Independent University, Bangladesh (IUB)
Department of Computer Science & Engineering
Data Communication & Networking (CSE 316)

EXPERIMENT#7: Static Routing

Objective:

Your task is to configure Static Routes between PC0, PC1, PC2 and PC4

1. Built network according to Figure 1
2. Configure static routes between the routers
3. Ping from each PC to all other PCs
4. Check Routing Table
5. Check Routing Simulation
6. Change One static route to a new one and verify the simulation changes

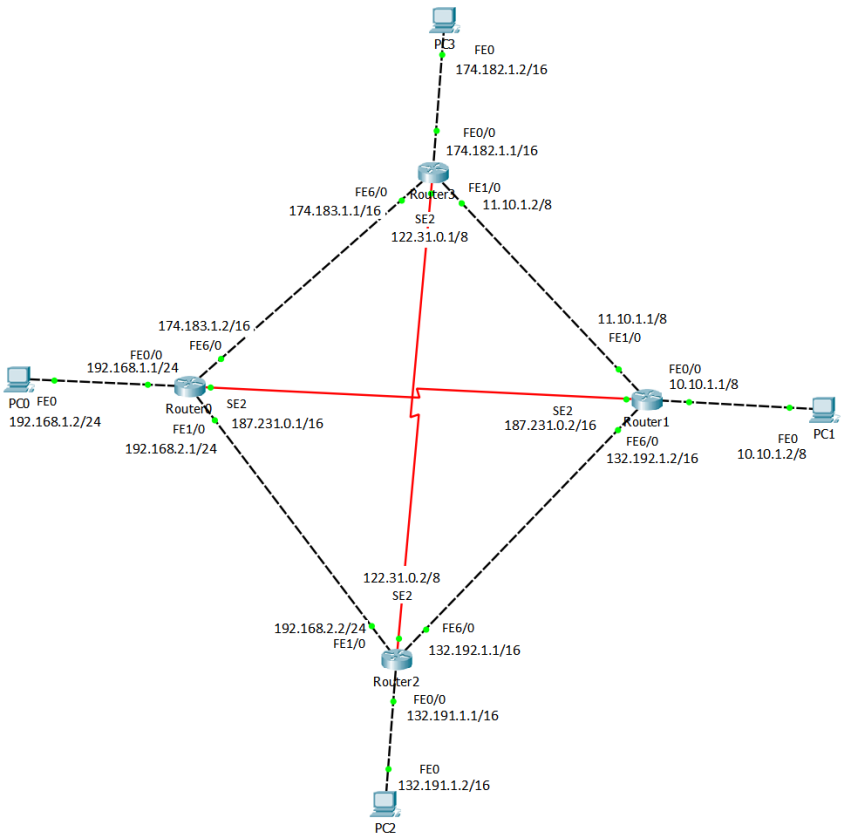


Figure 1

Tools and Materials:

In a real life Scenario:
Four Workstations with terminal Program (such as putty), four Cisco routers, four PCs, eight RJ45 cross-over cables, two serial cable (DCE)

For Lab Purpose:
Cisco Packet Tracer Software

Instructions:

Router0

```
Router>en
Router#conf t
Router(config)#hostname Router0
Router0(config)#interface FastEthernet0/0
Router0(config-if)#no shut
Router0(config-if)#ip address 192.168.1.1 255.255.255.0
Router0(config-if)#interface FastEthernet1/0
Router0(config-if)#no shut
Router0(config-if)#ip address 192.168.2.1 255.255.255.0
Router0(config-if)#interface FastEthernet6/0
Router0(config-if)#no shut
Router0(config-if)#ip address 174.183.1.2 255.255.0.0
Router0(config-if)#interface Serial2/0
Router0(config-if)#no shut
Router0(config-if)# clock rate 64000
Router0(config-if)#ip address 187.231.0.1 255.255.0.0
Router0(config-if)#exit

Router0(config)#ip route 132.191.0.0 255.255.0.0 192.168.2.2
Router0(config)#ip route 132.192.0.0 255.255.0.0 192.168.2.2
Router0(config)#ip route 122.0.0.0 255.0.0.0 192.168.2.2
Router0(config)#ip route 122.0.0.0 255.0.0.0 174.183.1.1
Router0(config)#ip route 11.0.0.0 255.0.0.0 174.183.1.1
Router0(config)#ip route 174.182.0.0 255.255.0.0 174.183.1.1
Router0(config)#ip route 0.0.0.0 0.0.0.0 192.168.2.2
```

Router2

```
Router>en
Router#conf t
Router(config)#hostname Router2
Router2(config)#interface FastEthernet0/0
Router2(config-if)#no shut
```

```
Router2(config-if)#ip address 132.191.1.1 255.255.0.0
Router2(config-if)#interface FastEthernet1/0
Router2(config-if)#no shut
Router2(config-if)#ip address 192.168.2.2 255.255.255.0
Router2(config-if)#interface FastEthernet6/0
Router2(config-if)#no shut
Router2(config-if)#ip address 132.192.1.1 255.255.0.0
Router2(config-if)#interface Serial2/0
Router2(config-if)#no shut
Router2(config-if)# clock rate 64000
Router2(config-if)#ip address 122.31.0.2 255.0.0.0
Router2(config-if)#exit

Router2(config)#ip route 10.0.0.0 255.0.0.0 132.192.1.2
Router2(config)#ip route 187.231.0.0 255.255.0.0 132.192.1.2
Router2(config)#ip route 11.0.0.0 255.0.0.0 132.192.1.2
Router2(config)#ip route 192.168.1.0 255.255.255.0 192.168.2.1
Router2(config)#ip route 174.183.0.0 255.255.0.0 192.168.2.1
Router2(config)#ip route 187.231.0.0 255.255.0.0 192.168.2.1
Router2(config)#ip route 0.0.0.0 255.255.0.0 132.192.1.2
```

Router1

```
Router>en
Router#conf t
Router(config)#hostname Router1
Router1(config)#interface FastEthernet0/0
Router1(config-if)#no shut
Router1(config-if)#ip address 10.10.1.1 255.0.0.0
Router1(config-if)#interface FastEthernet1/0
Router1(config-if)#no shut
Router1(config-if)#ip address 11.10.1.1 255.0.0.0
Router1(config-if)#interface FastEthernet6/0
Router1(config-if)#no shut
Router1(config-if)#ip address 132.192.1.2 255.255.0.0
Router1(config-if)#interface Serial2/0
Router1(config-if)#no shut
Router1(config-if)# clock rate 64000
Router1(config-if)#ip address 187.231.0.2 255.255.0.0
Router1(config-if)#exit

Router1(config)#ip route 174.182.0.0 255.255.0.0 11.10.1.2
Router1(config)#ip route 174.183.0.0 255.255.0.0 11.10.1.2
Router1(config)#ip route 122.0.0.0 255.0.0.0 11.10.1.2
Router1(config)#ip route 122.0.0.0 255.0.0.0 132.192.1.1
Router1(config)#ip route 192.168.2.0 255.255.255.0 132.192.1.1
```

```
Router1(config)#ip route 132.191.0.0 255.255.0.0 132.192.1.1
Router1(config)#ip route 0.0.0.0 0.0.0.0 11.10.1.2
```

Router3

```
Router>en
Router#conf t
Router(config)#hostname Router3
Router3(config)#interface FastEthernet0/0
Router3(config-if)#no shut
Router3(config-if)#ip address 174.182.1.1 255.255.0.0
Router3(config-if)#interface FastEthernet1/0
Router3(config-if)#no shut
Router3(config-if)#ip address 11.10.1.2 255.0.0.0
Router3(config-if)#interface FastEthernet6/0
Router3(config-if)#no shut
Router3(config-if)#ip address 174.183.1.1 255.255.0.0
Router3(config-if)#interface Serial2/0
Router3(config-if)#no shut
Router3(config-if)# clock rate 64000
Router3(config-if)#ip address 122.31.0.1 255.0.0.0
Router3(config-if)#exit

Router3(config)#ip route 132.192.0.0 255.255.0.0 11.10.1.1
Router3(config)#ip route 187.231.0.0 255.255.0.0 11.10.1.1
Router3(config)#ip route 10.0.0.0 255.0.0.0 11.10.1.1
Router3(config)#ip route 192.168.1.0 255.255.255.0 174.183.1.2
Router3(config)#ip route 187.231.0.0 255.255.0.0 174.183.1.2
Router3(config)#ip route 192.168.2.0 255.255.255.0 174.183.1.2
Router3(config)#ip route 0.0.0.0 0.0.0.0 174.183.1.2
```

Result

Router0

```
Router0#show ip route
Codes: C - connected, S - static, I - IGRP, 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 192.168.2.2 to network 0.0.0.0
```

S 11.0.0.0/8 [1/0] via 174.183.1.1
S 122.0.0.0/8 [1/0] via 192.168.2.2
[1/0] via 174.183.1.1
S 132.191.0.0/16 [1/0] via 192.168.2.2
S 132.192.0.0/16 [1/0] via 192.168.2.2
S 174.182.0.0/16 [1/0] via 174.183.1.1
C 174.183.0.0/16 is directly connected, FastEthernet6/0
C 187.231.0.0/16 is directly connected, Serial2/0
C 192.168.1.0/24 is directly connected, FastEthernet0/0
C 192.168.2.0/24 is directly connected, FastEthernet1/0
S* 0.0.0.0/0 [1/0] via 192.168.2.2

Router2

Router2#show ip route
Codes: C - connected, S - static, I - IGRP, 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 132.192.1.2 to network 0.0.0.0

* 0.0.0.0/16 is subnetted, 1 subnets
S* 0.0.0.0 [1/0] via 132.192.1.2
S 10.0.0.0/8 [1/0] via 132.192.1.2
S 11.0.0.0/8 [1/0] via 132.192.1.2
C 122.0.0.0/8 is directly connected, Serial2/0
C 132.191.0.0/16 is directly connected, FastEthernet0/0
C 132.192.0.0/16 is directly connected, FastEthernet6/0
S 174.183.0.0/16 [1/0] via 192.168.2.1
S 187.231.0.0/16 [1/0] via 192.168.2.1
[1/0] via 132.192.1.2
S 192.168.1.0/24 [1/0] via 192.168.2.1
C 192.168.2.0/24 is directly connected, FastEthernet1/0

Router1

Router1#show ip route
Codes: C - connected, S - static, I - IGRP, 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 11.10.1.2 to network 0.0.0.0

C 10.0.0.0/8 is directly connected, FastEthernet0/0
C 11.0.0.0/8 is directly connected, FastEthernet1/0
S 122.0.0.0/8 [1/0] via 132.192.1.1
[1/0] via 11.10.1.2
S 132.191.0.0/16 [1/0] via 132.192.1.1
C 132.192.0.0/16 is directly connected, FastEthernet6/0
S 174.182.0.0/16 [1/0] via 11.10.1.2
S 174.183.0.0/16 [1/0] via 11.10.1.2
C 187.231.0.0/16 is directly connected, Serial2/0
S 192.168.2.0/24 [1/0] via 132.192.1.1
S* 0.0.0.0/0 [1/0] via 11.10.1.2

Router3

Router3#show ip route
Codes: C - connected, S - static, I - IGRP, 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 174.183.1.2 to network 0.0.0.0

S 10.0.0.0/8 [1/0] via 11.10.1.1
C 11.0.0.0/8 is directly connected, FastEthernet1/0
C 122.0.0.0/8 is directly connected, Serial2/0
S 132.192.0.0/16 [1/0] via 11.10.1.1
C 174.182.0.0/16 is directly connected, FastEthernet0/0
C 174.183.0.0/16 is directly connected, FastEthernet6/0
S 187.231.0.0/16 [1/0] via 11.10.1.1
[1/0] via 174.183.1.2
S 192.168.1.0/24 [1/0] via 174.183.1.2
S 192.168.2.0/24 [1/0] via 174.183.1.2
S* 0.0.0.0/0 [1/0] via 174.183.1.2

Configure All the PCs with appropriate static IP and gateway and Ping from each PC to all other PCs

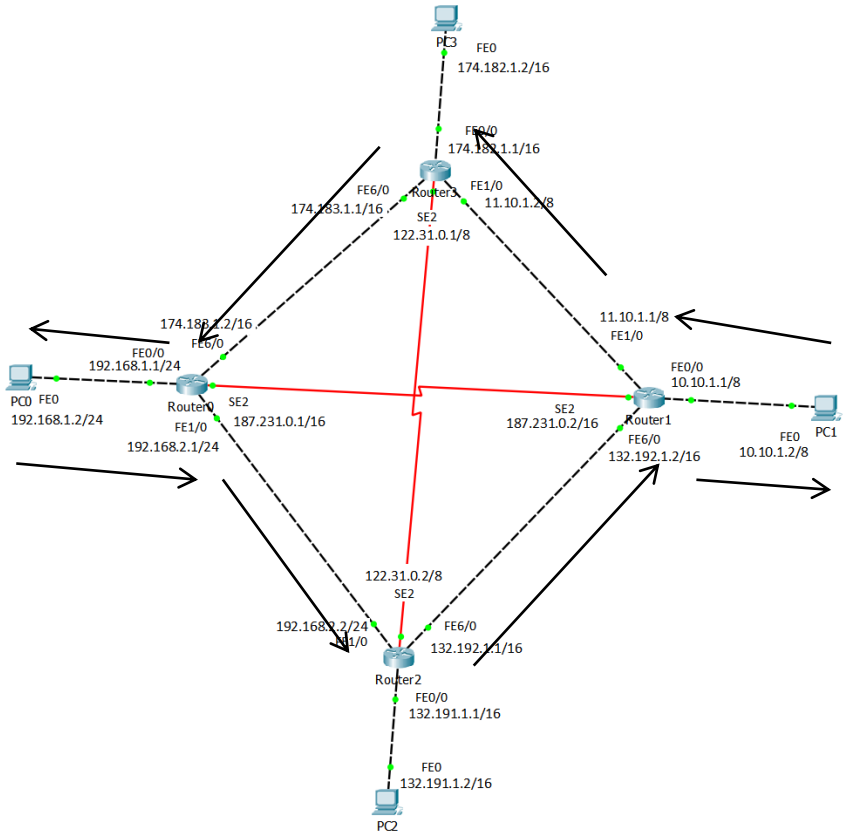
C:\>ping 10.10.1.2

Pinging 10.10.1.2 with 32 bytes of data:

Reply from 10.10.1.2: bytes=32 time=30ms TTL=125
Reply from 10.10.1.2: bytes=32 time=11ms TTL=125
Reply from 10.10.1.2: bytes=32 time=13ms TTL=125
Reply from 10.10.1.2: bytes=32 time=17ms TTL=125

Ping statistics for 10.10.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 11ms, Maximum = 30ms, Average = 17ms

Show simulation to verify the route of the packets



Change the route using the following commands:

Router0

Router0#conf t
Router0(config)#ip route 10.0.0.0 255.0.0.0 187.231.0.2

Router1

Router1#conf t
Router1(config)# ip route 192.168.1.0 255.255.255.0 187.231.0.1

Show simulation to verify the route of the packets