

Routing & Subnetting

- Q) Subnet 1 50 Hosts \rightarrow 64 N/W \rightarrow 200.1.2.0,
Subnet 2 12 hosts \rightarrow 16
Subnet 3 2 hosts \rightarrow 4.

Solⁿ SN1

N/W add \Rightarrow 200.1.2.0

DBA \rightarrow 200.1.2.63

Subnet mask \rightarrow 255.255.255.192.

SN2

N/W add \rightarrow 200.1.2.64.

DBA \rightarrow 200.1.2.79

Subnet mask \rightarrow 255.255.255.240.

SN3

N/W add \rightarrow 200.1.2.80.

DBA \rightarrow 200.1.2.83

Subnet mask 255.255.255.252.

Q) How does a router receive & decide which port to send the packet to?

Solⁿ A router receives a packet based on its destination IP address and then consults the routing table to decide which port or interface to forward the packet to.

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Routing Table.

The routing table is essentially a list of routes or paths that a router uses to determine which port or interface to forward the packet to.

It consists of

- **Destination Network**: The network or IP address range that the packet is being sent to.
- **Next hop**: IP address of the next router or device to forward the packet to.
- **Interface**: The router's outgoing port that should be used to send the packet.
- **Subnet mask**: Subnet mask of the designated network.

In the above example the IP route table looks like.

<u>Network</u>	<u>Subnet Mask</u>	<u>Interface</u>
200.1.2.0	255.255.255.192	0
200.1.2.64	255.255.255.240	1
200.1.2.80	255.255.255.252	3

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How does the router recognise which port/interface has which network.

Ex ping 200.1.2.70.

The router does "&" operation of subnet mask & IP of host. If it matches the network address then that is the required port.

Case 1 200.1.2.70

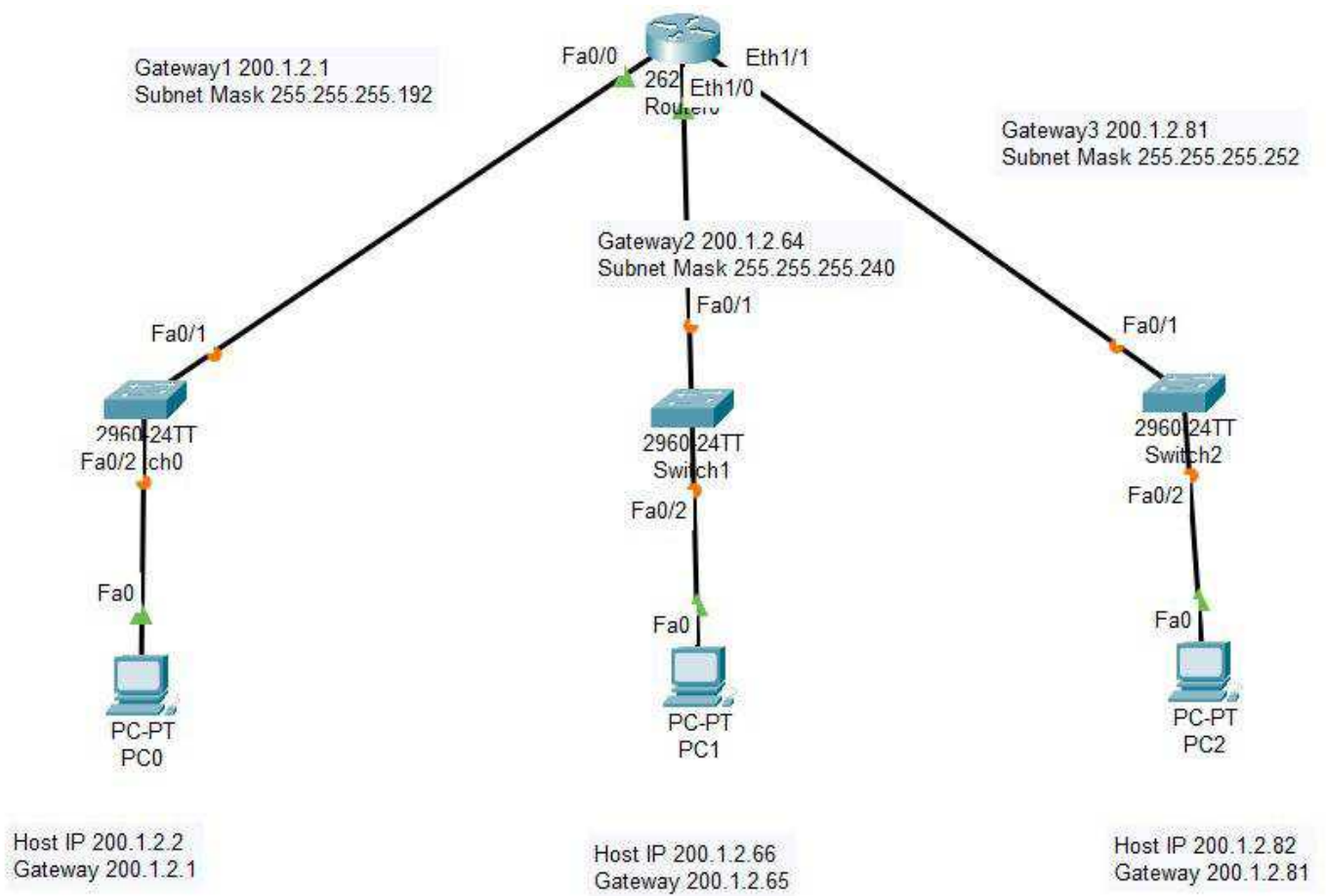
& 255.255.255.192

200.1.2.64, \neq NW address.

Case 2 200.1.2.70.

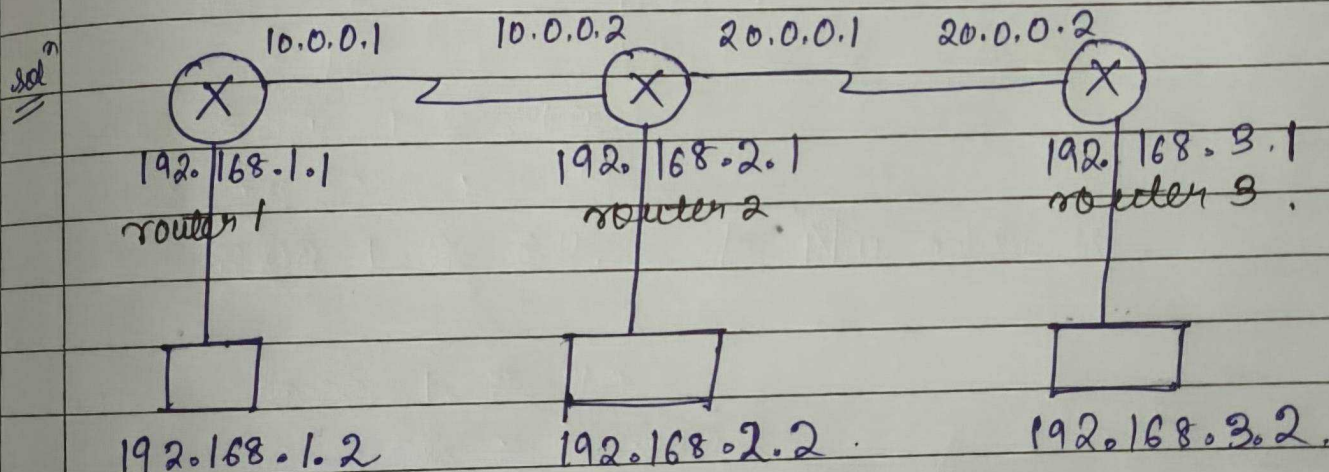
& 255.255.255.240

200.1.2.64 = NW address so interface 1 is required port.



Q) Configure 3 networks with 3 networks. Each network must have at least one host other than the gateway itself.

Networks 192.168.1.0.
192.168.2.0
192.168.3.0



Configuring the routers after assigning the IP addresses,

router 1

ip route	192.168.2.0	255.255.255.0	10.0.0.2
ip route	10.0.0.0	255.0.0.0	10.0.0.2
ip route	192.168.3.0	255.255.255.0	10.0.0.2
ip route	20.0.0.0	255.0.0.0	10.0.0.2

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router 2

```
ip route 10.0.0.0 255.0.0.0 10.0.0.1
ip route 192.168.3.0 255.255.255.0 20.0.0.2
ip route 20.0.0.0 255.0.0.0 20.0.0.2
ip route 192.168.1.0 255.255.255.0 10.0.0.1
```

router 3

```
ip route 20.0.0.0 255.0.0.0 20.0.0.1
ip route 20.0.0.0 255.0.0.0 20.0.0.1
ip route 192.168.1.0 255.255.255.0 20.0.0.1
ip route 192.168.2.0 255.255.255.0 20.0.0.1
```

Router Commands

- ① Show ip route - Shows the current routing table, which shows the routes that the router uses to forward packets.

gm

```
S 10.0.0.0/8 [1/0] via 20.0.0.1
C 20.0.0.0/8 is directly connected to Eth 0/0.
S 192.168.1.0/24 [1/0] via 20.0.0.1
S 192.168.2.0/24 [1/0] via 20.0.0.1
C 192.168.3.0/24 is directly connected to Eth 1/0.
C - connected, S - Static
```

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tracert command

tracert (trace route) is used to trace the path a packet takes from your computer to a remote dest, showing each hop along the way.

ex In the above example.
on the PC of host IP 192.168.1.2.

• `tracert 192.168.3.1`

1	0 ms	0 ms	0 ms	192.168.1.1
2	0 ms	0 ms	0 ms	10.0.0.2
3	0 ms	0 ms	0 ms	192.168.3.1

Trace complete.

Submitted by
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