Lab-7: Objective:

Configure Open Shortest Path First (OSPF) in figure 17.

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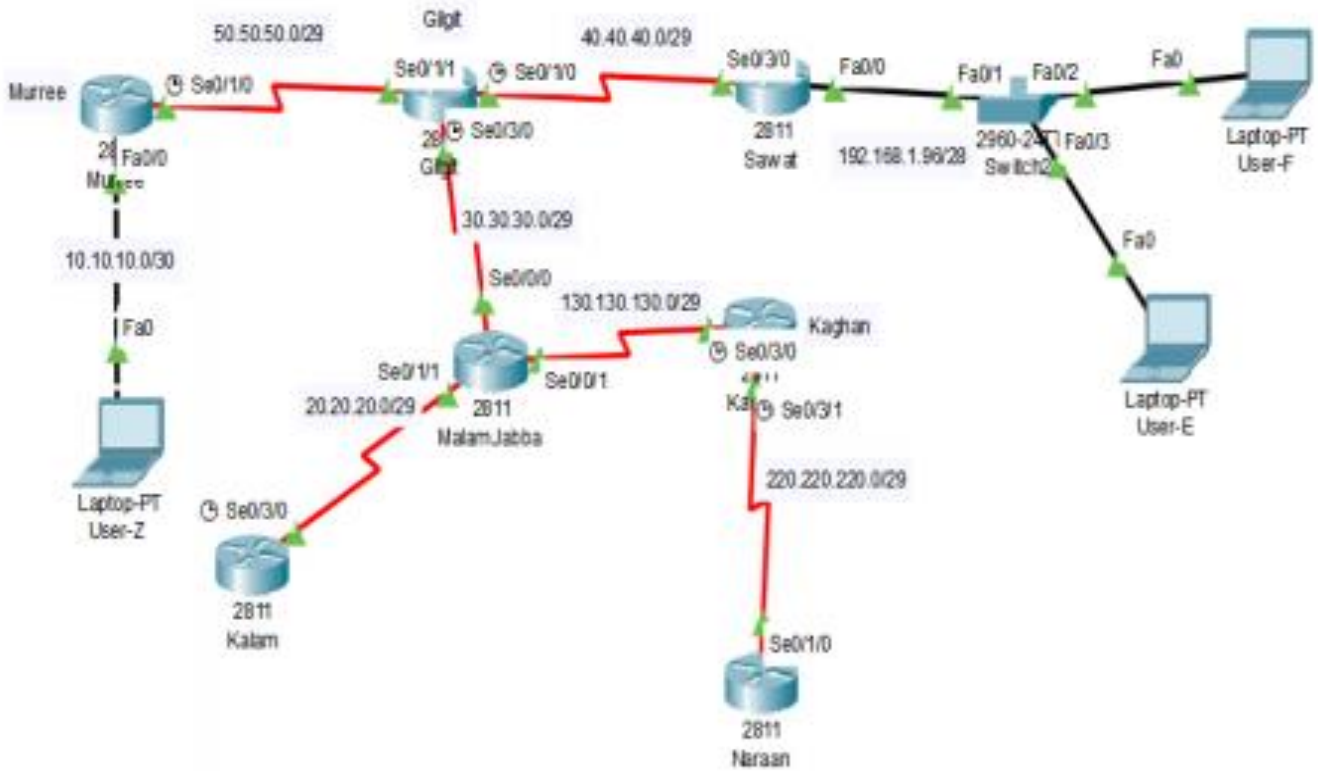

Figure 17

Open Shortest Path First (OSPF)

Open Shortest Path First (OSPF) is a link-state routing protocol which is used to find the best path between the source and the destination router using its own Shortest Path First). OSPF is developed by Internet Engineering Task Force (IETF) as one of the Interior Gateway Protocol

(IGP), i.e., the protocol which aims at moving the packet within a large autonomous system or routing domain. It is a network layer protocol which works on the protocol number 89 and uses AD value 110. OSPF uses multicast address 224.0.0.5 for normal communication and 224.0.0.6 for update to designated router (DR)/Backup Designated Router (BDR).

OSPF terms:

1. **Router I'd** – It is the highest active IP address present on the router. First, highest loopback address is considered. If no loopback is configured then the highest active IP address on the interface of the router is considered.
2. **Router priority** – It is a 8 bit value assigned to a router operating OSPF, used to elect DR and BDR in a broadcast network.
3. **Designated Router (DR)** – It is elected to minimize the number of adjacency formed. DR distributes the LSAs to all the other routers. DR is elected in a broadcast network to which all the other routers share their DBD. In a broadcast network, router requests for an update to DR and DR will respond to that request with an update.
4. **Backup Designated Router (BDR)** – BDR is backup to DR in a broadcast network. When DR goes down, BDR becomes DR and performs its functions.

Task 1, Assign the IP address on each Router

Router Kalam:

Kalam>enable

Kalam #configure terminal

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

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

Kalam (config-if)#ip address 20.20.20.1 255.255.255.248

Kalam (config-if)#clock rate 64000

Kalam (config-if)#no shutdown

Kalam (config-if)#exit

RouterMalam Jabba:

Malam Jabba>enable

Malam Jabba #configure terminal

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

Malam Jabba (config)#interface serial 0/1/0

Malam Jabba (config-if)#ip address 130.130.130.1 255.255.255.248

Malam Jabba (config)#clock rate 64000

Malam Jabba (config-if)#no shutdown

Malam Jabba (config-if)#exit

Malam Jabba (config)#interface serial 0/1/1

Malam Jabba (config-if)#ip address 20.20.20.2 255.255.255.248

Malam Jabba (config-if)#no shutdown

Malam Jabba (config-if)#exit

Malam Jabba (config)#interface serial 0/0/0

Malam Jabba (config-if)#ip address 30.30.30.2 255.255.255.248

Malam Jabba (config-if)#no shutdown

Malam Jabba (config-if)#exit

RouterGilgit:

Gilgit>enable

Gilgit #configure terminal

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

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

Gilgit (config-if)#ip address 40.40.40.1 255.255.255.248

Gilgit (config-if)#clock rate 64000

Gilgit (config-if)#no shutdown

Gilgit (config-if)#exit

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

Gilgit (config-if)#ip address 30.30.30.1 255.255.255.248

Gilgit (config-if)#clock rate 64000

Gilgit (config-if)#no shutdown

Gilgit (config-if)#exit

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

Gilgit (config-if)#ip address 50.50.50.2 255.255.255.248

Gilgit (config-if)#no shutdown

Gilgit (config-if)#exit

RouterSawat:

Sawat>enable

Sawat #configure terminal

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

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

Sawat (config-if)#ip address 40.40.40.2 255.255.255.248

Sawat (config-if)#no shutdown

Sawat (config-if)#exit

Sawat (config)#interface fa 0/0

Sawat (config-if)#ip address 192.16.1.97 255.255.255.240

Sawat (config-if)#no shutdown

Sawat (config-if)#exit

RouterKaghan:

Kaghan>enable

Kaghan #configure terminal

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

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

Kaghan (config-if)#ip address 130.130.130.2 255.255.255.248

Kaghan (config-if)#clock rate 64000

Kaghan (config-if)#no shutdown

Kaghan (config-if)#exit

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

Kaghan (config-if)#ip address 220.220.220.1 255.255.255.248

Kaghan (config-if)#clock rate 64000

Kaghan (config-if)#no shutdown

Kaghan (config-if)#exit

Router Naraan:

Naraan>enable

Naraan #configure terminal

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

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

Naraan (config-if)#ip address 220.220.220.2 255.255.255.248

Naraan (config-if)#no shutdown

Naraan (config-if)#exit

RouterMurree:

Murree>enable

Murree #configure terminal

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

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

Murree (config-if)#ip address 50.50.50.1 255.255.255.248

Murree (config-if)#clock rate 64000

Murree (config-if)#no shutdown

Murree (config-if)#exit

Murree (config)#interface fa 0/0

Murree (config-if)#ip address 10.10.10.1 255.255.255.252

Murree (config-if)#no shutdown

Murree (config-if)#exit

Task 2, Configure OSPF on each Router

Router Kalam:

Kalam (config)#router ospf 99

Kalam (config-router)#network 20.20.20.0 0.0.0.7 area 0

Kalam (config-router)#exit

Router Malam Jabba:

Malam Jabba (config)# router ospf 99

Malam Jabba (config-router)#network 20.20.20.0 0.0.0.7 area 0

Malam Jabba (config-router)#network 30.30.30.0 0.0.0.7 area 0

Malam Jabba (config-router)#network 130.130.130.0 0.0.0.7 area 0

Malam Jabba (config-router)#exit

Router Gilgit:

Gilgit (config)# router ospf 99

Gilgit (config-router)#network 40.40.40.0 0.0.0.7

Gilgit (config-router)#network 30.30.30.0 0.0.0.7 area 0

Gilgit (config-router)#network 30.30.30.0 0.0.0.7 area 0

Gilgit (config-router)#exit

Router Sawat:

Sawat (config)#router ospf 99

Sawat (config-router)# network 40.40.40.0 0.0.0.7 area 0

Sawat (config-router)# network 192.168.1.96 0.0.0.15 area 0

Sawat (config-router)#exit

Router Kaghan:

Kaghan (config)# router ospf 99

Kaghan (config-router)# network 130.130.130.0 0.0.0.7area 0

Kaghan (config-router)# network 220.220.220.0 0.0.0.7area 0

Kaghan(config-router)#exit

Router Naraan:

Naraan (config)# router ospf 99

Naraan (config-router)# network 220.220.220.0 0.0.0.7area 0

Naraan(config-router)#exit

Router Murree:

Murree (config)# router ospf 99

Murree (config-router)# network 50.50.50.0 0.0.0.7area 0

Murree (config-router)# network 10.10.10.00.0.0.3 area 0

Murree (config-router)#exit

Lab-7 Exercise:

Design a star network which consists of 5 routers. Attach 3 PC's with each router. Configure OSPF 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? Each student will use the Student ID as OSPF process ID.