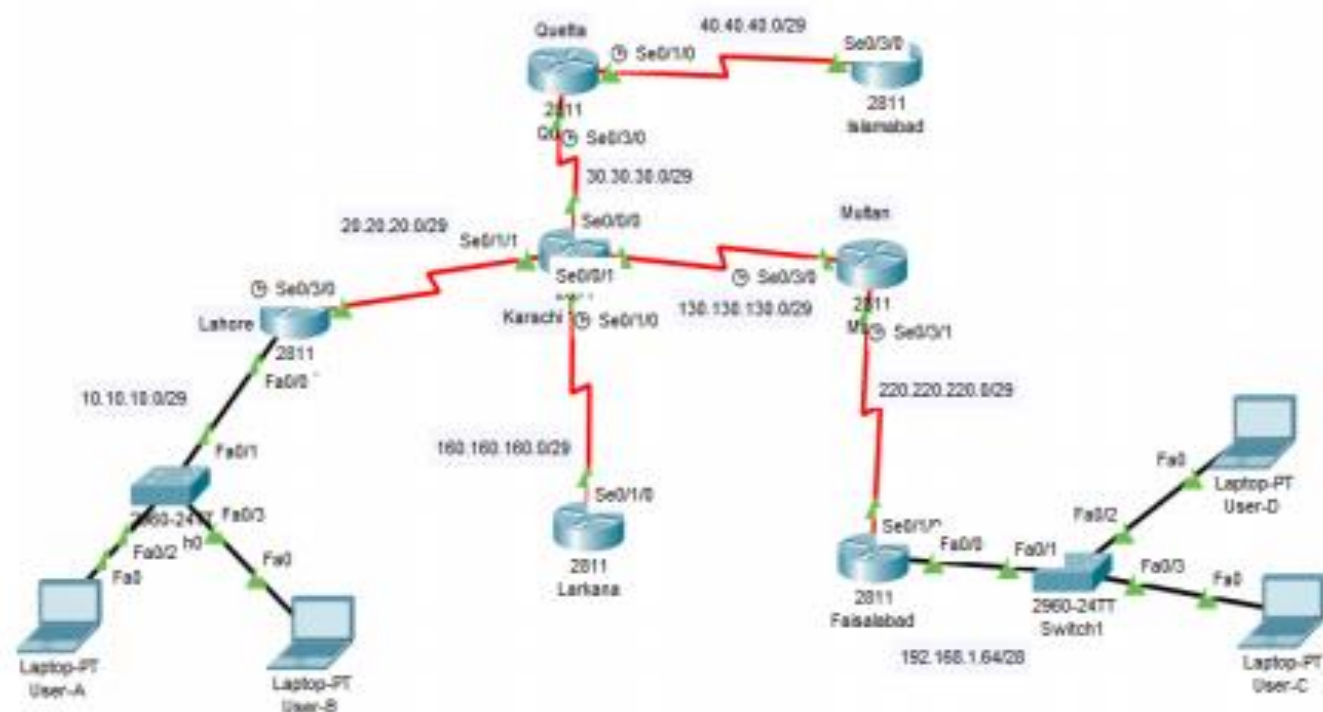Part A: Configure Routing Information Protocol (RIP) version 1on given network in figure 13.

Figure 13

What is Dynamic Routing?

In dynamic routing, the routers show the path between two routers that can be updated automatically. Paths are automatically updated. If the changes occur at the network side, there

is no need to update the routing path manually, routing paths will automatically be updated. Paths between routers are known as routing paths. When changes occur at the network it sends messages to a router to inform about changes. The router updates the changes and using routing algorithm routes i.e. routing paths are calculated and updated in the table. Dynamic routing also is known for adaptive routing as it adopts the routing path automatically.

The routes or paths on which the dynamic routing is performed are known as a dynamic path or dynamic routes. In this routing; the information is responsive to the network changes to update the changes dynamically. Responsive means it changes according to the network changes. It adjusts itself with respect to the network changes.

Let us discuss some of the major key differences between Static Routing vs. dynamic routing.

1. In static routing, routing tables are manually updated while in dynamic routing tables are automatically updated.
2. The static routing is best for small network implementation and star topologies. It is not as good for any other topologies. Whereas dynamic routing is best for a large network implementation. It is good for network topologies which consist of redundant links.
3. Static Routing requires less bandwidth than dynamic routing. Where dynamic routing requires large bandwidth.
4. In static routing routes, the path is updated by the user or an administrator while in dynamic routing, routes are updated automatically.
5. Static Routing does not use any routing protocols and algorithms while dynamic routing uses routing protocols and complex algorithms to calculate routing operations.
6. Static Routing is known for non-adaptive routing, while dynamic routing is known for adaptive routing.
7. Static routes require small administrative distance than the dynamic route.
8. In static routing, routes not react with network changes while in dynamic routing, routes react with network changes.
9. Static Routing does not require a license while dynamic routing requires a license. Also, in static routing, link failure disturbs routing is in process. While in dynamic routing, link failure does not disturb routing is in process.
10. In static routing, routes for the destination are the same as defined. While in dynamic routing, routes depend on the current network topology.
11. Reroute traffic is not present in static routing, while it is present in dynamic routing.
12. There is no need for extra sources in static routing; while in dynamic routing extra resources are required.
13. In static routing, the network infrastructure is small whereas network infrastructure is huge in dynamic routing.

Routing Information Protocol Version 1 (RIPv1)

RIPv1 uses local broadcasts to share routing information. These updates are periodic in nature, occurring, by default, every 30 seconds. To prevent packets from circling around a loop forever, both versions of RIP solve counting to infinity by placing a hop count limit of 15 hops on packets. Any packet that reaches the sixteenth hop will be dropped. RIPv1 is a classful protocol. RIP supports up to six equal-cost paths to a single destination. Equal-cost path are the paths where the metric is same (Hop count).
• It Supports only classful routing (Does not support VLSM).
• No authentication in version 1.

Task 1, Assign the IP address on each Router

Router Lahore:

Lahore >enable

Lahore #configure terminal

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

Lahore (config)#interface serial 0/3/0

Lahore (config-if)#ip address 20.20.20.1 255.255.255.248

Lahore (config)#clock rate 64000

Lahore (config-if)#no shutdown

Lahore (config-if)#exit

Lahore (config)#interface fa 0/0

Lahore (config-if)#ip address 10.10.10.1 255.255.255.248

Lahore (config-if)#no shutdown

Lahore (config-if)#exit

Router Karachi:

Karachi >enable

Karachi #configure terminal

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

Karachi (config)#interface serial 0/1/0

Karachi (config-if)#ip address 160.160.160.1 255.255.255.248

Karachi (config)#clock rate 64000

Karachi (config-if)#no shutdown

Karachi (config-if)#exit

Karachi (config)#interface serial 0/1/1

Karachi (config-if)#ip address 20.20.20.1 255.255.255.248

Karachi (config-if)#no shutdown

Karachi (config-if)#exit

Karachi (config)#interface serial 0/0/0

Karachi (config-if)#ip address 30.30.30.2 255.255.255.248

Karachi (config-if)#no shutdown

Karachi (config-if)#exit

Karachi (config)#interface serial 0/0/1

Karachi (config-if)#ip address 130.130.130.1 255.255.255.248

Karachi (config-if)#no shutdown

Karachi (config-if)#exit

Router Quetta:

Quetta >enable

Quetta #configure terminal

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

Quetta (config)#interface serial 0/1/0

Quetta (config-if)#ip address 40.40.40.1 255.255.255.248

Quetta (config)#clock rate 64000

Quetta (config-if)#no shutdown

Quetta (config-if)#exit

Quetta (config)#interface serial 0/3/0

Quetta (config-if)#ip address 30.30.30.1 255.255.255.248

Quetta (config)#clock rate 64000

Quetta (config-if)#no shutdown

Quetta (config-if)#exit

Router Islamabad:

Islamabad >enable

Islamabad #configure terminal

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

Islamabad (config)#interface serial 0/3/0

Islamabad (config-if)#ip address 40.40.40.2 255.255.255.248

Islamabad (config-if)#no shutdown

Islamabad (config-if)#exit

Router Multan:

Multan >enable

Multan #configure terminal

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

Multan(config)#interface serial 0/3/0

Multan (config-if)#ip address 130.130.130.2 255.255.255.248

Multan (config-if)#clock rate 64000

Multan (config-if)#no shutdown

Multan (config-if)#exit

Multan(config)#interface serial 0/3/1

Multan (config-if)#ip address 220.220.220.1 255.255.255.248

Multan (config-if)#clock rate 64000

Multan (config-if)#no shutdown

Multan (config-if)#exit

RouterFaisalabad:

Faisalabad>enable

Faisalabad #configure terminal

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

Faisalabad(config)#interface serial 0/1/0

Faisalabad (config-if)#ip address 220.220.220.2 255.255.255.248

Faisalabad (config-if)#no shutdown

Faisalabad (config-if)#exit

Faisalabad (config)#interface fa 0/0

Faisalabad (config-if)#ip address 192.168.1.65 255.255.255.240

Faisalabad (config-if)#no shutdown

Faisalabad (config-if)#exit

Router Larkana:

Larkana >enable

Larkana #configure terminal

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

Larkana (config)#interface serial 0/1/0

Larkana (config-if)#ip address 160.160.160.2 255.255.255.248

Larkana (config-if)#no shutdown

Larkana (config-if)#exit

Task 2, Configure RIPv1 on each Router

Router Lahore:

Lahore (config)#router rip

Lahore (config-router)#network 10.0.0.0

Lahore (config-router)#network 20.0.0.0

Lahore (config-router)#exit

Router Karachi:

Karachi (config)#router rip

Karachi(config-router)#network 20.0.0.0

Karachi(config-router)#network 30.0.0.0

Karachi(config-router)#network 130.130.0.0

Karachi(config-router)#network 160.160.0.0

Karachi(config-router)#exit

Router Quetta:

Quetta (config)#router rip

Quetta(config-router)#network 40.0.0.0

Quetta (config-router)#network 30.0.0.0

Quetta(config-router)#exit

Router Islamabad:

Islamabad (config)#router rip

Islamabad(config-router)#network 40.0.0.0

Islamabad(config-router)#exit

Router Multan:

Multan(config)#router rip

Multan(config-router)#network 130.130.0.0

Multan(config-router)#network 220.220.220.0

Multan(config-router)#exit

RouterFaisalabad:

Faisalabad (config)#router rip

Faisalabad(config-router)#network 220.220.220.0

Faisalabad(config-router)#network 192.168.1.0

Faisalabad(config-router)#exit

Router Larkana:

Larkana (config)#router rip

Larkana(config-router)#network 160.160.0.0

Larkana(config-router)#exit

Routing Information Protocol (RIP) version 2

Part B:Configure Routing Information Protocol (RIP) version 2 on given network in figure 14.
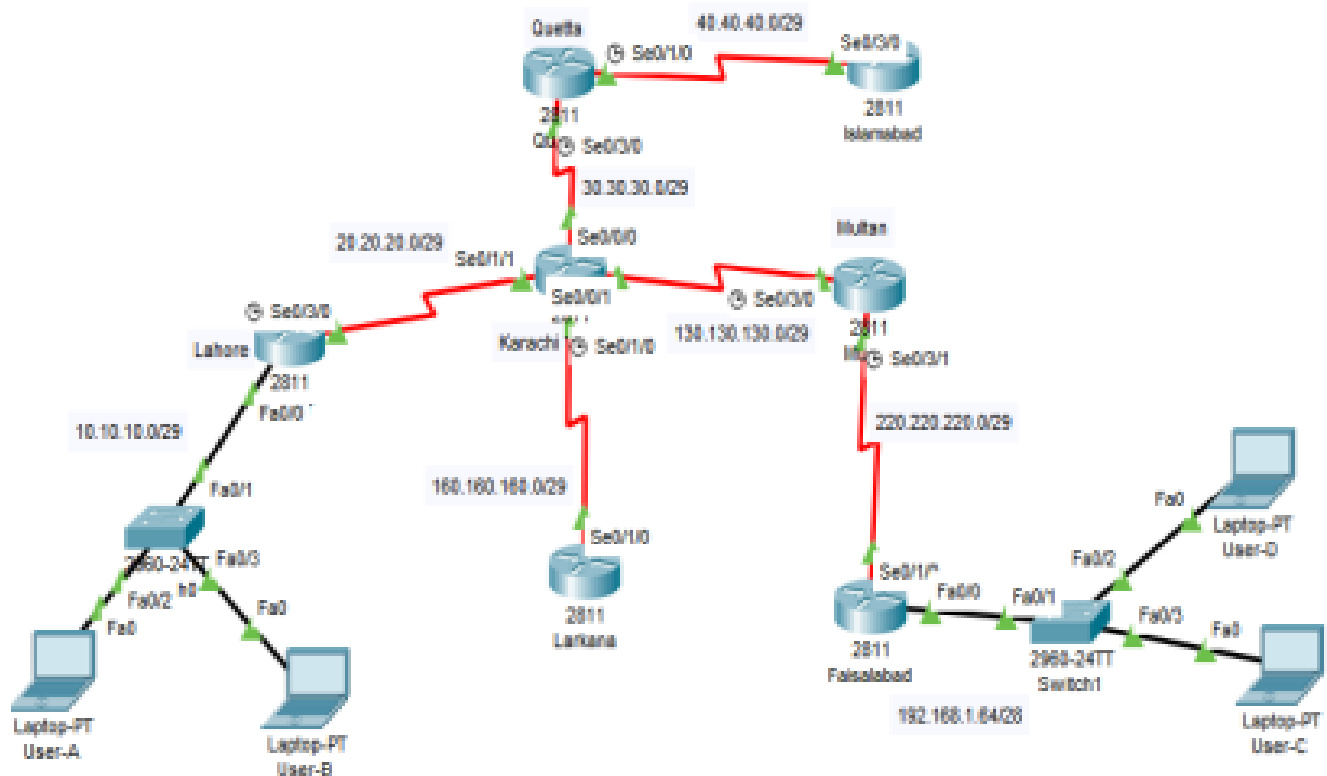

Figure 14

Routing Information Protocol (RIP) version 2:

RIPv2 is a distance vector routing protocol with routing enhancements built into it, and it is based on RIPV1. Therefore, it is commonly called as hybrid routing protocol.

RIPv2 uses multicasts instead of broadcasts. RIPv2 supports triggered updates. When a change occurs, a RIPv2 router will immediately propagate its routing information to its connected neighbors. RIPv2 is a classless protocol and it supports variable-length subnet masking (VLSM). Both RIPv1 and RIPv2 uses hop count as the metric.

• It supports classless routing (Supports VLSM). RIPv2 incorporates the addition of the network mask in the update to allow classless routing advertisements.

• Authentication is available.

• RIPv2 uses multi-cast instead of broadcast. Multicast communication reduces the burden on the network devices that do not need to listen to RIP updates.

Task 1, Assign the IP address on each Router

Router Lahore:

Lahore >enable

Lahore #configure terminal

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

Lahore (config)#interface serial 0/3/0

Lahore (config-if)#ip address 20.20.20.1 255.255.255.248

Lahore (config)#clock rate 64000

Lahore (config-if)#no shutdown

Lahore (config-if)#exit

Lahore (config)#interface fa 0/0

Lahore (config-if)#ip address 10.10.10.1 255.255.255.248

Lahore (config-if)#no shutdown

Lahore (config-if)#exit

Router Karachi:

Karachi >enable

Karachi #configure terminal

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

Karachi (config)#interface serial 0/1/0

Karachi (config-if)#ip address 160.160.160.1 255.255.255.248

Karachi (config)#clock rate 64000

Karachi (config-if)#no shutdown

Karachi (config-if)#exit

Karachi (config)#interface serial 0/1/1

Karachi (config-if)#ip address 20.20.20.1 255.255.255.248

Karachi (config-if)#no shutdown

Karachi (config-if)#exit

Karachi (config)#interface serial 0/0/0

Karachi (config-if)#ip address 30.30.30.2 255.255.255.248

Karachi (config-if)#no shutdown

Karachi (config-if)#exit

Karachi (config)#interface serial 0/0/1

Karachi (config-if)#ip address 130.130.130.1 255.255.255.248

Karachi (config-if)#no shutdown

Karachi (config-if)#exit

Router Quetta:

Quetta >enable

Quetta #configure terminal

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

Quetta (config)#interface serial 0/1/0

Quetta (config-if)#ip address 40.40.40.1 255.255.255.248

Quetta (config)#clock rate 64000

Quetta (config-if)#no shutdown

Quetta (config-if)#exit

Quetta (config)#interface serial 0/3/0

Quetta (config-if)#ip address 30.30.30.1 255.255.255.248

Quetta (config)#clock rate 64000

Quetta (config-if)#no shutdown

Quetta (config-if)#exit

Router Islamabad:

Islamabad >enable

Islamabad #configure terminal

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

Islamabad (config)#interface serial 0/3/0

Islamabad (config-if)#ip address 40.40.40.2 255.255.255.248

Islamabad (config-if)#no shutdown

Islamabad (config-if)#exit

Router Multan:

Multan >enable

Multan #configure terminal

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

Multan(config)#interface serial 0/3/0

Multan (config-if)#ip address 130.130.130.2 255.255.255.248

Multan (config-if)#clock rate 64000

Multan (config-if)#no shutdown

Multan (config-if)#exit

Multan(config)#interface serial 0/3/1

Multan (config-if)#ip address 220.220.220.1 255.255.255.248

Multan (config-if)#clock rate 64000

Multan (config-if)#no shutdown

Multan (config-if)#exit

Router Faisalabad:

Faisalabad >enable

Faisalabad #configure terminal

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

Faisalabad (config)#interface serial 0/1/0

Faisalabad (config-if)#ip address 220.220.220.2 255.255.255.248

Faisalabad (config-if)#no shutdown

Faisalabad (config-if)#exit

Faisalabad (config)#interface fa 0/0

Faisalabad (config-if)#ip address 192.168.1.65 255.255.255.240

Faisalabad (config-if)#no shutdown

Faisalabad (config-if)#exit

Router Larkana:

Larkana >enable

Larkana #configure terminal

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

Larkana (config)#interface serial 0/1/0

Larkana (config-if)#ip address 160.160.160.2 255.255.255.248

Larkana (config-if)#no shutdown

Larkana (config-if)#exit

Task 2, Configure RIPv2 on each Router
Router Lahore:

Lahore (config)#router rip

Lahore (config-router)#version 2

Lahore (config-router)#network 10.0.0.0

Lahore (config-router)#network 20.0.0.0

Lahore (config-router)#exit

Router Karachi:

Karachi (config)#router rip

Karachi(config-router)#version 2

Karachi(config-router)#network 20.0.0.0

Karachi(config-router)#network 30.0.0.0

Karachi(config-router)#network 130.130.0.0

Karachi(config-router)#network 160.160.0.0

Karachi(config-router)#exit

Router Quetta:

Quetta (config)#router rip

Quetta(config-router)#version 2

Quetta(config-router)#network 40.0.0.0

Quetta (config-router)#network 30.0.0.0

Quetta(config-router)#exit

Router Islamabad:

Islamabad (config)#router rip

Islamabad(config-router)#version 2

Islamabad(config-router)#network 40.0.0.0

Islamabad(config-router)#exit

Router Multan:

Multan(config)#router rip

Multan(config-router)#version 2

Multan(config-router)#network 130.130.0.0

Multan(config-router)#network 220.220.220.0

Multan(config-router)#exit

Router Faisalabad:

Faisalabad (config)#router rip

Faisalabad(config-router)#version 2

Faisalabad(config-router)#network 220.220.220.0

Faisalabad(config-router)#network 192.168.1.0

Faisalabad(config-router)#exit

Router Larkana:

Larkana (config)#router rip

Larkana(config-router)#version 2

Larkana(config-router)#network 160.160.0.0

Larkana(config-router)#exit

Lab-5 Exercise:

Design a hybrid network which consists of 5 routers. Attach 3 PC's with each router. Configure RIPv2 on this environment so that all the devices can send data packets to each other. What do you understand when you use the command "Show IP route" on each router?