

## Lab2 Static and Default routes for routers

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Group Number: .....

### Lab Objectives

1. To gain skills for achieving basic configuration of a router.
2. To practice calculating IP addresses using VLSM and major network address
3. To configure the IP addresses of different networks connected through routers.
4. To check the status of the interfaces of a router.
5. To achieve connectivity through two different ways; static and default.
6. To understand the meaning of the routing table

### Lab Instructions

1. Follow the procedure of the lab and fulfill all requirements.
2. Answer all questions in the provided spaces (preferably in the red-bold font).
3. Add all required screenshots into corresponding spaces
4. Save the file again as a “.pdf ” file
5. Submit the PDF file in Blackboard by the due date.

## Network Topology

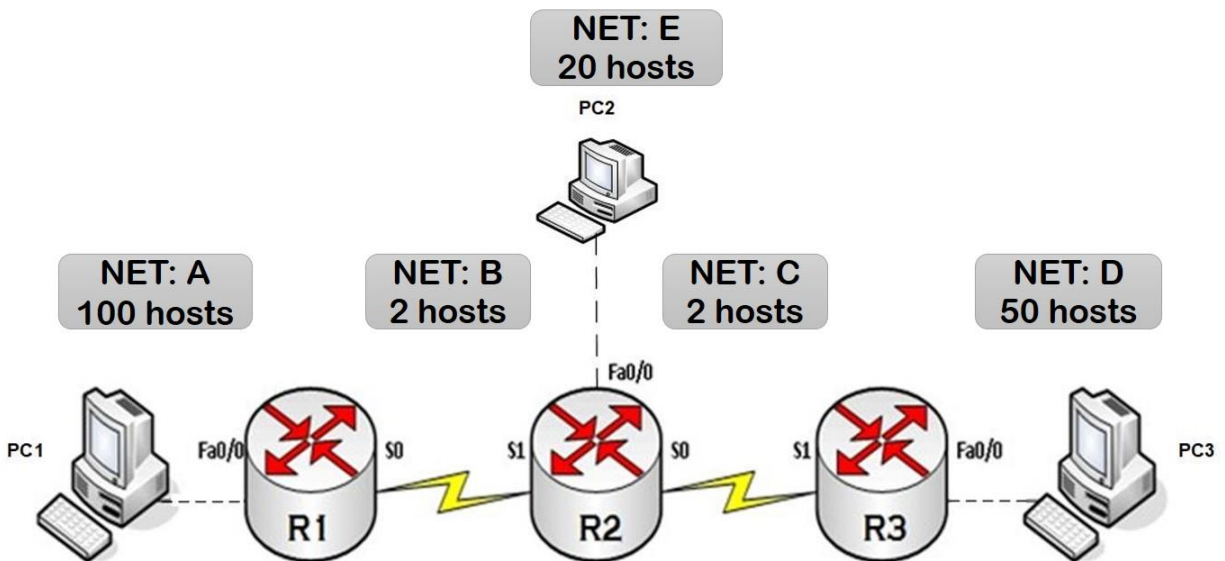


Fig.1: Topology of Static and Default Routes

In this scenario, networks A and D represent SOHO LANs, and R2 represents the ISP and Net E represents the Internet.

### Procedure:

1. Connect the diagram shown above using the proper ports on routers
2. Add your personalized major IP address as a note to your diagram. For Group 1, this Subnet ID would be **192.168.0.0/(15+1)**.
3. Use VLSM to calculate all the subnet IDs, IP addresses and ranges. You must use the smallest subnets possible and not leave gaps in your subnetting scheme.
4. For the serial cables, connect the DCE end to the lowest serial interface
5. For the serial cable, connect the first valid address to the lowest serial interface
6. For networks A, D & E: assign lowest IP of the range (first valid address) to the router's interface and the highest IP (last valid address) to the PC .
7. Use proper labels to indicate the Net ID of each network and the addresses of all the devices connected to it.
8. Add enough notes when appropriate to make the diagram well understood.
9. Take a screenshot of your diagram and insert it as image 1 **[2 mark]**

Insert image 1 here

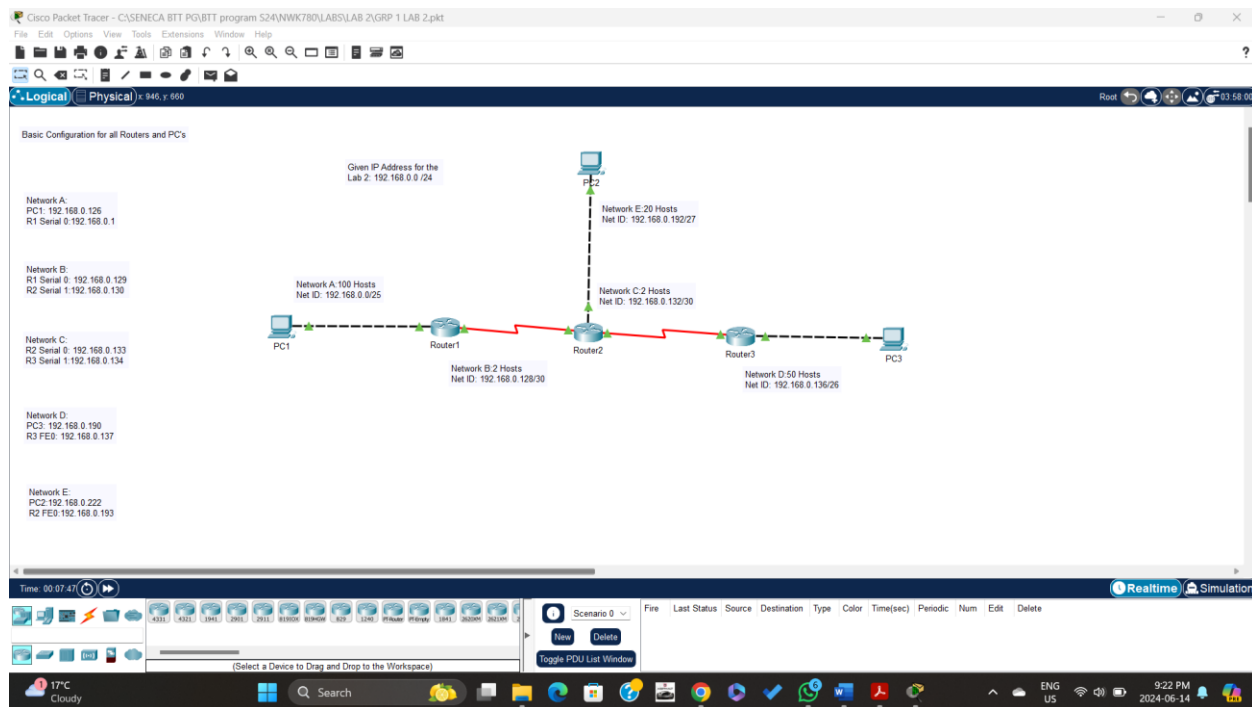


Fig.2: My personalized network diagram

10. Fill in the table below with the proper IP addresses [1 mark]

R1	FastEthernet0/0	192.168.0.1	255.255.255.128	N.A
	Serial0	192.168.0.129	255.255.255.252	N.A.
R2	Serial1	192.168.0.130	255.255.255.252	N.A.
	Serial0	192.168.0.133	255.255.255.252	N.A.
	FastEthernet0/0	192.168.0.193	255.255.255.224	N.A.
R3	FastEthernet0/0	192.168.0.137	255.255.255.192	N.A.
	Serial1	192.168.0.134	255.255.255.252	N.A.
PC1	NIC	192.168.0.126	255.255.255.128	192.168.0.1
PC2	NIC	192.168.0.222	255.255.255.224	192.168.0.193
PC3	NIC	192.168.0.190	255.255.255.192	192.168.0.137

Table 1: IP addresses for all devices

11. Check connectivity between each PC and its gateway by pinging the gateway from the PC's CLI.
12. Take a screen capture of PC1 pinging R1; insert the picture below **[0.3 marks]**

Insert image 2 here

Fig.3: PC1 pinging R1

13. Check the routing table of each router and make sure that it includes the connected networks
14. Take a screen capture of the routing table of R2; insert the picture below **[0.3 marks]**

Insert image 3 here

```
R2#sh ip route
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

      192.168.0.0/27 is subnetted, 1 subnets
C       192.168.0.192 is directly connected, FastEthernet0/0
R2#
R2#group 1
```

Fig.4: Routing table of R2

## Connected LANs using Static Routes

15. Configure static routes on all three routers.
16. Check the routing table of each router and take a screen capture of it. **[0.6 marks]**

Insert the routing table of R1 here

```

C      192.168.0.0 is directly connected, FastEthernet0/0
R1#sh ip int br
Interface                IP-Address      OK? Method Status      Protocol
FastEthernet0/0          192.168.0.1     YES manual up          up
FastEthernet0/1          unassigned      YES unset   administratively down down
Serial0/0/0              unassigned      YES unset   administratively down down
Serial0/0/1              192.168.0.129  YES manual down          down
R1#Group 1

```




Fig.5: Routing table of R1

Insert the routing table of R2 here

```

R2#sh ip route
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

      192.168.0.0/27 is subnetted, 1 subnets
C      192.168.0.192 is directly connected, FastEthernet0/0
R2#
R2#group 1

```

Fig.6: Routing table of R2

Insert the routing table of R3 here

```

R2#
R2#sh ip int br
Interface                IP-Address      OK? Method Status      Protocol
FastEthernet0/0          192.168.0.193  YES manual up          up
FastEthernet0/1          unassigned      YES unset   administratively down down
Serial0/0/0              unassigned      YES unset   administratively down down
Serial0/0/1              192.168.0.130  YES manual down          down
R2#
R2#GROUP 1

```

Fig.7: Routing table of R3

17. Check connectivity between all PCs, you should have all PCs able to ping all others **[0.6 marks]**

Insert PC1 pinging PC2 here

Fig.8: PC1 ping PC2

Insert PC2 pinging PC3 here

Fig.9: PC2 ping PC3

Insert PC3 pinging PC1 here

Fig.10: PC3 ping PC1

## Connected LANs using Default Routes

18. Remove the static routes from routers R1 and R3.

19. Set default routes on both R1 and R3

20. Check the routing table of each router and take a screen capture of it. **[0.6 marks]**

Insert the routing table of R1 here

Fig.11: Routing table of R1

Insert the routing table of R2 here

Fig.12: Routing table of R2

Insert the routing table of R3 here

Fig.13: Routing table of R3

21. Check connectivity between all PCs, you should have all PCs able to ping all others **[0.6 marks]**

Insert PC1 pinging PC2 here

Fig.14: PC1 ping PC2

Insert PC2 pinging PC3 here

Fig.15: PC2 ping PC3

Insert PC3 pinging PC1 here

Fig.16: PC3 ping PC1

22. Submit the PDF file.