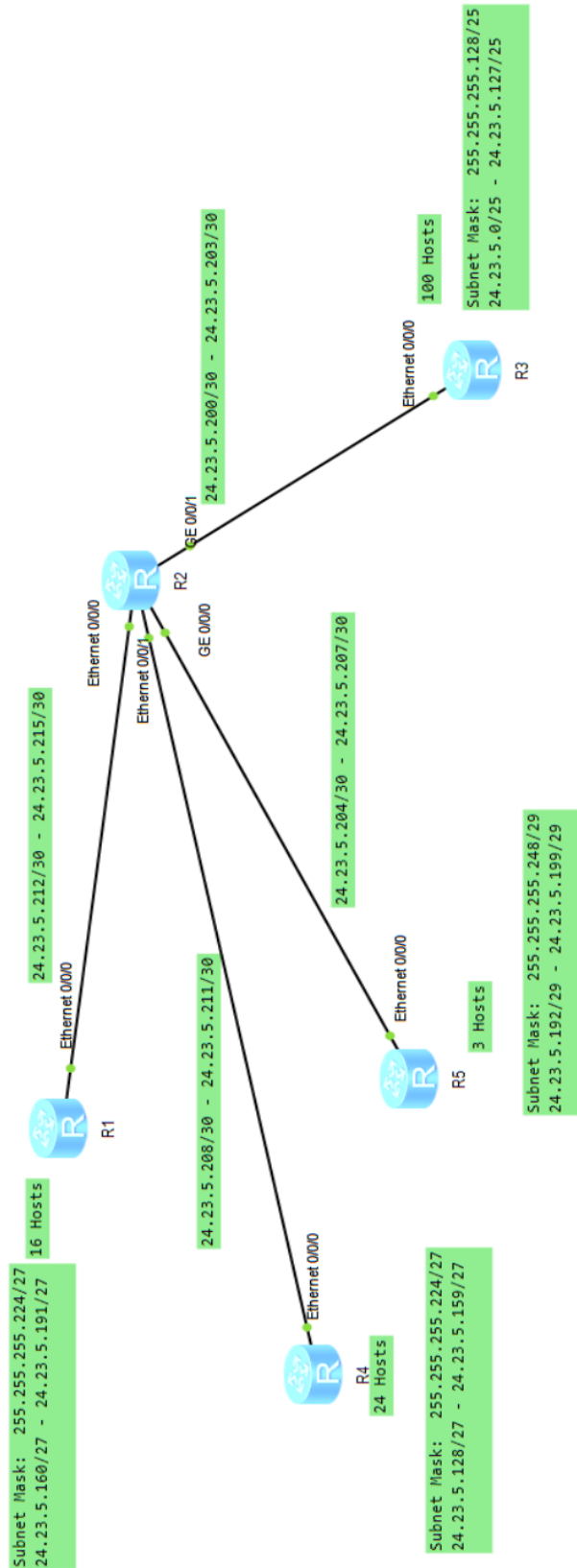


LAB-2

(Calculation of IP Addresses / subnetting and eNSP interfaces)

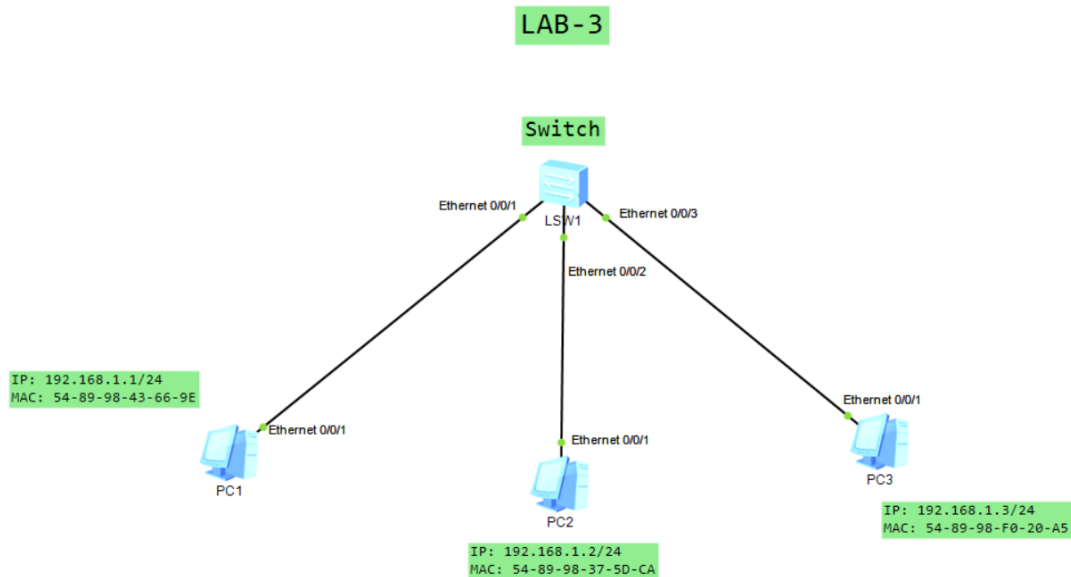
LAB-1 VLSM

Network: 24.23.5.0/24



LAB-3

(Mac Addresses, ARP, and Switching)



```
PC1
Basic Config Command MCPacket UdpPacket Console
Welcome to use PC Simulator!

PC>ping 192.168.1.3

Ping 192.168.1.3: 32 data bytes, Press Ctrl_C to break
From 192.168.1.3: bytes=32 seq=1 ttl=128 time=62 ms
From 192.168.1.3: bytes=32 seq=2 ttl=128 time=47 ms
From 192.168.1.3: bytes=32 seq=3 ttl=128 time=62 ms
From 192.168.1.3: bytes=32 seq=4 ttl=128 time=47 ms
From 192.168.1.3: bytes=32 seq=5 ttl=128 time=62 ms

--- 192.168.1.3 ping statistics ---
 5 packet(s) transmitted
 5 packet(s) received
 0.00% packet loss
 round-trip min/avg/max = 47/56/62 ms

PC>
```

Role of PC 2:

When PC1 wants to ping PC3, it needs to know PC3's MAC address. Since PC1 and PC3 are not directly connected, PC1 sends an ARP request as a broadcast message, asking, "Who has the IP address 192.168.1.3? Please tell me your MAC address."

Now, PC2 plays a crucial role in this process. PC2, being on the same local network as PC1 and PC3, receives the ARP request. However, since PC2 is not the intended recipient (192.168.1.3), it does not respond to the ARP request.

Instead, PC3, the actual owner of IP address 192.168.1.3, receives the ARP request. PC3 responds directly to PC1 with its MAC address (54-89-98-F0-20-A5). PC1 then updates its ARP table with the MAC address for IP address 192.168.1.3 and uses it to send the ping request to PC3.

Static ARP Entry:

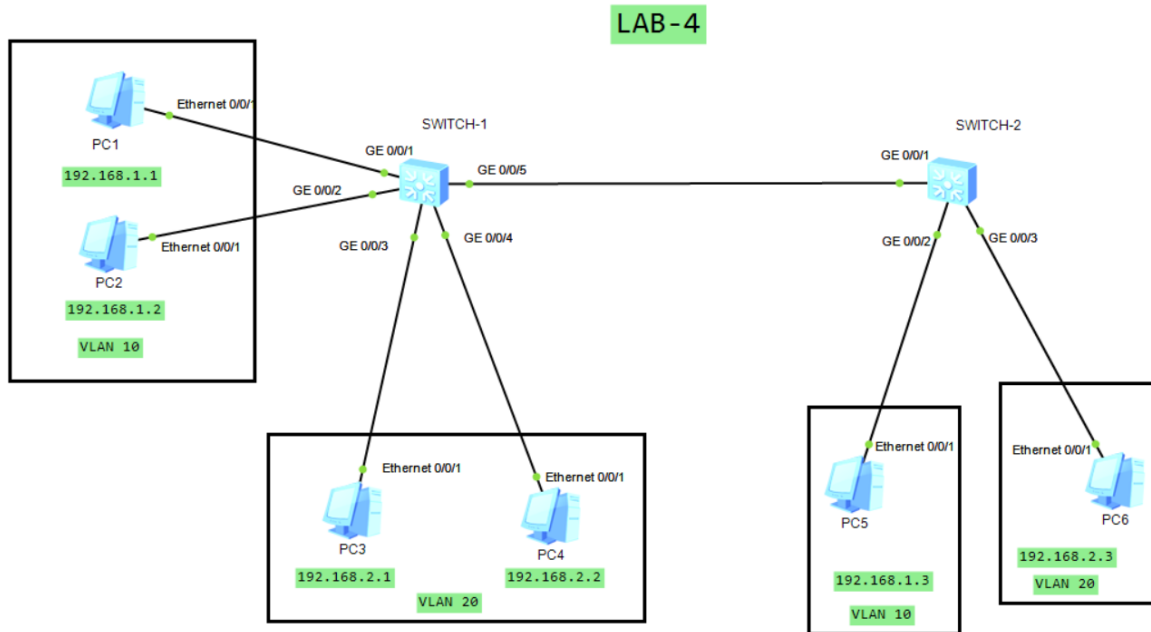
A static ARP entry is a manually configured mapping between an IP address and a MAC address on a device. Administrators can create static ARP entries to override the dynamic ARP resolution process. When a static ARP entry exists, the device will always use the specified MAC address for the corresponding IP address, regardless of whether it receives ARP requests.

Dynamic ARP Entry:

Dynamic ARP entries are automatically learned and maintained by devices on the network. When two devices communicate for the first time, they exchange ARP requests and replies to discover each other's MAC addresses. The device then adds this information to its ARP table, associating the IP address with the learned MAC address.

LAB-4

Virtual Local Area Network (VLAN)



SWITCH-1 CONFIGURATION:

```
#
vlan batch 10 20
#
interface GigabitEthernet0/0/1
 port link-type access
 port default vlan 10
#
interface GigabitEthernet0/0/2
 port link-type access
 port default vlan 10
#
interface GigabitEthernet0/0/3
 port link-type access
 port default vlan 20
#
interface GigabitEthernet0/0/4
```

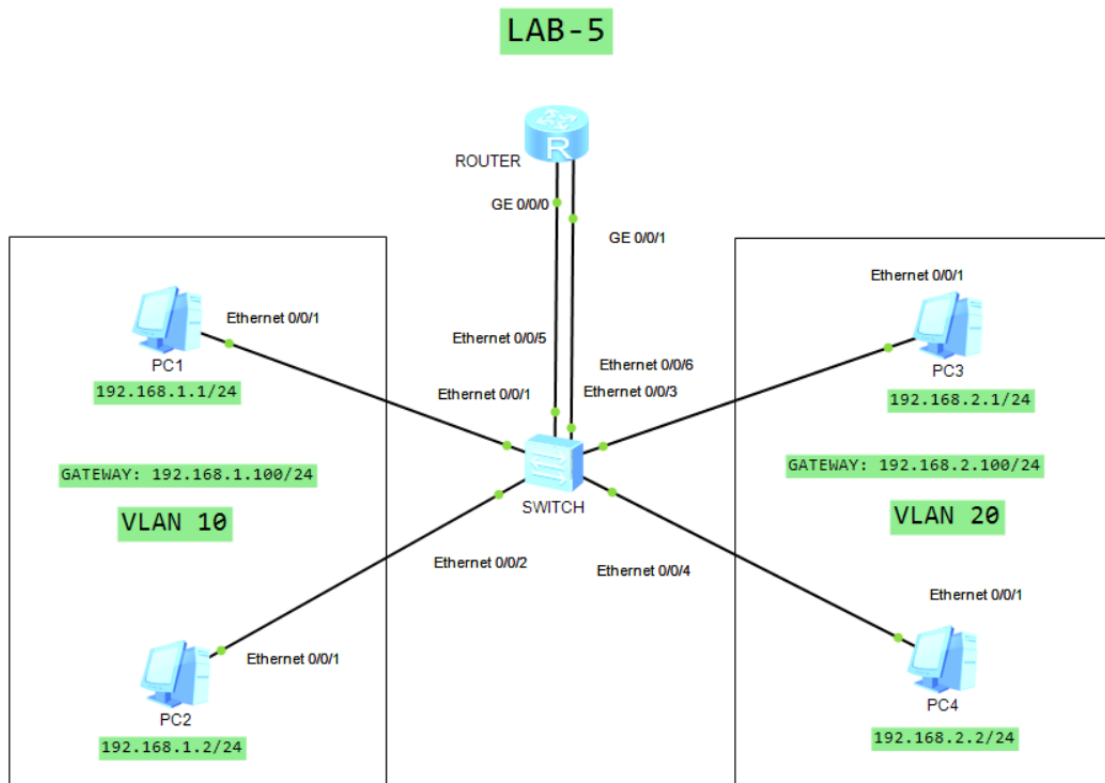
```
port link-type access
port default vlan 20
#
interface GigabitEthernet0/0/5
port link-type trunk
port trunk allow-pass vlan 10 20
#
```

SWITCH-2 CONFIGURATION:

```
#
vlan batch 10 20
#
interface GigabitEthernet0/0/1
port link-type trunk
port trunk allow-pass vlan 10 20
#
interface GigabitEthernet0/0/2
port link-type access
port default vlan 10
#
interface GigabitEthernet0/0/3
port link-type access
port default vlan 20
#
```

LAB-5

VLAN Intercommunication



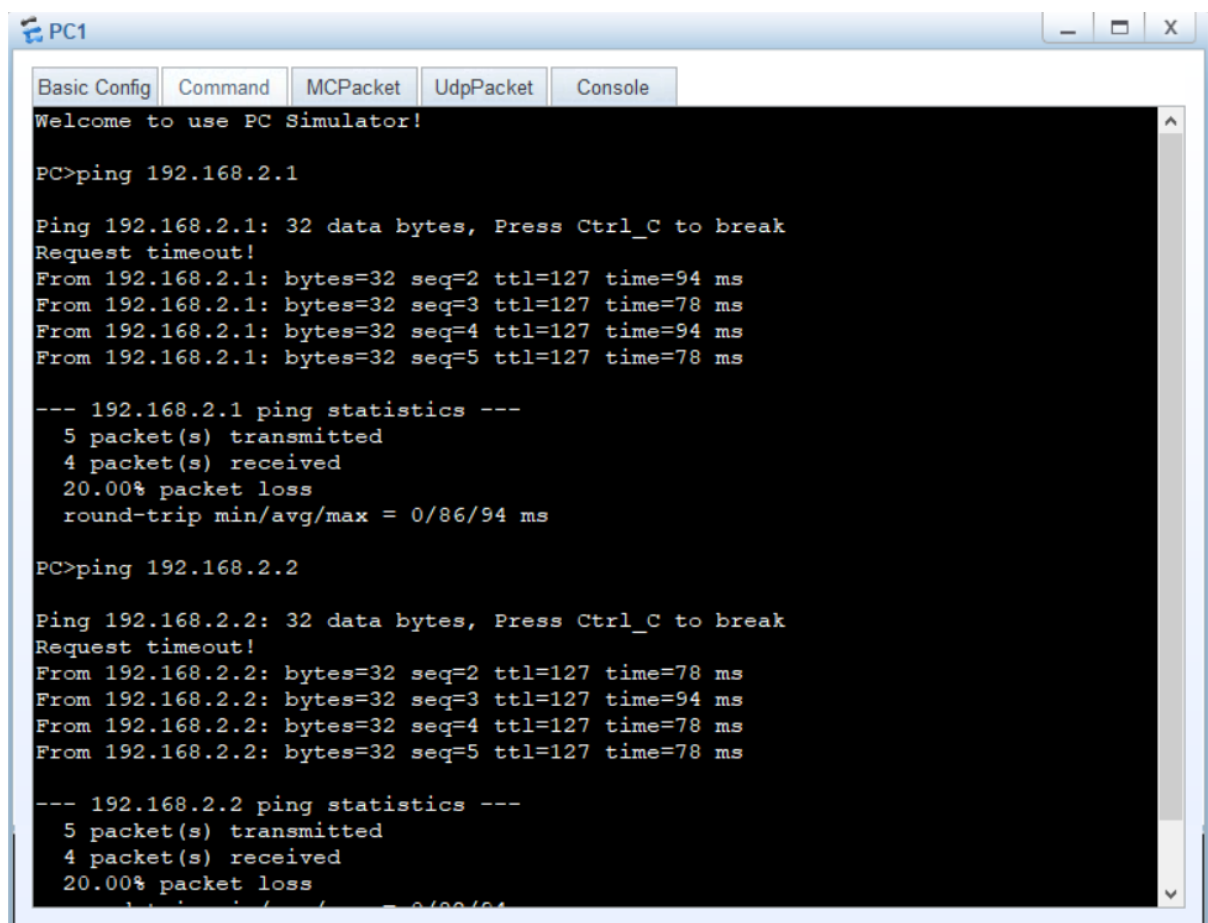
SWITCH CONFIGURATION:

```
#
vlan batch 10 20
#
interface Ethernet0/0/1
port link-type access
port default vlan 10
#
interface Ethernet0/0/2
port link-type access
port default vlan 10
#
interface Ethernet0/0/3
port link-type access
port default vlan 20
#
```

```
interface Ethernet0/0/4
port link-type access
port default vlan 20
#
interface Ethernet0/0/5
port link-type access
port default vlan 10
#
interface Ethernet0/0/6
port link-type access
port default vlan 20
#
```

ROUTER CONFIGURATION:

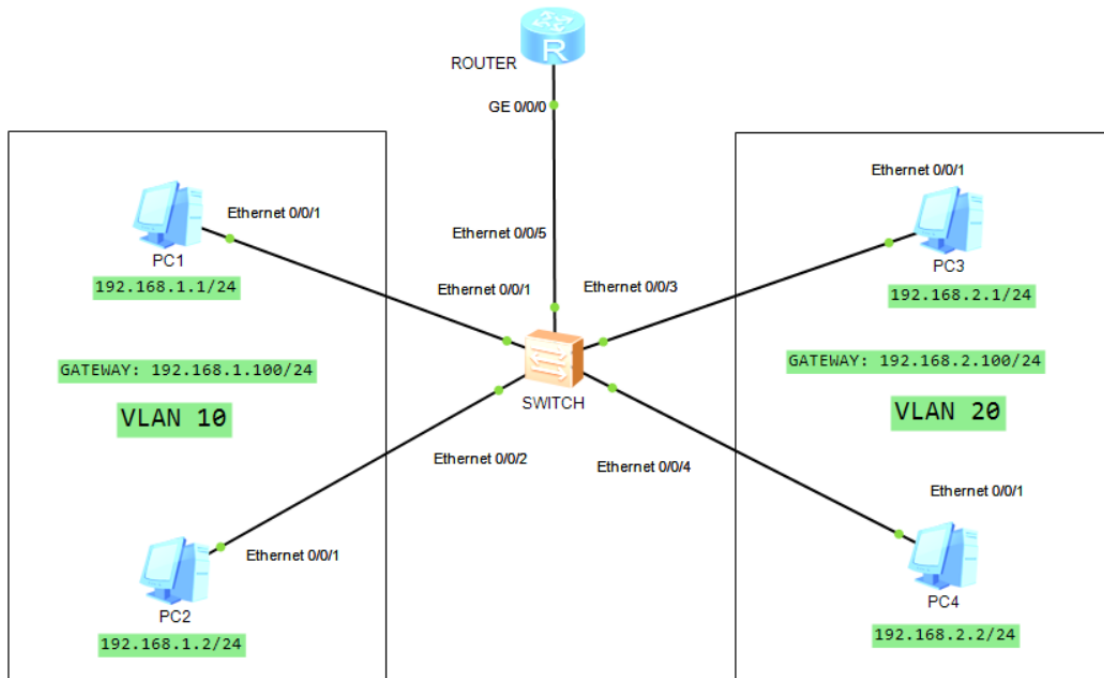
```
#
interface GigabitEthernet0/0/0
ip address 192.168.1.100 255.255.255.0
#
interface GigabitEthernet0/0/1
ip address 192.168.2.100 255.255.255.0
#
```



LAB-6

Vlan Intercommunication using Router's subinterface

LAB-6 ROUTER ON A STICK



SWITCH CONFIGURATION:

```
#
vlan batch 10 20
#
interface Ethernet0/0/1
port link-type access
port default vlan 10
#
interface Ethernet0/0/2
port link-type access
port default vlan 10
#
interface Ethernet0/0/3
port link-type access
port default vlan 20
```



```
#
interface Ethernet0/0/4
  port link-type access
  port default vlan 20
#
interface Ethernet0/0/5
  port link-type trunk
  port trunk allow-pass vlan 10 20
#
```

ROUTER CONFIGURATION:

```
#
interface GigabitEthernet0/0/0.1
  dot1q termination vid 10
  ip address 192.168.1.100 255.255.255.0
  arp broadcast enable
#
interface GigabitEthernet0/0/0.2
  dot1q termination vid 20
  ip address 192.168.2.100 255.255.255.0
  arp broadcast enable
#
```

```
PC1
Basic Config Command MCPacket UdpPacket Console
Welcome to use PC Simulator!

PC>ping 192.168.2.1

Ping 192.168.2.1: 32 data bytes, Press Ctrl_C to break
Request timeout!
From 192.168.2.1: bytes=32 seq=2 ttl=127 time=94 ms
From 192.168.2.1: bytes=32 seq=3 ttl=127 time=78 ms
From 192.168.2.1: bytes=32 seq=4 ttl=127 time=94 ms
From 192.168.2.1: bytes=32 seq=5 ttl=127 time=78 ms

--- 192.168.2.1 ping statistics ---
 5 packet(s) transmitted
 4 packet(s) received
20.00% packet loss
round-trip min/avg/max = 0/86/94 ms

PC>ping 192.168.2.2

Ping 192.168.2.2: 32 data bytes, Press Ctrl_C to break
Request timeout!
From 192.168.2.2: bytes=32 seq=2 ttl=127 time=78 ms
From 192.168.2.2: bytes=32 seq=3 ttl=127 time=94 ms
From 192.168.2.2: bytes=32 seq=4 ttl=127 time=78 ms
From 192.168.2.2: bytes=32 seq=5 ttl=127 time=78 ms

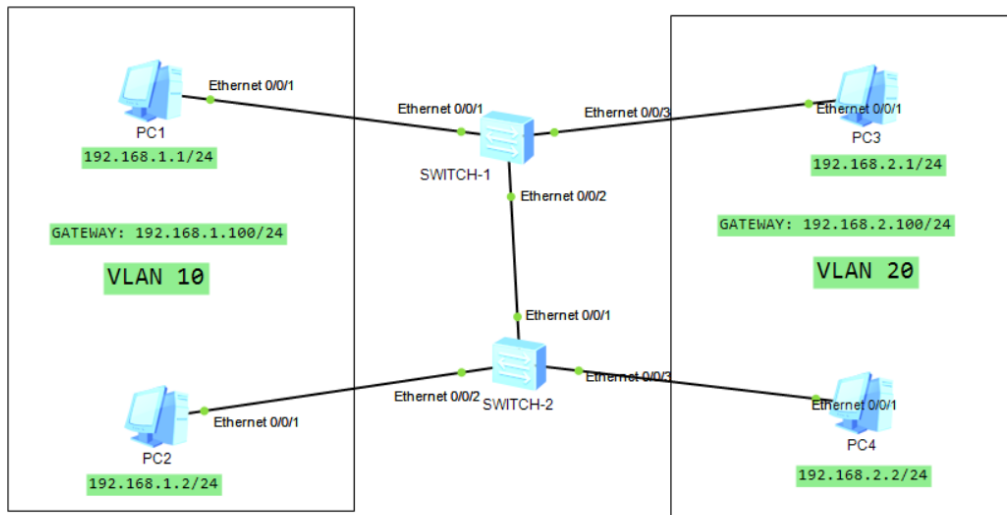
--- 192.168.2.2 ping statistics ---
 5 packet(s) transmitted
 4 packet(s) received
20.00% packet loss
round-trip min/avg/max = 0/86/94 ms
```

LAB-7

VLAN Intercommunication using VLANIF

LAB-7

VLAN-IF



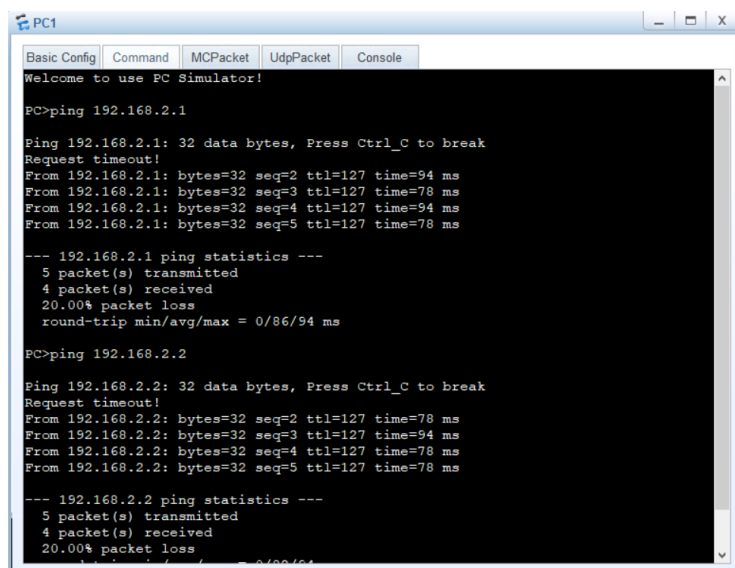
SWITCH-1 CONFIGURATION:

```
#
vlan batch 10 20
#
interface Vlanif10
 ip address 192.168.1.100 255.255.255.0
#
interface Vlanif20
 ip address 192.168.2.100 255.255.255.0
#
interface MEth0/0/1
#
interface Ethernet0/0/1
 port link-type access
 port default vlan 10
#
interface Ethernet0/0/2
 port link-type trunk
 port trunk allow-pass vlan 10 20
#
```

```
interface Ethernet0/0/3
port link-type access
port default vlan 20
#
```

SWITCH-2 CONFIGURATION:

```
#
vlan batch 10 20
#
interface Vlanif10
ip address 192.168.1.100 255.255.255.0
#
interface Vlanif20
ip address 192.168.2.100 255.255.255.0
#
#
interface Ethernet0/0/1
port link-type trunk
port trunk allow-pass vlan 10 20
#
interface Ethernet0/0/2
port link-type access
port default vlan 10
#
interface Ethernet0/0/3
port link-type access
port default vlan 20
#
```



The screenshot shows a terminal window titled 'PC1' with tabs for 'Basic Config', 'Command', 'MCPacket', 'UdpPacket', and 'Console'. The 'Console' tab is active, displaying the following text:

```
Welcome to use PC Simulator!

PC>ping 192.168.2.1

Ping 192.168.2.1: 32 data bytes, Press Ctrl_C to break
Request timeout!
From 192.168.2.1: bytes=32 seq=2 ttl=127 time=94 ms
From 192.168.2.1: bytes=32 seq=3 ttl=127 time=78 ms
From 192.168.2.1: bytes=32 seq=4 ttl=127 time=94 ms
From 192.168.2.1: bytes=32 seq=5 ttl=127 time=78 ms

--- 192.168.2.1 ping statistics ---
 5 packet(s) transmitted
 4 packet(s) received
 20.00% packet loss
 round-trip min/avg/max = 0/86/94 ms

PC>ping 192.168.2.2

Ping 192.168.2.2: 32 data bytes, Press Ctrl_C to break
Request timeout!
From 192.168.2.2: bytes=32 seq=2 ttl=127 time=78 ms
From 192.168.2.2: bytes=32 seq=3 ttl=127 time=94 ms
From 192.168.2.2: bytes=32 seq=4 ttl=127 time=78 ms
From 192.168.2.2: bytes=32 seq=5 ttl=127 time=78 ms

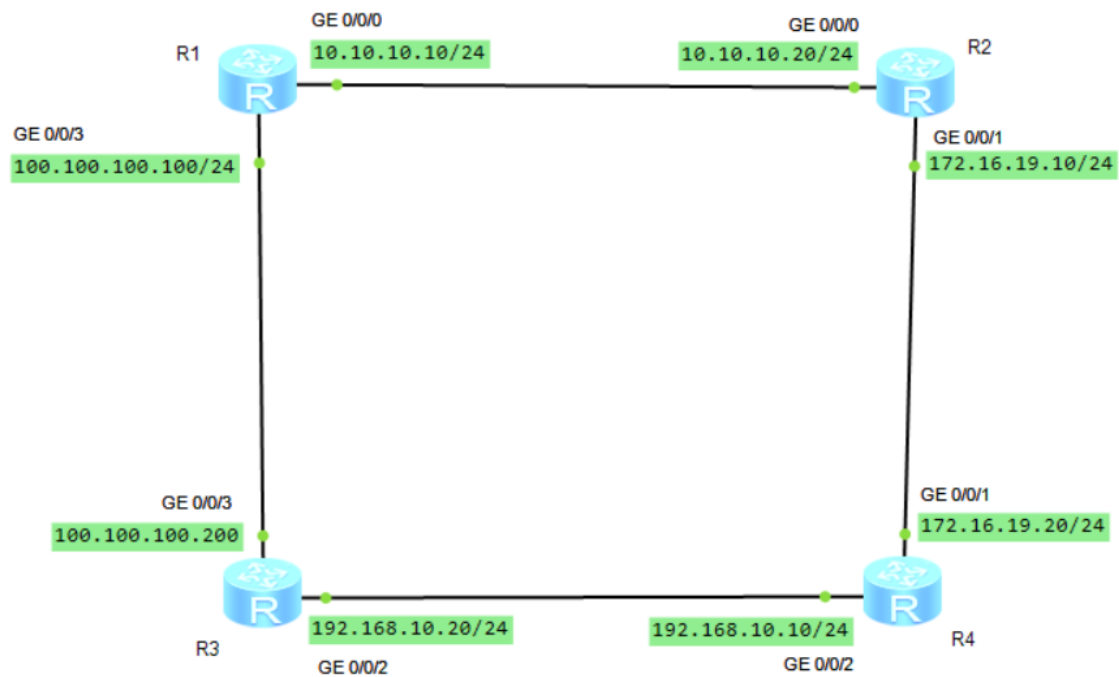
--- 192.168.2.2 ping statistics ---
 5 packet(s) transmitted
 4 packet(s) received
 20.00% packet loss
 round-trip min/avg/max = 0/86/94 ms
```

LAB-8

Static Routes

LAB-8

STATIC ROUTES



SWITCH-1 CONFIGURATION:

```
interface GigabitEthernet0/0/0
ip address 10.10.10.10 255.255.255.0
#
interface GigabitEthernet0/0/1
#
interface GigabitEthernet0/0/2
#
interface GigabitEthernet0/0/3
ip address 100.100.100.100 255.255.255.0
#
wlan
#
interface NULL0
```

```
#
ip route-static 172.16.19.0 255.255.255.0 10.10.10.20
ip route-static 192.168.10.0 255.255.255.0 100.100.100.200
ip route-static 192.168.10.0 255.255.255.0 10.10.10.20
#
```

SWITCH-2 CONFIGURATION:

```
#
interface GigabitEthernet0/0/0
 ip address 10.10.10.20 255.255.255.0
#
interface GigabitEthernet0/0/1
 ip address 172.16.19.10 255.255.255.0
#
interface GigabitEthernet0/0/2
#
interface GigabitEthernet0/0/3
#
wlan
#
interface NULL0
#
ip route-static 10.10.10.0 255.255.255.0 100.100.100.100
ip route-static 100.100.100.0 255.255.255.0 10.10.10.10
ip route-static 192.168.10.0 255.255.255.0 10.10.10.10
#
```

SWITCH-3 CONFIGURATION:

```
#
interface GigabitEthernet0/0/0
#
interface GigabitEthernet0/0/1
#
interface GigabitEthernet0/0/2
 ip address 192.168.10.20 255.255.255.0
#
interface GigabitEthernet0/0/3
 ip address 100.100.100.200 255.255.255.0
#
wlan
```

```
#
interface NULL0
#
ip route-static 10.10.10.0 255.255.255.0 100.100.100.100
ip route-static 172.16.19.0 255.255.255.0 10.10.10.20
ip route-static 172.16.19.0 255.255.255.0 100.100.100.100
#
```

SWITCH-4 CONFIGURATION:

```
#
interface GigabitEthernet0/0/1
 ip address 172.16.19.20 255.255.255.0
#
interface GigabitEthernet0/0/2
 ip address 192.168.10.10 255.255.255.0
#
interface GigabitEthernet0/0/3
#
wlan
#
interface NULL0
#
ip route-static 10.10.10.0 255.255.255.0 192.168.10.20
ip route-static 10.10.10.0 255.255.255.0 10.10.10.10
ip route-static 100.100.100.0 255.255.255.0 100.100.100.200
ip route-static 100.100.100.0 255.255.255.0 192.168.10.20
#
```

```
R1

user privilege level 15
set authentication password cipher RXE$J-@_YSajUnlvMEIBk;|#
user-interface vty 16 20
#
return

<R1>
<R1>
<R1>
<R1>
<R1>
<R1>
<R1>
<R1>
<R1>
<R1>ping 172.16.19.20
  PING 172.16.19.20: 56  data bytes, press CTRL_C to break
    Reply from 172.16.19.20: bytes=56 Sequence=1 ttl=254 time=70 ms
    Reply from 172.16.19.20: bytes=56 Sequence=2 ttl=254 time=80 ms
    Reply from 172.16.19.20: bytes=56 Sequence=3 ttl=254 time=40 ms
    Reply from 172.16.19.20: bytes=56 Sequence=4 ttl=254 time=90 ms
    Reply from 172.16.19.20: bytes=56 Sequence=5 ttl=254 time=80 ms

  --- 172.16.19.20 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 40/72/90 ms

<R1>
```

```
R2

user-interface con 0
user-interface vty 0 4
  user privilege level 15

<R2>
<R2>ping 100.100.100.200
  PING 100.100.100.200: 56  data bytes, press CTRL_C to break
    Reply from 100.100.100.200: bytes=56 Sequence=1 ttl=254 time=100 ms
    Reply from 100.100.100.200: bytes=56 Sequence=2 ttl=254 time=120 ms
    Reply from 100.100.100.200: bytes=56 Sequence=3 ttl=254 time=70 ms
    Reply from 100.100.100.200: bytes=56 Sequence=4 ttl=254 time=120 ms
    Reply from 100.100.100.200: bytes=56 Sequence=5 ttl=254 time=80 ms

  --- 100.100.100.200 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 70/98/120 ms

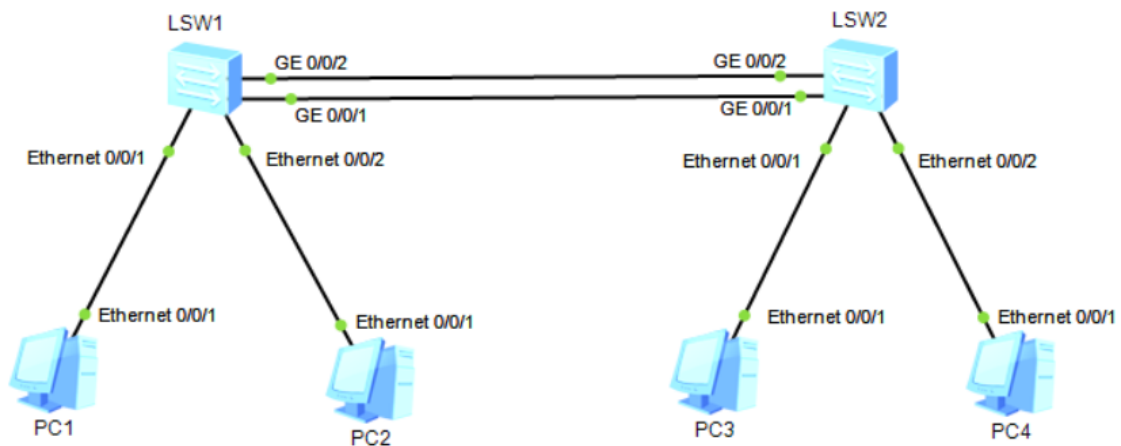
<R2>
```

LAB-9

Link Aggregation (Eth-Trunk)

LAB-9

Link Aggregation (Eth-Trunk)



```
PC1
Basic Config | Command | MCPacket | UdpPacket | Console
Welcome to use PC Simulator!
PC>ping 192.168.0.3
Ping 192.168.0.3: 32 data bytes, Press Ctrl_C to break
From 192.168.0.3: bytes=32 seq=1 ttl=128 time=78 ms
From 192.168.0.3: bytes=32 seq=2 ttl=128 time=62 ms
From 192.168.0.3: bytes=32 seq=3 ttl=128 time=63 ms
From 192.168.0.3: bytes=32 seq=4 ttl=128 time=94 ms
From 192.168.0.3: bytes=32 seq=5 ttl=128 time=94 ms
--- 192.168.0.3 ping statistics ---
 5 packet(s) transmitted
 5 packet(s) received
 0.00% packet loss
 round-trip min/avg/max = 62/78/94 ms
PC>
```


SWITCH-1 CONFIGURATION :

```
#
interface Eth-Trunk1
  port link-type trunk
#
#
interface GigabitEthernet0/0/1
  eth-trunk 1
#
interface GigabitEthernet0/0/2
  eth-trunk 1
#
```

SWITCH-2 CONFIGURATION :

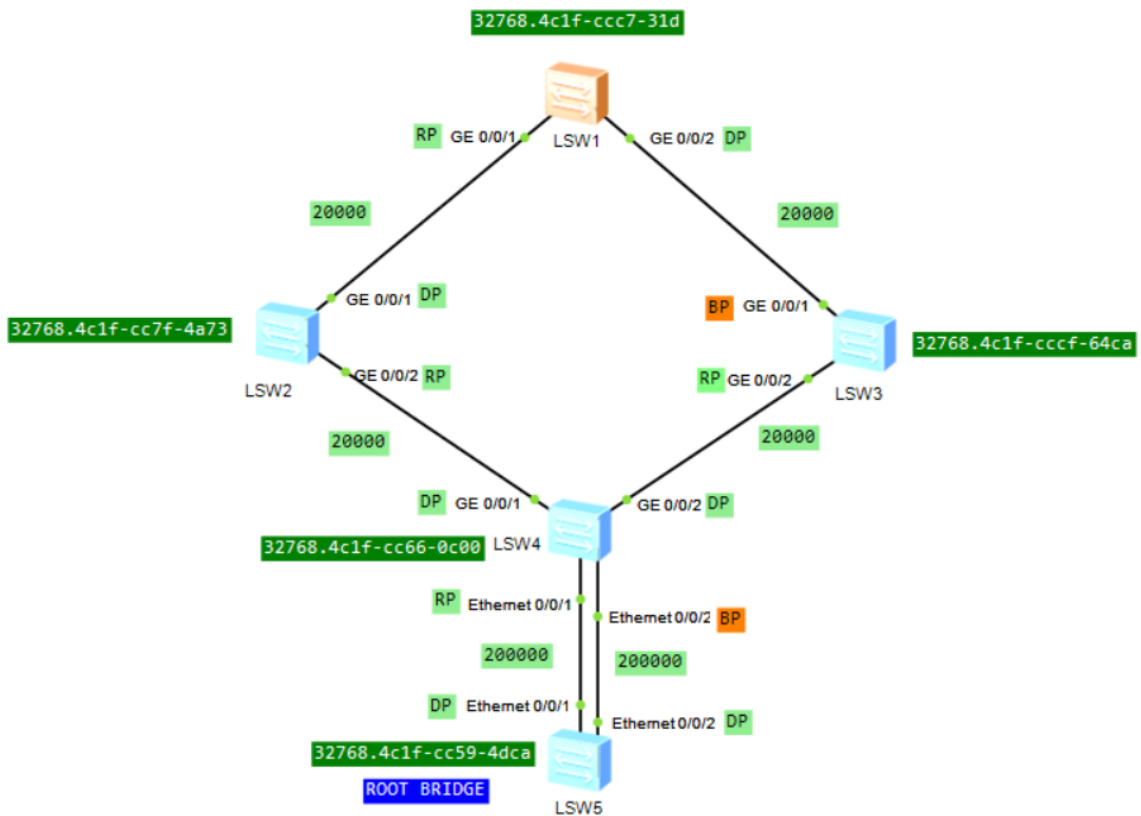
```
#
interface Eth-Trunk1
  port link-type trunk
#
#
interface GigabitEthernet0/0/1
  eth-trunk 1
#
interface GigabitEthernet0/0/2
  eth-trunk 1
#
```

LAB-10

Spanning Tree Protocol (STP)

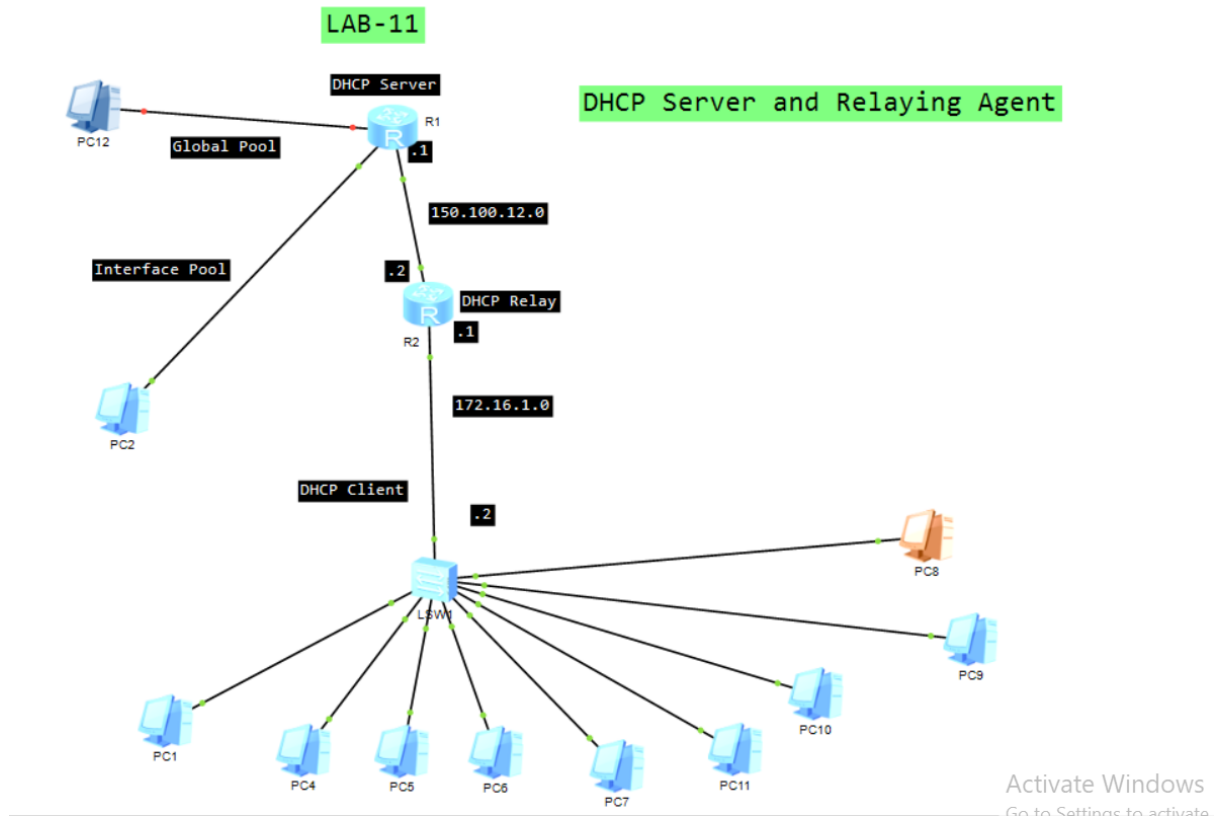
LAB-10

Spanning Tree Protocol (STP)



LAB-11

Dynamic Host Configuration Protocol (DHCP)



Router R1 DHCP Server Configuration:

```
dhcp enable
#
ip pool 1
 gateway-list 172.16.1.1
 network 172.16.1.0 mask 255.255.255.0
 dns-list 150.100.15.1 150.100.15.2
 domain-name neduet.edu.pk
 static-bind ip-address 172.16.1.33 mac-address 5489-9860-57
2B
#
ip pool 2
 gateway-list 1.1.1.1
 network 1.1.1.0 mask 255.255.255.0
 dns-list 1.1.1.1
#
```

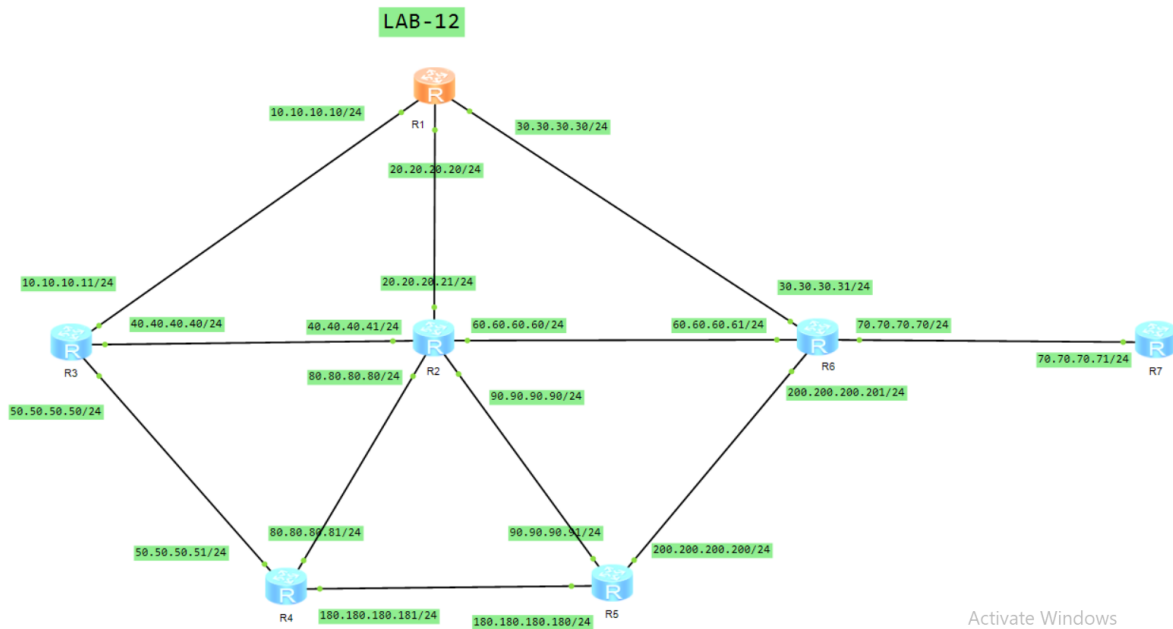
```
interface Ethernet0/0/0
ip address 150.100.12.1 255.255.255.0
dhcp select global
#
interface Ethernet0/0/1
ip address 1.1.1.1 255.255.255.0
dhcp select global
#
ip route-static 172.16.1.0 255.255.255.0 150.100.12.2
```

Router R2 DHCP Relay Configuration:

```
dhcp enable
#
interface Ethernet0/0/0
ip address 150.100.12.2 255.255.255.0
#
interface Ethernet0/0/1
ip address 172.16.1.1 255.255.255.0
dhcp select relay
dhcp relay server-ip 150.100.12.1
```

LAB-12

Routing Interface Protocol



ROUTER-1 CONFIGURATION:

```
#
interface GigabitEthernet0/0/0
 ip address 10.10.10.10 255.255.255.0
#
interface GigabitEthernet0/0/1
 ip address 20.20.20.20 255.255.255.0
#
interface GigabitEthernet0/0/2
 ip address 30.30.30.30 255.255.255.0
#
interface GigabitEthernet0/0/3
#
wlan
#
interface NULL0
#
rip 1
 network 10.0.0.0
 network 20.0.0.0
 network 30.0.0.0
#
```

ROUTER-2 CONFIGURATION:

```
#
interface GigabitEthernet0/0/0
 ip address 80.80.80.80 255.255.255.0
#
interface GigabitEthernet0/0/1
 ip address 20.20.20.21 255.255.255.0
#
interface GigabitEthernet0/0/2
 ip address 90.90.90.90 255.255.255.0
#
interface GigabitEthernet0/0/3
 ip address 40.40.40.41 255.255.255.0
#
wlan
#
interface NULL0
#
rip 1
 network 20.0.0.0
 network 40.0.0.0
 network 60.0.0.0
 network 80.0.0.0
 network 90.0.0.0
#
```

ROUTER-3 CONFIGURATION:

```
#
interface GigabitEthernet0/0/0
 ip address 10.10.10.11 255.255.255.0
#
interface GigabitEthernet0/0/1
 ip address 50.50.50.50 255.255.255.0
#
interface GigabitEthernet0/0/2
#
interface GigabitEthernet0/0/3
 ip address 40.40.40.40 255.255.255.0
#
wlan
#
interface NULL0
#
```

```
rip 1
network 10.0.0.0
network 40.0.0.0
network 50.0.0.0
#
```

ROUTER-4 CONFIGURATION:

```
#
interface GigabitEthernet0/0/0
ip address 80.80.80.81 255.255.255.0
#
interface GigabitEthernet0/0/1
ip address 50.50.50.51 255.255.255.0
#
interface GigabitEthernet0/0/2
#
interface GigabitEthernet0/0/3
ip address 180.180.180.181 255.255.255.0
#
wlan
#
interface NULL0
#
rip 1
network 50.0.0.0
network 80.0.0.0
network 180.180.0.0
#
```

ROUTER-5 CONFIGURATION:

```
#
interface GigabitEthernet0/0/0
ip address 200.200.200.200 255.255.255.0
#
interface GigabitEthernet0/0/1
#
interface GigabitEthernet0/0/2
ip address 90.90.90.91 255.255.255.0
#
interface GigabitEthernet0/0/3
ip address 180.180.180.180 255.255.255.0
#
wlan
```

```
#
interface NULL0
#
rip 1
 network 90.0.0.0
 network 180.180.0.0
 network 200.200.200.0
#
```

ROUTER-6 CONFIGURATION:

```
#
interface GigabitEthernet0/0/0
 ip address 200.200.200.201 255.255.255.0
#
interface GigabitEthernet0/0/1
 ip address 70.70.70.70 255.255.255.0
#
interface GigabitEthernet0/0/2
 ip address 30.30.30.31 255.255.255.0
#
interface GigabitEthernet0/0/3
#
wlan
#
interface NULL0
#
rip 1
 network 60.0.0.0
 network 30.0.0.0
 network 70.0.0.0
 network 200.200.0.0
 network 200.200.200.0
#
```

ROUTER-7 CONFIGURATION:

```
#
interface GigabitEthernet0/0/0
#
interface GigabitEthernet0/0/1
 ip address 70.70.70.71 255.255.255.0
#
```



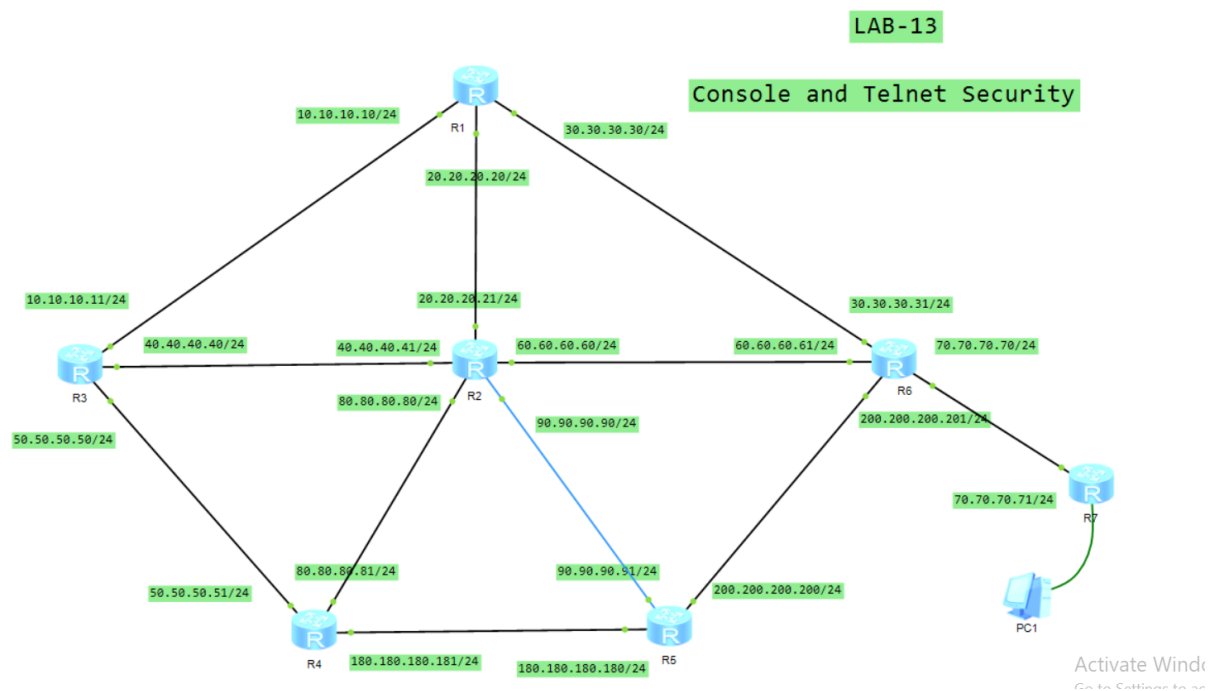
```

interface GigabitEthernet0/0/2
#
interface GigabitEthernet0/0/3
#
wlan
#
interface NULL0
#
rip 1
network 70.0.0.0
#

```

LAB-13

Console and Telnet Security

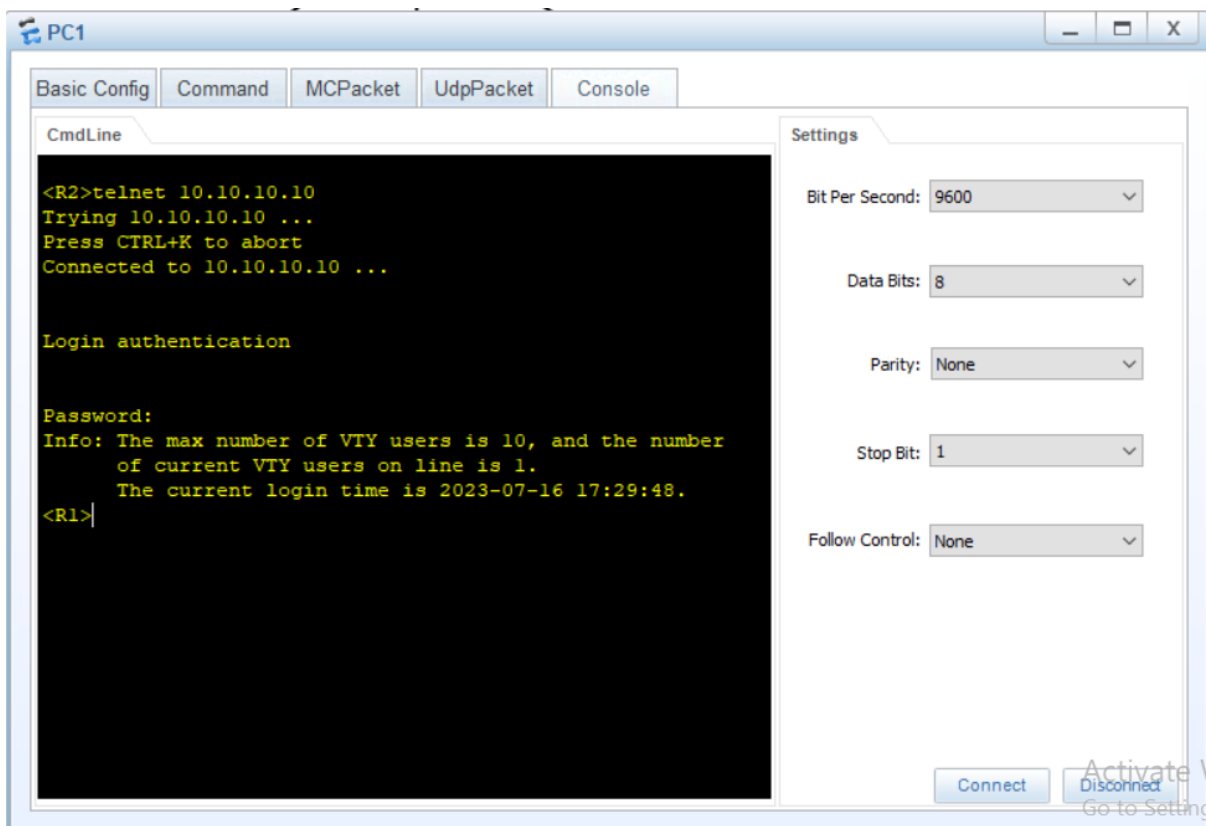
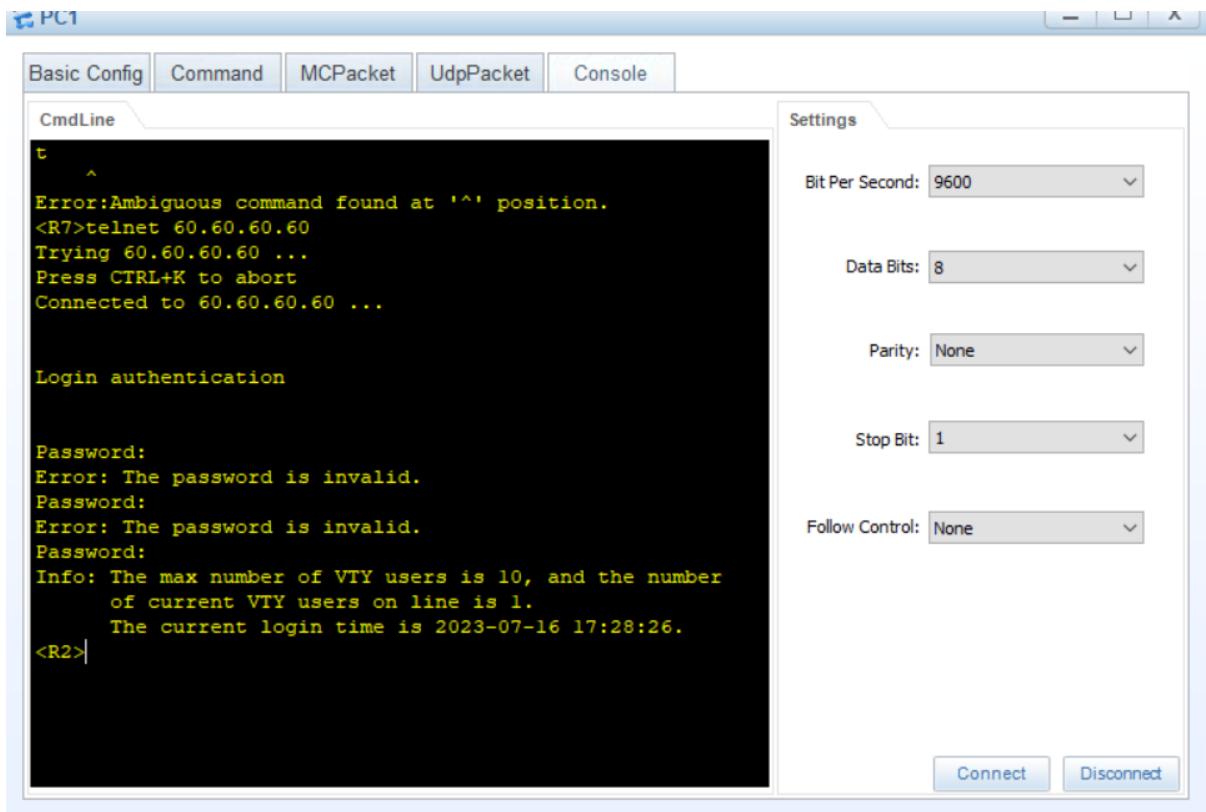


CONFIGURATION ON ALL ROUTERS:

```

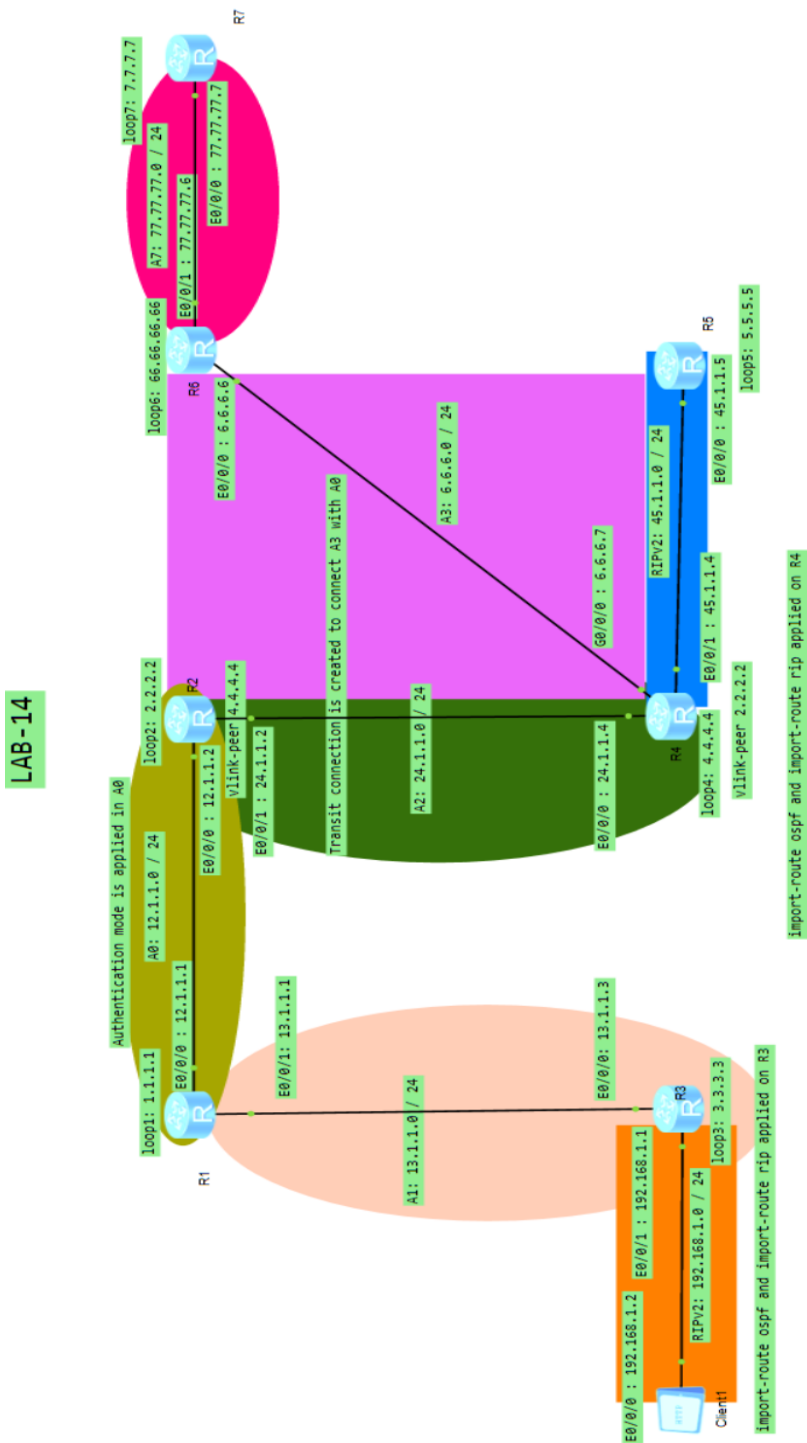
#
telnet server enable
user-interface vty 0 4
authentication-mode password
user privilege level 15
set authentication password cipher ataib123
#

```



LAB-14

Open Shortest Path First (OSPF)



ROUTER-1 CONFIGURATION:

```
#
router id 1.1.1.1
#
interface Ethernet0/0/0
 ip address 12.1.1.1 255.255.255.0
#
interface Ethernet0/0/1
 ip address 13.1.1.1 255.255.255.0
#
interface LoopBack1
 ip address 1.1.1.1 255.255.255.255
#
ospf 1
 area 0.0.0.0
  authentication-mode md5 1 cipher Tp,R+2.p*4jKUGU-KkpB'EH#
  network 1.1.1.1 0.0.0.0
  network 12.1.1.0 0.0.0.255
 area 0.0.0.1
  network 13.1.1.0 0.0.0.255
#
user-interface con 0
user-interface vty 0 4
user-interface vty 16 20
#
```

ROUTER-2 CONFIGURATION:

```
#
router id 2.2.2.2
#
interface Ethernet0/0/0
 ip address 12.1.1.2 255.255.255.0
#
interface Ethernet0/0/1
 ip address 24.1.1.2 255.255.255.0
#
interface LoopBack2
 ip address 2.2.2.2 255.255.255.255
#
ospf 1
 area 0.0.0.0
```

```
authentication-mode md5 1 cipher Sx^OF8POI2pe}@HMNPn@OFa#
network 2.2.2.2 0.0.0.0
network 12.1.1.0 0.0.0.255
area 0.0.0.2
network 24.1.1.0 0.0.0.255
vlink-peer 4.4.4.4
#
user-interface con 0
user-interface vty 0 4
user-interface vty 16 20
#
```

ROUTER-3 CONFIGURATION:

```
#
router id 3.3.3.3
#
interface Ethernet0/0/0
ip address 13.1.1.3 255.255.255.0
#
interface Ethernet0/0/1
ip address 192.168.1.1 255.255.255.0
#
interface LoopBack3
ip address 3.3.3.3 255.255.255.255
#
ospf 1
import-route rip 1
area 0.0.0.1
network 3.3.3.3 0.0.0.0
network 13.1.1.0 0.0.0.255
#
rip 1
version 2
network 192.168.1.0
import-route ospf 1
#
user-interface con 0
user-interface vty 0 4
user-interface vty 16 20
#
```

ROUTER-4 CONFIGURATION:

```
#
router id 4.4.4.4
#
interface Ethernet0/0/0
 ip address 24.1.1.4 255.255.255.0
#
interface Ethernet0/0/1
 ip address 45.1.1.4 255.255.255.0
#
interface GigabitEthernet0/0/0
 ip address 6.6.6.7 255.255.255.0
#
interface LoopBack4
 ip address 4.4.4.4 255.255.255.255
#
ospf 1
 import-route rip 1
 area 0.0.0.0
 authentication-mode md5 1 cipher _.^sWl}o-G3IF$':[285/OX#
 area 0.0.0.2
 network 4.4.4.4 0.0.0.0
 network 24.1.1.0 0.0.0.255
 vlink-peer 2.2.2.2
 area 0.0.0.3
 network 6.6.6.0 0.0.0.255
 vlink-peer 66.66.66.66
#
rip 1
 version 2
 network 45.0.0.0
 import-route ospf 1
#
user-interface con 0
user-interface vty 0 4
user-interface vty 16 20
#
```

ROUTER-5 CONFIGURATION:

```
#
aaa
authentication-scheme default
authorization-scheme default
accounting-scheme default
domain default
domain default_admin
local-user admin password cipher _~f,*!}/<!ajUn1vMEIBX)P#
local-user admin service-type http
#
firewall zone Local
priority 16
#
interface Ethernet0/0/0
ip address 45.1.1.5 255.255.255.0
#
interface GigabitEthernet0/0/0
ip address 6.6.6.7 255.255.255.0
#
interface LoopBack5
ip address 5.5.5.5 255.255.255.0
#
rip 1
version 2
network 45.0.0.0
network 5.0.0.0
#
user-interface con 0
user-interface vty 0 4
user-interface vty 16 20
#
```

ROUTER-6 CONFIGURATION:

```
#
router id 66.66.66.66
#
interface Ethernet0/0/0
ip address 6.6.6.6 255.255.255.0
#
interface Ethernet0/0/1
ip address 77.77.77.6 255.255.255.0
#
```

```

interface LoopBack6
 ip address 66.66.66.66 255.255.255.0
#
ospf 1
 area 0.0.0.0
  authentication-mode md5 1 cipher JNl>1sgdH+@X,k6.E\Z,@O(#
 area 0.0.0.3
  network 6.6.6.0 0.0.0.255
  network 66.66.66.66 0.0.0.0
  vlink-peer 4.4.4.4
 area 0.0.0.7
  network 77.77.77.0 0.0.0.255
#
user-interface con 0
user-interface vty 0 4
user-interface vty 16 20
#

```

ROUTER-7 CONFIGURATION:

```

aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password cipher mdeIV<"F6,pe}@HMNPn@8)V#
 local-user admin service-type http
#
interface Ethernet0/0/0
 ip address 77.77.77.7 255.255.255.0
#
interface LoopBack7
 ip address 7.7.7.7 255.255.255.0
#
ospf 1
 area 0.0.0.7
  network 7.7.7.7 0.0.0.0
  network 77.77.77.0 0.0.0.255
#
user-interface con 0
user-interface vty 0 4
user-interface vty 16 20
#

```