INSTITUTE OF ENGINEERING
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COMPUTER NETWORK

LAB #4

Subnet Mask, Default Gateway and Static Routing

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Table of Contents

List of Outputs

Activities A

Activities B

Activities C

C.2

C.3

C.4

C.5

C.6

C.7

C.8

C.9

C.10

C.11

Activities C :Repeating exercise C4-C9 after configuring Static route

List of Figures

1 Title

Subnet Mask, Default Gateway and Static Routing

2 Objective

- To be familiar with network and subnet mask
- To be familiar with default gateway and its configuration
- To be familiar with Routing: Static Routing and its configuration

3 Requirement

- Network simulation tool: Packet Tracer

4 Procedure

We created three different networks and explore different networking terms like Subnet, Subnet mask, Default gateway, Routing, Static Routing, Routing table, etc. we also learned the technique to extract network id of destination network if subnet mask is known.We Configured each interface of each routers. We also explored the telnet through different router and configure it .We performed Numerous Ping operation to confirm the connectivity betweens and among networks and subnets and repeated the Ping operation after configuring the Static route. We also observed the Routing table to confirm the static routing. We have compared the result of previous similar operation/ping with current .

5 Exercises:

5.1 Question -1

What is a subnet mask? Why is it used? Explain with examples.

Answer:

Subnet is a technique to split larger network in to smaller ones like partitioning the whole floor into rooms .If one have to communicate with other on same subnet/Room then there is no need of Router/doors reducing traffic congestion , unnecessary routes and network speed.

Subnet mask hides(mask) host id from IP address and is 4 bytes long having similar format to IP address. i.e

0-255 . 0-255 . 0-255 . 0-255

Host use subnet mask to determine whether the destination is within the subnet or outside. Subnet mask also serve the purpose of limiting or defining the range of valid ip for specific network.

Lets examine how subnet mask divides network and host id/address from an IP address. lets take Class C IP address **192.168.123.132** and default Class C subnet mask **255.255.255.0**. here Network id is determined by AND operation of Subnet mask and IP address and remaining part of Ip address is Host id.

11000000.10101000.01111011.10000100 – IP address (192.168.123.132)
11111111.11111111.11111111.00000000 – Subnet mask (255.255.255.0)

ANDing gives Network address and remaning is Host address.

11000000.10101000.01111011.00000000 – Network address (192.168.123.0)
00000000.00000000.00000000.10000100 – Host address (000.000.000.132)

5.2 Question -2

How does a sending host know whether the destination computer is on the same network or on the different network? How data packet is forwarded in each case from the sending host? Explain.

Answer:

The Host perform the And operation of it's subnet mask and its IP and then with destination IP and extract and match the network address if matched then it falls on same network if not different.If destination is Local then host determine the MAC(hardware address) using ARP table and forward the packet to destination directly . If destination is remote then Packet is forwarded to default gateway or Router which then handles the remaining process by consulting the Routing table to determine the best route to destination.

5.3 Question -3

What is a routing? Explain static routing and configuration of static routing in a router with its syntax and functions. Also mention how the routing table of a router can be observed.

Answer:

A Router is a networking device capable of Handling incoming data packets and forwards to their respective destination network after consulting routing table. Routing is technique of selecting the best route for data packets to destination.

Static Routing is the Non adaptive and manual way of adding routes in Routing table of the Router.Here the routes are fixed by administrator abd unaffected by any changes in network topology.It is easy to configure , Secure and less resource consuming.However it is not suitable for large network and one need to have sound knowledge of topology to configure static routing.

The basic syntax for static routing Configuration is :

ip route **Destination-Network Subnet-Mask [next-hop-address or outgoing interface]**

- Destination Network: Destination Network address
- Subnet-mask: only needed if subnetting is implemented and used tto reveal the destination network address.
- Next-hop-address or outgoing interface: Its an Ip of nearest Router in Routing Path or alternatively we can also specify the interface.

  There are other parameters like administrative distance and Permanent.

The Routing Table of router can be observed using command ***show ip route***

5.4 Question -4

Note down the observation of each steps with necessary commands specified in activities A, B and C mentioned above and comment on it.

A. Create the following network topology using Packet Tracer and perform the followings:

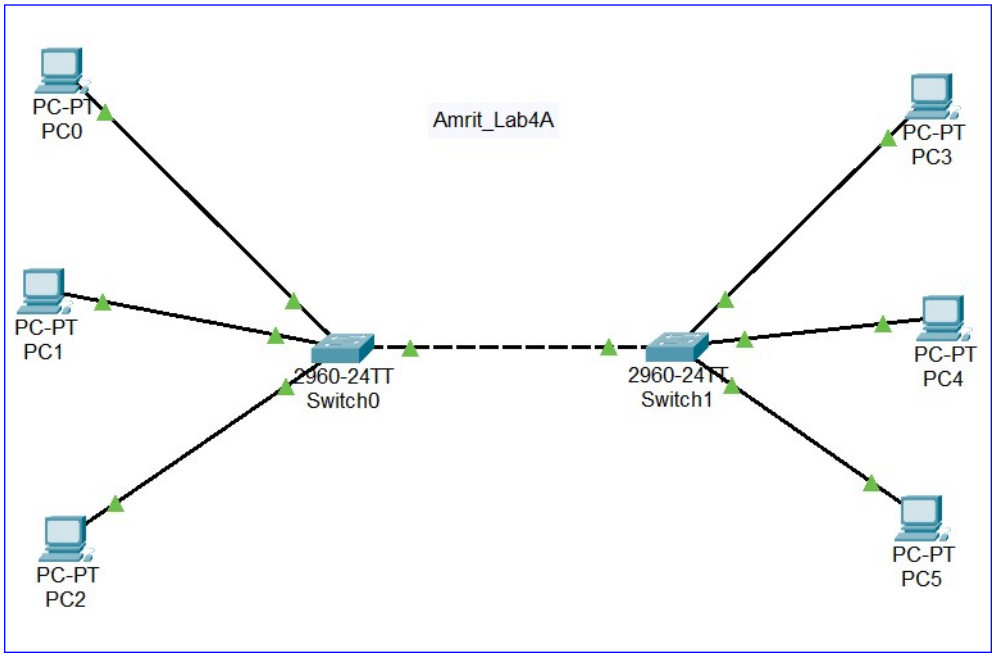

Figure 1: Network topology Lab 4A

1. **Assign the IP Address and subnet mask of given computers as:** It is performed using the GUI interface available in every PC

   - PC0: 200.200.20.2 255.255.255.0

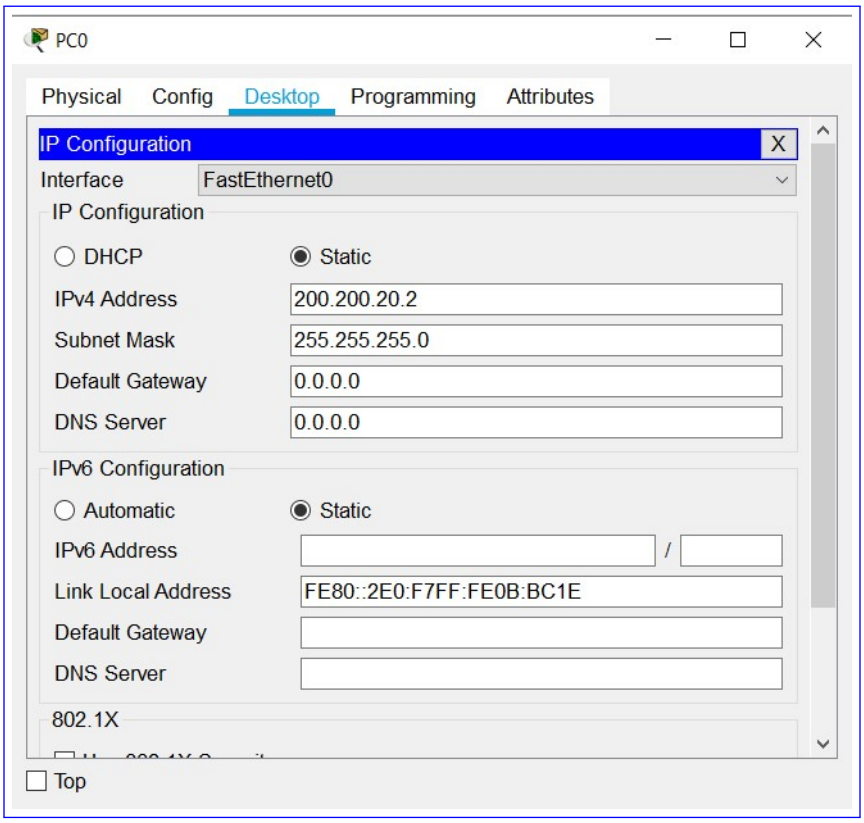

Figure 2: PC0 IP configuration

   - PC1: 200.200.20.3 255.255.255.0
   - PC2: 200.200.20.4 255.255.255.0
   - PC3: 200.200.20.34 255.255.255.0
   - PC4: 200.200.20.35 255.255.255.0
   - PC5: 200.200.20.36 255.255.255.0

2. **Test the connectivity from PC0 to each of the following computers one by one using ping command and note down the result.**

   - PC1: Ping Successful

```
C:\>ping 200.200.20.3

Pinging 200.200.20.3 with 32 bytes of data:

Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128

Ping statistics for 200.200.20.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Output 1: Ping PC0 to PC1

Similarly for all PCs ping is performed and result is noted

- PC2: Ping Successful
- PC3: Ping Successful
- PC4: Ping Successful
- PC5: Ping Successful

3. **Again, test the connectivity from PC3 to each of the following computers one by one using ping command and note down the result.**

   - PC0: Ping Successful

```
C:\>ping 200.200.20.2

Pinging 200.200.20.2 with 32 bytes of data:

Reply from 200.200.20.2: bytes=32 time<1ms TTL=128
Reply from 200.200.20.2: bytes=32 time<1ms TTL=128
Reply from 200.200.20.2: bytes=32 time=1ms TTL=128
Reply from 200.200.20.2: bytes=32 time<1ms TTL=128

Ping statistics for 200.200.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Output 2: Ping PC3 to PC0

Similarly for all PCs ping is performed and result is noted

- PC1: Ping Successful
- PC2: Ping Successful
- PC4: Ping Successful
- PC5: Ping Successful

4. **Change the subnet mask of each of the computer as: 255.255.255.224. Now again test the connectivity from PC0 to each of the following computers one by one using ping command and note down the result.**

   - PC1: Ping Successful

```
C:\>ping 200.200.20.3

Pinging 200.200.20.3 with 32 bytes of data:

Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128

Ping statistics for 200.200.20.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Output 3: Ping PC0 to PC1

   - PC2: Ping Successful

   - PC3: Ping Failed

```
C:\>ping 200.200.20.34

Pinging 200.200.20.34 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 200.200.20.34:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 4: Ping PC0 to PC3

- PC4: Ping Failed
- PC5: Ping Failed

In **A.2** PC0 could ping all the computers from PC0 to PC6 but now it is unable to ping Network 2 i.e PC3,PC4,PC5 due to Change in Subnet mask. Previously the default subnet mask **255.255.255.0** due to which Both network 1 and 2 has Network address as **200.200.20.0** and acts as single network and can forwards packets within the networks freely. But when subnet mask is changed to **255.255.255.224** the network splits into subnet and network address for Network 1 becomes **200.200.20.0** and for Network 2 it is **200.200.20.32**. So they became the different network and as we know we need Router and Routing Routes to properly exchange package between networks.

The process to obtain Network address is explained in Exercise 1 and the detailed process of obtaining Network Id for both Network is explained in Activities C.11

5. **Again, test the connectivity from PC3 to each of the following computers one by one using ping command and note down the result.**

   - PC0: Ping Failed

```
C:\>ping 200.200.20.2

Pinging 200.200.20.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 200.200.20.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 5: Ping PC3 to PC0

   - PC1: Ping Failed
   - PC2: Ping Failed

   - PC4: Ping Successful

```
C:\>ping 200.200.20.35

Pinging 200.200.20.35 with 32 bytes of data:

Reply from 200.200.20.35: bytes=32 time=1ms TTL=128
Reply from 200.200.20.35: bytes=32 time<1ms TTL=128
Reply from 200.200.20.35: bytes=32 time<1ms TTL=128
Reply from 200.200.20.35: bytes=32 time<1ms TTL=128
```

```
Ping statistics for 200.200.20.35:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Output 6: Ping PC3 to PC4

- PC5: Ping Successful

In **A.3** PC3 could ping all the computers from PC0 to PC6 but now it is unable to ping Network 1 i.e PC0,PC1,PC2 due to Change in Subnet mask. Previously the default subnet mask **255.255.255.0** due to which Both network 1 and 2 has Network address as **200.200.20.0** and acts as single network and can forwards packets within the networks freely. But when subnet mask is changed to **255.255.255.224** the network splits into subnet and network address for Network 1 becomes **200.200.20.0** and for Network 2 it is **200.200.20.32**. So they became the different network and as we know we need Router and Routing Routes to properly exchange package between networks.

The process to obtain Network address is explained in Exercise 1 and the detailed process of obtaining Network Id for both Network is explained in Activities C.11

B. Modify the above network as following i.e. use a router in between switches (i.e. between Switch1 and Switch2), and perform the followings::

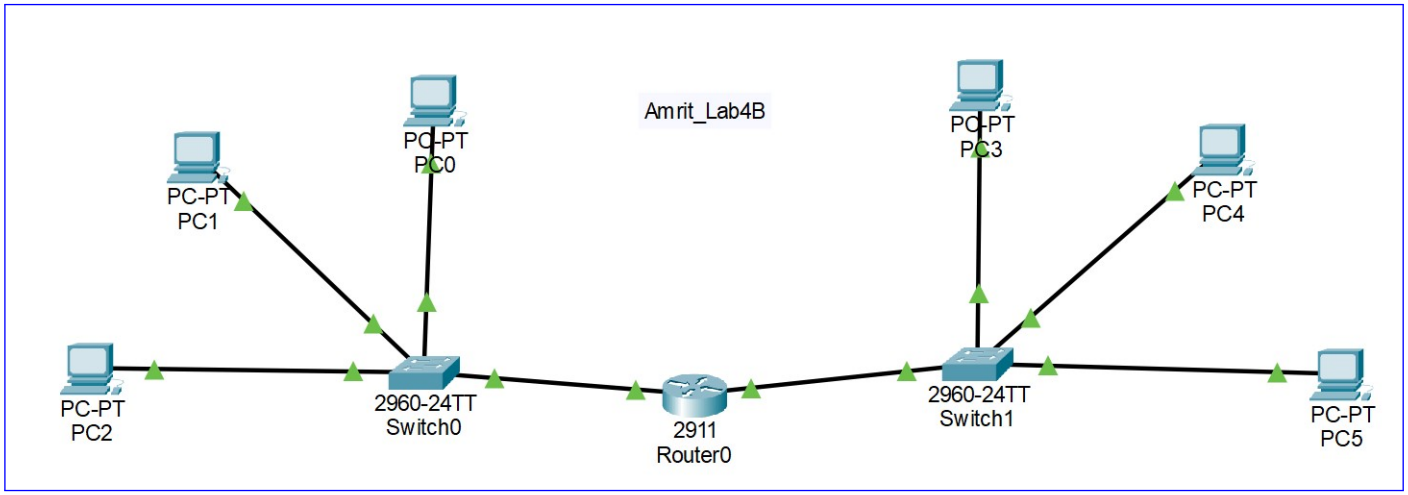

Figure 3: Network topology Lab 4B

1. **Assign the IP address of GigabitEthernet 0/0 interface of Router0 as 200.200.20.1 255.255.255.224 and turn on the interface. Similarly assign the IP address of GigabitEthernet 0/1 interface of Router0 as 200.200.20.33 255.255.255.224 and turn on the interface.**

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address 200.200.20.1 255.255.255.224
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed
    state to up
```

Output 7: Assign the IP address of GigabitEthernet 0/0 for Router 0

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip address 200.200.20.33 255.255.255.224
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed
    state to up
```

Output 8: Assign the IP address of GigabitEthernet 0/1 for Router 0

2. **Now test the connectivity from PC0 to each of the following computers one by one using ping command and note down the result and comment on it.**

   - PC1: Ping Successful

```
C:\>ping 200.200.20.3

Pinging 200.200.20.3 with 32 bytes of data:

Reply from 200.200.20.3: bytes=32 time=1ms TTL=128
Reply from 200.200.20.3: bytes=32 time=3ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128

Ping statistics for 200.200.20.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 1ms
```

Output 9: Ping PC0 to PC1

- PC2: Ping Successful
- PC3: Ping Failed

```
C:\>ping 200.200.20.34

Pinging 200.200.20.34 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 200.200.20.34:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 10: Ping PC0 to PC3

- PC4: Ping Failed
- PC5: Ping Failed

3. **Now again, test the connectivity from PC3 to each of the following computers one by one using ping command and note down the result and comment on it.**
   - PC0: Ping Failed

```
C:\>ping 200.200.20.2

Pinging 200.200.20.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 200.200.20.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 11: Ping PC3 to PC0

- PC1: Ping Failed
- PC2: Ping Failed
- PC4: Ping Successful

```
C:\>ping 200.200.20.35

Pinging 200.200.20.35 with 32 bytes of data:

Reply from 200.200.20.35: bytes=32 time=1ms TTL=128
Reply from 200.200.20.35: bytes=32 time=1ms TTL=128
Reply from 200.200.20.35: bytes=32 time<1ms TTL=128
Reply from 200.200.20.35: bytes=32 time<1ms TTL=128

Ping statistics for 200.200.20.35:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Output 12: Ping PC3 to PC4

- PC5: Ping Successful

4. **Assign the default gateway of 200.200.20.1 on PC0, PC1 and PC2. Similarly assign default gateway of 200.200.20.33 on PC3, PC4 and PC5. Again test the connectivity from PC0 to each of the following computers one by one using ping command and note down the result.**

   - PC1: Ping Successful

```
C:\>ping 200.200.20.3

Pinging 200.200.20.3 with 32 bytes of data:

Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128
Reply from 200.200.20.3: bytes=32 time<1ms TTL=128

Ping statistics for 200.200.20.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Output 13: Ping PC0 to PC1

   - PC2: Ping Successful

   - PC3: Ping Successful

```
C:\>ping 200.200.20.34

Pinging 200.200.20.34 with 32 bytes of data:

Request timed out.
Reply from 200.200.20.34: bytes=32 time=1ms TTL=127
Reply from 200.200.20.34: bytes=32 time<1ms TTL=127
Reply from 200.200.20.34: bytes=32 time<1ms TTL=127

Ping statistics for 200.200.20.34:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Output 14: Ping PC0 to PC3

   - PC4: Ping Successful
   - PC5: Ping Successful

In Activity **B.2** PC0 could ping only the PCs in it's Network and unable to ping PCs on Network 2. This is because the default gateway was set to **0.0.0.0** so when PC0 try to connect to PCs on other Network PC0 extract the network id and since they belongs to different network , a Router is needed to establish the connection. Since default gateway is set to **0.0.0.0** all outgoing package is forwarded to unknown address which never reach the destination.

But this all changes once correct Default gateway is set for all PCs in both network . For network 1 default gateway is set to **200.200.20.1** and for Network 2 **200.200.20.33**.Since Default gateway is set both Network can successfully pass the outgoing packet to Router and communicate with each other.So in this activity PC0 could ping all other PCs.

5. **Now again, test the connectivity from PC3 to each of the following computers one by one using ping command and note down the result and comment on it.**

   - PC0: Ping Successful

```
C:\>ping 200.200.20.2

Pinging 200.200.20.2 with 32 bytes of data:

Reply from 200.200.20.2: bytes=32 time=1ms TTL=127
Reply from 200.200.20.2: bytes=32 time<1ms TTL=127
Reply from 200.200.20.2: bytes=32 time=1ms TTL=127
Reply from 200.200.20.2: bytes=32 time<1ms TTL=127

Ping statistics for 200.200.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Output 15: Ping PC3 to PC0

   - PC1: Ping Successful
   - PC2: Ping Successful

   - PC4: Ping Successful

```
C:\>ping 200.200.20.35

Pinging 200.200.20.35 with 32 bytes of data:

Reply from 200.200.20.35: bytes=32 time<1ms TTL=128
Reply from 200.200.20.35: bytes=32 time=1ms TTL=128
Reply from 200.200.20.35: bytes=32 time<1ms TTL=128
Reply from 200.200.20.35: bytes=32 time<1ms TTL=128

Ping statistics for 200.200.20.35:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Output 16: Ping PC3 to PC4

   - PC5: Ping Successful

In Activity **B.2** PC3 could ping only the PCs in it's Network and unable to ping PCs on Network 2. This is because the default gateway was set to **0.0.0.0** so when PC0 try to connect to PCs on other Network PC3 extract the network id and since they belongs to different network , a Router is needed to establish the connection. Since default gateway is set to **0.0.0.0** all outgoing package is forwarded to unknown address which never reach the destination.

But this all changes once correct Default gateway is set for all PCs in both network . For network 1 default gateway is set to **200.200.20.1** and for Network 2 **200.200.20.33**.Since Default gateway is set both Network can successfully pass the outgoing packet to Router and communicate with each other.So in this activity PC3 could ping all other PCs.

6. **Use the command *show ip route* in the router and note down the result, and comment on it.**

```
Router>show ip route
Codes: L - local, 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, 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 not set

     200.200.20.0/24 is variably subnetted, 4 subnets, 2 masks
C       200.200.20.0/27 is directly connected, GigabitEthernet0/0
L       200.200.20.1/32 is directly connected, GigabitEthernet0/0
C       200.200.20.32/27 is directly connected, GigabitEthernet0/1
L       200.200.20.33/32 is directly connected, GigabitEthernet0/1
```

Output 17: *show ip route*

C. Modify the above network to connect additional networks by using another router as following,and perform the followings:

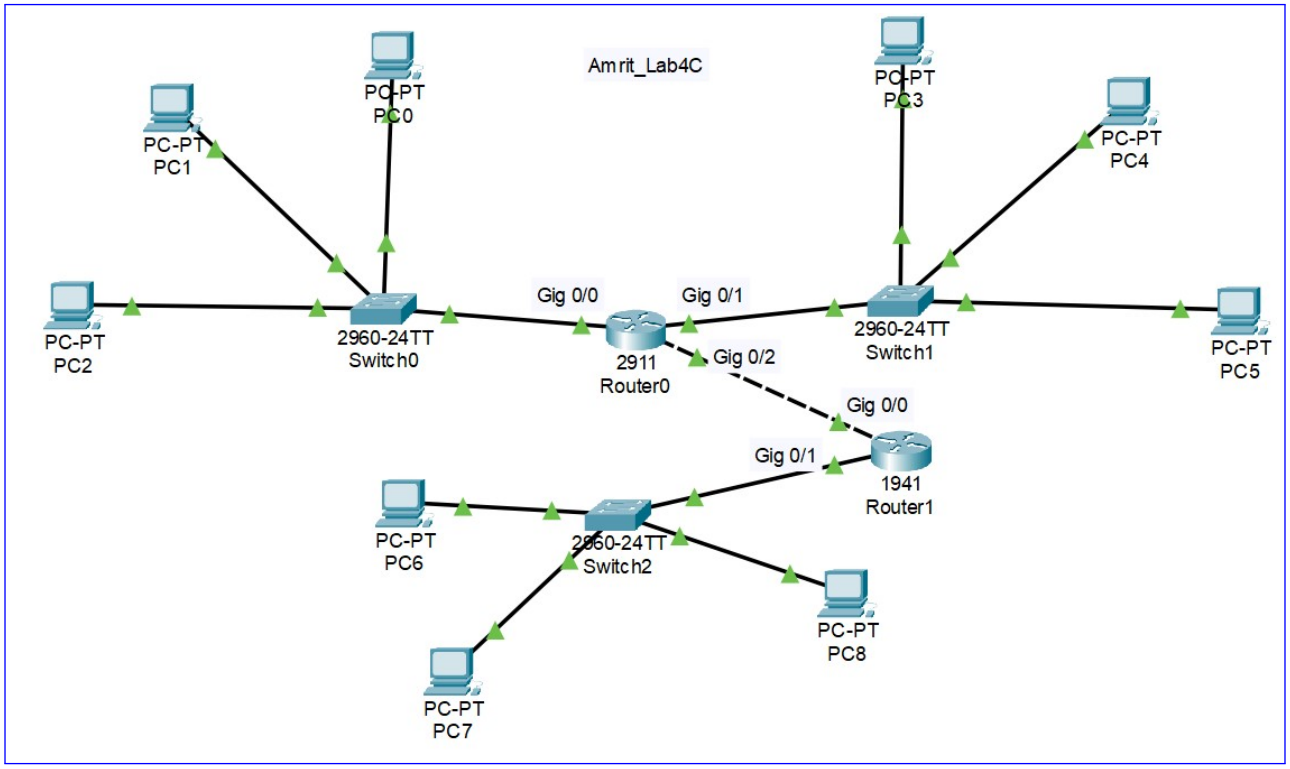

Figure 4: Network topology Lab 4C

1. **Assign default gateway for each computer as 200.200.20.99 and Assign the IP Address and subnet mask of added computers as:**

   - PC6: 200.200.20.100 255.255.255.224

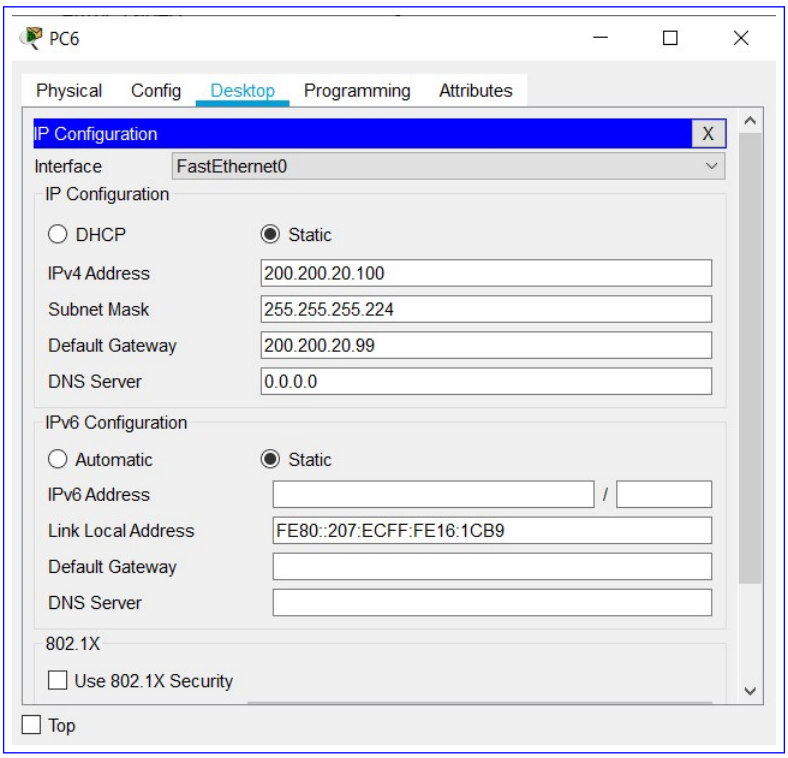

Figure 5: Assign default gateway, ip and subnet mask

- PC7: 200.200.20.101 255.255.255.224
- PC8: 200.200.20.102 255.255.255.224

2. **Also configure the GigabitEthernet interfaces of routers with following IP Addresses and turn on the corresponding interfaces.**

   - Router0: GigabitEthernet 0/2 200.200.20.65 255.255.255.224

```
Router>enable
Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/2
Router(config-if)#ip address 200.200.20.65 255.255.255.224
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up
```

Output 18: Assign the IP address of GigabitEthernet 0/2 for Router 0

   - Router1: GigabitEthernet 0/0 200.200.20.66 255.255.255.224

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address 200.200.20.66 255.255.255.224
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
    changed state to up
```

Output 19: Assign the IP address of GigabitEthernet 0/0 for Router 1

   - Router1: GigabitEthernet 0/1 200.200.20.99 255.255.255.224

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip address 200.200.20.99 255.255.255.224
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1,
    changed state to up
```

Output 20: Assign the IP address of GigabitEthernet 0/1 for Router 1

3. **Configure the hostname, console password, vty password and enable password in both routers. Hostname of Router0 should be your first name and hostname of Router1 should be your surname. Set console password as your first name, enable password as your roll no. like 456 and vty password as your surname for each router.**

S.N	Hostname	Console Password	Enable Password	Vty Password
Router 0	AMRIT	amrit	403	phuyal
Router 1	Phuyal	amrit	403	phuyal

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname AMRIT

AMRIT(config)#line console 0
AMRIT(config-line)#password amrit
AMRIT(config-line)#login
AMRIT(config-line)#exit

AMRIT(config)#enable password 403

AMRIT(config)#line vty 0 4
AMRIT(config-line)#password phuyal
AMRIT(config-line)#login
AMRIT(config-line)#exit

AMRIT(config)#service password-encryption
```

Output 21: Configuration for Router 0

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname Phuyal

Phuyal(config)#line console 0
Phuyal(config-line)#password amrit
Phuyal(config-line)#login
Phuyal(config-line)#exit

Phuyal(config)#enable password 403

Phuyal(config)#line vty 0 4
Phuyal(config-line)#password phuyal
Phuyal(config-line)#login
Phuyal(config-line)#exit

Phuyal(config)#service password-encryption
```

Output 22: Configuration for Router 1

4. **Observe and note down the output of the command *show ip route* in each router.**

```
AMRIT#show ip route

Gateway of last resort is not set

     200.200.20.0/24 is variably subnetted, 6 subnets, 2 masks
C       200.200.20.0/27 is directly connected, GigabitEthernet0/0
L       200.200.20.1/32 is directly connected, GigabitEthernet0/0
C       200.200.20.32/27 is directly connected, GigabitEthernet0/1
L       200.200.20.33/32 is directly connected, GigabitEthernet0/1
C       200.200.20.64/27 is directly connected, GigabitEthernet0/2
L       200.200.20.65/32 is directly connected, GigabitEthernet0/2
```

Output 23: *show ip route* Router 0

```
Phuyal#show ip route

Gateway of last resort is not set

     200.200.20.0/24 is variably subnetted, 4 subnets, 2 masks
C       200.200.20.64/27 is directly connected, GigabitEthernet0/0
```

```
L       200.200.20.66/32 is directly connected, GigabitEthernet0/0
C       200.200.20.96/27 is directly connected, GigabitEthernet0/1
L       200.200.20.99/32 is directly connected, GigabitEthernet0/1
```

Output 24: *show ip route* Router 1

Name	IP
PC0	200.200.20.2
PC1	200.200.20.3
PC2	200.200.20.4
Router 0 0/0	200.200.20.1
Router 0 0/1	200.200.20.33
Router 0 0/2	200.200.20.65
PC3	200.200.20.34
PC4	200.200.20.35
PC5	200.200.20.36
Router 1 0/0	200.200.20.66
Router 1 0/1	200.200.20.99
PC6	200.200.20.100
PC7	200.200.20.101
PC8	200.200.20.102

5. **Observe the output while using ping command from PC0 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, Router0 and Router1 (use each IP address of router).**

   - PC0: Ping Successful
   - PC1: Ping Successful
   - PC2: Ping Successful
   - Router 0 0/0: Ping Successful

```
C:\>ping 200.200.20.1

Pinging 200.200.20.1 with 32 bytes of data:

Reply from 200.200.20.1: bytes=32 time=1ms TTL=255
Reply from 200.200.20.1: bytes=32 time=1ms TTL=255
Reply from 200.200.20.1: bytes=32 time<1ms TTL=255
Reply from 200.200.20.1: bytes=32 time<1ms TTL=255

Ping statistics for 200.200.20.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Output 25: Ping PC0 to Router 0 0/0

   - Router 0 0/1: Ping Successful
   - Router 0 0/2: Ping Successful

```
C:\>ping 200.200.20.65

Pinging 200.200.20.65 with 32 bytes of data:

Reply from 200.200.20.65: bytes=32 time<1ms TTL=255
Reply from 200.200.20.65: bytes=32 time=3ms TTL=255
Reply from 200.200.20.65: bytes=32 time<1ms TTL=255
Reply from 200.200.20.65: bytes=32 time=1ms TTL=255
```

```
Ping statistics for 200.200.20.65:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 1ms
```

Output 26: Ping PC0 to Router 0 0/2

- PC3: Ping Successful
- PC4: Ping Successful
- PC5: Ping Successful
- Router 1 0/0: Ping Failed (Request timed out)

```
C:\>ping 200.200.20.66

Pinging 200.200.20.66 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 200.200.20.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 27: Ping PC0 to Router 1 0/0

- Router 1 0/1: Ping Failed (Destination host unreachable)

```
C:\>ping 200.200.20.99

Pinging 200.200.20.99 with 32 bytes of data:

Reply from 200.200.20.1: Destination host unreachable.
Reply from 200.200.20.1: Destination host unreachable.
Reply from 200.200.20.1: Destination host unreachable.
Reply from 200.200.20.1: Destination host unreachable.

Ping statistics for 200.200.20.99:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 28: Ping PC0 to Router 1 0/1

- PC6: Ping Failed (Destination host unreachable)

```
C:\>ping 200.200.20.100

Pinging 200.200.20.100 with 32 bytes of data:

Reply from 200.200.20.1: Destination host unreachable.
Request timed out.
Reply from 200.200.20.1: Destination host unreachable.
Reply from 200.200.20.1: Destination host unreachable.

Ping statistics for 200.200.20.100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 29: Ping PC0 to PC6

- PC7: Ping Failed (Destination host unreachable)

- PC8: Ping Failed (Destination host unreachable)

6. **Observe the output while using ping command from PC3 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, Router0 and Router1 (use each IP address of router).**

- PC0: Ping Successful
-

```
C:\>ping 200.200.20.2

Pinging 200.200.20.2 with 32 bytes of data:

Reply from 200.200.20.2: bytes=32 time=1ms TTL=127
Reply from 200.200.20.2: bytes=32 time<1ms TTL=127
Reply from 200.200.20.2: bytes=32 time<1ms TTL=127
Reply from 200.200.20.2: bytes=32 time<1ms TTL=127

Ping statistics for 200.200.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Output 30: Ping PC3 to PC0

- PC1: Ping Successful
- PC2: Ping Successful
- Router 0 0/0: Ping Successful
- Router 0 0/1: Ping Successful
- Router 0 0/2: Ping Successful

```
C:\>ping 200.200.20.65

Pinging 200.200.20.65 with 32 bytes of data:

Reply from 200.200.20.65: bytes=32 time=1ms TTL=255
Reply from 200.200.20.65: bytes=32 time<1ms TTL=255
Reply from 200.200.20.65: bytes=32 time=3ms TTL=255
Reply from 200.200.20.65: bytes=32 time=3ms TTL=255

Ping statistics for 200.200.20.65:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 1ms
```

Output 31: Ping PC3 to Router 0 0/2

- PC3: Ping Successful
- PC4: Ping Successful
- PC5: Ping Successful
- Router 1 0/0: Ping Failed (Request timed out)

```
C:\>ping 200.200.20.66

Pinging 200.200.20.66 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 200.200.20.66:
```

```
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 32: Ping PC3 to Router 1 0/0

- Router 1 0/1: Ping Failed (Destination host unreachable)

```
C:\>ping 200.200.20.99

Pinging 200.200.20.99 with 32 bytes of data:

Reply from 200.200.20.33: Destination host unreachable.
Reply from 200.200.20.33: Destination host unreachable.
Reply from 200.200.20.33: Destination host unreachable.
Reply from 200.200.20.33: Destination host unreachable.

Ping statistics for 200.200.20.99:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 33: Ping PC3 to Router 1 0/1

- PC6: Ping Failed (Destination host unreachable)

```
C:\>ping 200.200.20.100

Pinging 200.200.20.100 with 32 bytes of data:

Reply from 200.200.20.33: Destination host unreachable.
Request timed out.
Reply from 200.200.20.33: Destination host unreachable.
Request timed out.

Ping statistics for 200.200.20.100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 34: Ping PC3 to PC6

- PC7: Ping Failed (Destination host unreachable)
- PC8: Ping Failed (Destination host unreachable)

7. **Observe the output while using ping command from PC6 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, Router0 and Router1 (use each IP address of router).**

   - PC0: Ping Failed (Destination host unreachable)
   - PC1: Ping Failed (Destination host unreachable)

```
C:\>ping 200.200.20.3

Pinging 200.200.20.3 with 32 bytes of data:

Reply from 200.200.20.99: Destination host unreachable.
Reply from 200.200.20.99: Destination host unreachable.
Reply from 200.200.20.99: Destination host unreachable.
Reply from 200.200.20.99: Destination host unreachable.

Ping statistics for 200.200.20.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 35: Ping PC6 to PC1

   - PC2: Ping Failed (Destination host unreachable)
   - Router 0 0/0: Ping Failed (Destination host unreachable)
   - Router 0 0/1: Ping Failed (Destination host unreachable)

```
C:\>ping 200.200.20.33

Pinging 200.200.20.33 with 32 bytes of data:

Reply from 200.200.20.99: Destination host unreachable.
Reply from 200.200.20.99: Destination host unreachable.
Reply from 200.200.20.99: Destination host unreachable.
Reply from 200.200.20.99: Destination host unreachable.

Ping statistics for 200.200.20.33:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 36: Ping PC6 to Router 0 0/1

- Router 0 0/2: Ping Failed (Request timed out)

```
C:\>ping 200.200.20.65

Pinging 200.200.20.65 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 200.200.20.65:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Output 37: Ping PC6 to Router 0 0/2

- PC3: Ping Failed (Destination host unreachable)
- PC4: Ping Failed (Destination host unreachable)
- PC5: Ping Failed (Destination host unreachable)
- Router 1 0/0: Ping Successful

```
C:\>ping 200.200.20.66

Pinging 200.200.20.66 with 32 bytes of data:

Reply from 200.200.20.66: bytes=32 time<1ms TTL=255
Reply from 200.200.20.66: bytes=32 time<1ms TTL=255
Reply from 200.200.20.66: bytes=32 time=3ms TTL=255
Reply from 200.200.20.66: bytes=32 time<1ms TTL=255

Ping statistics for 200.200.20.66:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms
```

Output 38: Ping PC6 to Router 1 0/0

- Router 1 0/1: Ping Successful

```
C:\>ping 200.200.20.99

Pinging 200.200.20.99 with 32 bytes of data:

Reply from 200.200.20.99: bytes=32 time=5ms TTL=255
Reply from 200.200.20.99: bytes=32 time<1ms TTL=255
Reply from 200.200.20.99: bytes=32 time<1ms TTL=255
Reply from 200.200.20.99: bytes=32 time=82ms TTL=255

Ping statistics for 200.200.20.99:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 82ms, Average = 21ms
```

Output 39: Ping PC6 to Router 1 0/1

- PC6: Ping Successful
- PC7: Ping Successful
- PC8: Ping Successful

8. **Observe the output while using ping command from Router0 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8 and Router1 (use each IP address of router).**

- PC0: Ping Successful
- PC1: Ping Successful

```
AMRIT>ping 200.200.20.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Output 40: Ping Router 0 to PC1

- PC2: Ping Successful
- PC3: Ping Successful

```
AMRIT>ping 200.200.20.34

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.34, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/3 ms
```

Output 41: Ping Router 0 to PC3

- PC4: Ping Successful
- PC5: Ping Successful
- Router 1 0/0: Ping Successful

```
AMRIT>ping 200.200.20.66

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.66, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Output 42: Ping Router 0 to Router 1 0/0

- Router 1 0/1: Ping Failed

```
AMRIT>ping 200.200.20.99

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.99, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
```

Output 43: Ping Router 0 to Router 1 0/1

- PC6: Ping Failed

```
AMRIT>ping 200.200.20.100

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.100, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
```

Output 44: Ping Router 0 to PC6

- PC7: Ping Failed
- PC8: Ping Failed

9. **Observe the output while using ping command from Router1 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8 and Router0 (use each IP address of router).**

   - PC0: Ping Failed

```
Phuyal>ping 200.200.20.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
```

Output 45: Ping Router 1 to Router PC0

   - PC1: Ping Failed

```
Phuyal>ping 200.200.20.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.3, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
```

Output 46: Ping Router 1 to PC1

   - PC2: Ping Failed
   - Router 0 0/0: Ping Failed
   - Router 0 0/1: Ping Failed
   - Router 0 0/2: Ping Successful

```
Phuyal>ping 200.200.20.65

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.65, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Output 47: Ping Router 1 to Router 0 0/2

   - PC3: Ping Failed

```
Phuyal>ping 200.200.20.34

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.34, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
```

Output 48: Ping Router 1 to PC3

- PC4: Ping Failed
- PC5: Ping Failed
- PC6: Ping Successful

```
Phuyal>ping 200.200.20.100

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.100, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/1/4 ms
```

Output 49: Ping Router 1 to PC6

- PC7: Ping Successful
- PC8: Ping Successful

10. **From PC0 enter into Router0 using telnet and configure the static route for destination network of Network 3.**

    For Static *ip route* command is used and syntax is:

    ip route **Destination-Network** **Subnet-Mask** **[next-hop-address or outgoing interface]**

    We are aware of Subnet mask and next-hop-address but unknown to Destination-network. which we have to calculate by ANDing the IP address's of network and assigned subnet mask for that network. For Network 3 assigned IPs are 200.200.20.100, 200.200.20.101 and 200.200.20.102 so by ANDing any of these IP with Subnet mask **255.255.255.224** we get Destination-network.

    11001000.11001000.00010100.011 00101 – IP address (200.200.20.101)
    11111111.11111111.11111111.111 00000 – Subnet mask (255.255.255.224)

    ANDing gives Network address .

    11001000.11001000.00010100.011 00000 – Network address (200.200.20.96)

    Net hop address is the address of closet router in routing path to travel from router 0 to router 1 next hop address is **200.200.20.66**. So the syntax will be :

    ip route *200.200.20.96* *255.255.255.224* *200.200.20.66*

```
C:\>telnet 200.200.20.1
Trying 200.200.20.1 ...Open


User Access Verification

Password:
AMRIT>enable
Password:
AMRIT#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
AMRIT(config)#ip route 200.200.20.96 255.255.255.224 200.200.20.66
AMRIT(config)#^Z
```

```
AMRIT#
```

Output 50: Telnet to Router 0 and configure for static route for net 3

11. **From there enter into Router1 using telnet and configure the static route for destination network of Network 1 and Network 2.**

    Without existing from telnet we further telnet to Router 1 to configure Static Route for network 1 and 2. The Destination address for network 1 is calculated as :

11001000.11001000.00010100.000 00011 – IP address (200.200.20.3)
11111111.11111111.11111111.111 00000 – Subnet mask (255.255.255.224)

ANDing gives Network address.

11001000.11001000.00010100.000 00000 – Network address (200.200.20.0)

Similarly,The Destination address for network 2 is calculated as :

11001000.11001000.00010100.001 00011 – IP address (200.200.20.35)
11111111.11111111.11111111.111 00000 – Subnet mask (255.255.255.224)

ANDing gives Network address .

11001000.11001000.00010100.001 00000 – Network address (200.200.20.32)

Thus destination address for Network 1 is **200.200.20.0** and for network 2 is **200.200.20.32**. The next hop address for both network is same i.e. **200.200.20.65**.

```
AMRIT#telnet 200.200.20.66
Trying 200.200.20.66 ...Open


User Access Verification

Password:
Phuyal>enable
Password:
Phuyal#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Phuyal(config)#ip route 200.200.20.0 255.255.255.224 200.200.20.65
Phuyal(config)#ip route 200.200.20.32 255.255.255.224 200.200.20.65
Phuyal(config)#^Z
Phuyal#exit

[Connection to 200.200.20.66 closed by foreign host]
AMRIT#exit

[Connection to 200.200.20.1 closed by foreign host]
C:\>
```

Output 51: Telnet to Router 1 and configure for static route for net 1 and 2

12. **Repeat the step from 4 to 9 and observe the output. Compare the result with previous and comment on it.**

    .Observe and note down the output of the command show ip route in each router.

    We can observe the added Static routes in routing table of Router 0 and Router 1.

```
AMRIT#show ip route
Gateway of last resort is not set

     200.200.20.0/24 is variably subnetted, 7 subnets, 2 masks
C       200.200.20.0/27 is directly connected, GigabitEthernet0/0
L       200.200.20.1/32 is directly connected, GigabitEthernet0/0
C       200.200.20.32/27 is directly connected, GigabitEthernet0/1
L       200.200.20.33/32 is directly connected, GigabitEthernet0/1
C       200.200.20.64/27 is directly connected, GigabitEthernet0/2
L       200.200.20.65/32 is directly connected, GigabitEthernet0/2
S       200.200.20.96/27 [1/0] via 200.200.20.66
```

Output 52: *show ip route* Router 0 after static route

```
Phuyal#show ip route

Gateway of last resort is not set

     200.200.20.0/24 is variably subnetted, 6 subnets, 2 masks
S       200.200.20.0/27 [1/0] via 200.200.20.65
S       200.200.20.32/27 [1/0] via 200.200.20.65
C       200.200.20.64/27 is directly connected, GigabitEthernet0/0
L       200.200.20.66/32 is directly connected, GigabitEthernet0/0
C       200.200.20.96/27 is directly connected, GigabitEthernet0/1
L       200.200.20.99/32 is directly connected, GigabitEthernet0/1
```

Output 53: *show ip route* Router 1 after static route

- **Observe the output while using ping command from PC0 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, Router0 and Router1 (use each IP address of router).**
  - PC0: Ping Successful
  - PC1: Ping Successful
  - PC2: Ping Successful
  - Router 0 0/0: Ping Successful
  - Router 0 0/1: Ping Successful
  - Router 0 0/2: Ping Successful
  - PC3: Ping Successful
  - PC4: Ping Successful
  - PC5: Ping Successful
  - Router 1 0/0: Ping Successful
  - Router 1 0/1: Ping Successful
  - PC6: Ping Successful

```
C:\>ping 200.200.20.100

Pinging 200.200.20.100 with 32 bytes of data:

Reply from 200.200.20.100: bytes=32 time<1ms TTL=126
Reply from 200.200.20.100: bytes=32 time<1ms TTL=126
Reply from 200.200.20.100: bytes=32 time<1ms TTL=126
Reply from 200.200.20.100: bytes=32 time=11ms TTL=126

Ping statistics for 200.200.20.100:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 2ms
```

Output 54: Ping PC0 to PC6 after static route

- PC7: Ping Successful
- PC8: Ping Successful

Previously PC0 could only ping or establish connection between Network 2 only,this is due to absent of routes in Routing Table of Router 0 after static route to Network 3 is added ping is successful.

- **Observe the output while using ping command from PC3 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, Router0 and Router1 (use each IP address of router).**
  - PC0: Ping Successful
  - PC1: Ping Successful
  - PC2: Ping Successful
  - Router 0 0/0: Ping Successful
  - Router 0 0/1: Ping Successful
  - Router 0 0/2: Ping Successful
  - PC3: Ping Successful
  - PC4: Ping Successful
  - PC5: Ping Successful
  - Router 1 0/0: Ping Successful
  - Router 1 0/1: Ping Successful
  - PC6: Ping Successful

```
C:\>ping 200.200.20.100

Pinging 200.200.20.100 with 32 bytes of data:

Reply from 200.200.20.100: bytes=32 time<1ms TTL=126
Reply from 200.200.20.100: bytes=32 time=11ms TTL=126
Reply from 200.200.20.100: bytes=32 time<1ms TTL=126
Reply from 200.200.20.100: bytes=32 time=12ms TTL=126

Ping statistics for 200.200.20.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 12ms, Average = 5ms
```

Output 55: Ping PC3 to PC6 after static route

- PC7: Ping Successful
- PC8: Ping Successful

Previously PC3 could only ping or establish connection between Network 1 only,this is due to absent of routes in Routing Table of Router 0 after static route to Network 3 is added ping is successful.

- **Observe the output while using ping command from PC6 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, Router0 and Router1 (use each IP address of router).**
  - PC0: Ping Successful

```
C:\>ping 200.200.20.2

Pinging 200.200.20.2 with 32 bytes of data:
```

```
Reply from 200.200.20.2: bytes=32 time<1ms TTL=126
Reply from 200.200.20.2: bytes=32 time<1ms TTL=126
Reply from 200.200.20.2: bytes=32 time<1ms TTL=126
Reply from 200.200.20.2: bytes=32 time=11ms TTL=126

Ping statistics for 200.200.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 2ms
```

Output 56: Ping PC6 to PC0 after static route

- PC1: Ping Successful
- PC2: Ping Successful
- Router 0 0/0: Ping Successful
- Router 0 0/1: Ping Successful
- Router 0 0/2: Ping Successful
- PC3: Ping Successful
- PC4: Ping Successful
- PC5: Ping Successful
- Router 1 0/0: Ping Successful
- Router 1 0/1: Ping Successful
- PC6: Ping Successful
- PC7: Ping Successful
- PC8: Ping Successful

Previously PC6 could only ping or establish connection within Network 3 only,this is due to absent of routes in Routing Table of Router 1 after static router to Network 1 and Network 2 are added ping is successful.

- **Observe the output while using ping command from Router0 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8 and Router1 (use each IP address of router).**
  - PC0: Ping Successful
  - PC1: Ping Successful
  - PC2: Ping Successful
  - PC3: Ping Successful
  - PC4: Ping Successful
  - PC5: Ping Successful
  - Router 1 0/0: Ping Successful
  - Router 1 0/1: Ping Successful
  - PC6: Ping Successful

```
AMRIT>ping 200.200.20.100

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.100, timeout is 2
   seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/3 ms
```

Output 57: Ping Router 0 to PC6 after static route

  - PC7: Ping Successful
  - PC8: Ping Successful
- **Observe the output while using ping command from Router1 to PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8 and Router0 (use each IP address of router).**
  - PC0: Ping Successful

```
Phuyal>ping 200.200.20.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.200.20.2, timeout is 2 seconds
    :
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Output 58: Ping Router 1 to PC0 after static route

- PC1: Ping Successful
- PC2: Ping Successful
- Router 0 0/0: Ping Successful
- Router 0 0/1: Ping Successful
- Router 0 0/2: Ping Successful
- PC3: Ping Successful
- PC4: Ping Successful
- PC5: Ping Successful
- PC6: Ping Successful
- PC7: Ping Successful
- PC8: Ping Successful

6 Conclusion

In this Lab we familiarize ourselves with network, subnet and subnet mask, Default gateway and configuration, Routing , static routing and its configuration. We completed this Lab with the help of Cisco packet tracer . We acquire very important skill to extract the Network id from the IP address with the help of Subnet mask. We configured each PCs for Ip, default gateway and Subnet mask and each interface of Routers for IP and Subnet mask. To check connectivity between and among subnets we perform Ping and compare result in different configuration like before and after configuring Default gateway , before and after configuring subnet mask and finally before and after configuring Static Routes in each Router.