1) Familiarization of Network Devices

2) Connection via Cross Cables

```
HOST 1
------

IP Address : 192.168.1.1
Subnet Mask : 255.255.255.0
Default Gateway : 10.0.0.1

PC>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=31ms TTL=128
Reply from 192.168.1.2: bytes=32 time=31ms TTL=128
Reply from 192.168.1.2: bytes=32 time=31ms TTL=128
Reply from 192.168.1.2: bytes=32 time=31ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 31ms, Maximum = 31ms, Average = 31ms

HOST 2
------

IP Address : 192.168.1.2
Subnet Mask : 255.255.255.0
Default Gateway : 10.0.0.1

PC>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=60ms TTL=128
Reply from 192.168.1.1: bytes=32 time=30ms TTL=128
Reply from 192.168.1.1: bytes=32 time=30ms TTL=128
Reply from 192.168.1.1: bytes=32 time=30ms TTL=128

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 30ms, Maximum = 60ms, Average = 37ms
```


PC-PT
PC0

PC-PT
PC1

3) Connection via a Hub

```
HOST 1
------

IP Address : 192.168.1.1
Subnet Mask : 255.255.255.0
Default Gateway : 10.0.0.1

PC>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=124ms TTL=128
Reply from 192.168.1.2: bytes=32 time=63ms TTL=128
Reply from 192.168.1.2: bytes=32 time=62ms TTL=128
Reply from 192.168.1.2: bytes=32 time=62ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 62ms, Maximum = 124ms, Average = 77ms

HOST 2
------

IP Address : 192.168.1.2
Subnet Mask : 255.255.255.0
Default Gateway : 10.0.0.1

PC>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=62ms TTL=128
Reply from 192.168.1.1: bytes=32 time=62ms TTL=128
Reply from 192.168.1.1: bytes=32 time=63ms TTL=128
Reply from 192.168.1.1: bytes=32 time=62ms TTL=128

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 62ms, Maximum = 63ms, Average = 62ms
```
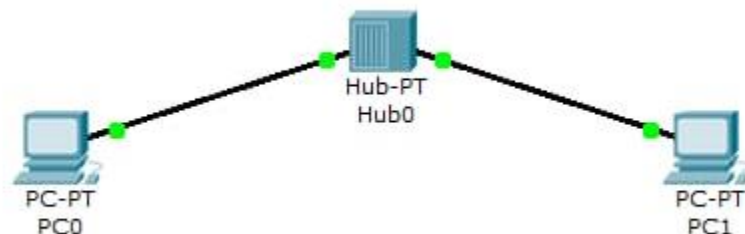
4) Connection via a Switch.

```
HOST 1
------

IP Address : 192.168.1.1
Subnet Mask : 255.255.255.0
Default Gateway : 10.0.0.1

PC>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=62ms TTL=128
Reply from 192.168.1.2: bytes=32 time=63ms TTL=128
Reply from 192.168.1.2: bytes=32 time=63ms TTL=128
Reply from 192.168.1.2: bytes=32 time=63ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 62ms, Maximum = 63ms, Average = 62ms

HOST 2
------

IP Address : 192.168.1.2
Subnet Mask : 255.255.255.0
Default Gateway : 10.0.0.1

PC>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=62ms TTL=128
Reply from 192.168.1.1: bytes=32 time=47ms TTL=128
Reply from 192.168.1.1: bytes=32 time=63ms TTL=128
Reply from 192.168.1.1: bytes=32 time=62ms TTL=128

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 47ms, Maximum = 63ms, Average = 58ms
```
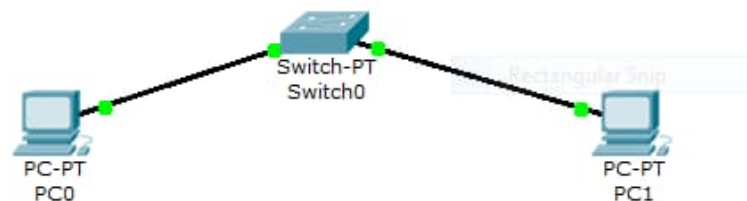
5) IPv4 Addressing

```
Switch 1
--------

1) Assign hostname to a switch.

Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#


**********************************************************************


2) Secure access to the console line.

S1(config)#line console 0
S1(config-line)#password aswin
S1(config-line)#login
S1(config-line)#exit


**********************************************************************


3) Secure access to the vty lines.

S1(config)#line vty 0 15
S1(config-line)#password aswin
S1(config-line)#login


**********************************************************************


4) Secure privileged Exec mode access (Encrypted Password).

S1(config-line)#enable secret aswink


**********************************************************************


5) Encrypt all plain text passwords.

S1(config-line)#service password-encryption


**********************************************************************


6) Configure a MOTD banner.

S1(config-line)#banner motd "Warning!"


**********************************************************************


7) Configure the IP address on interface VLAN 1 on the switch.

S1(config)#interface vlan1
S1(config-if)#ip address 192.168.0.2 255.255.255.0
S1(config-if)#ip default-gateway 192.168.0.1


**********************************************************************
```

```
Switch 2
--------

1) Assign hostname to a switch.

Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S2
S2(config)#

**********************************************************************

2) Secure access to the console line.

S2(config)#line console 0
S2(config-line)#password aswin
S2(config-line)#login
S2(config-line)#exit

**********************************************************************

3) Secure access to the vty lines.

S2(config)#line vty 0 15
S2(config-line)#password aswin
S2(config-line)#login

**********************************************************************

4) Secure privileged Exec mode access (Encrypted Password).

S2(config-line)#enable secret aswink

**********************************************************************

5) Encrypt all plain text passwords.

S2(config-line)#service password-encryption

**********************************************************************

6) Configure a MOTD banner.

S2(config-line)#banner motd "Warning!"

**********************************************************************

7) Configure the IP address on interface VLAN 1 on the switch.

S2(config)#interface vlan1
S2(config-if)#ip address 192.168.1.2 255.255.255.0
S2(config-if)#ip default-gateway 192.168.1.1
```

```
Router
------

1) Assign hostname to a router.

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R1
R1(config)#

***********************************************************************

2) Secure access to the console line.

R1(config)#line console 0
R1(config-line)#password aswin
R1(config-line)#login
R1(config-line)#exit
R1(config)#

***********************************************************************

3) Secure privileged Exec mode access (PlainText Password).

R1(config)#enable password class

***********************************************************************

4) Secure privileged Exec mode access (Encrypted Password).

R1(config)#enable secret aswink

***********************************************************************

5) Secure access to the vty lines.

R1(config)#line vty 0 15
R1(config-line)#password aswin
R1(config-line)#login
R1(config-line)#exit
R1(config)#

***********************************************************************

6) Encrypt all plain text passwords.

R1(config)#service password-encryption

***********************************************************************

7) Configure a MOTD banner.

R1(config)#banner motd "Unauthorized access is strictly prohibited"
R1(config)#exit
```

```
****************************************************************
```
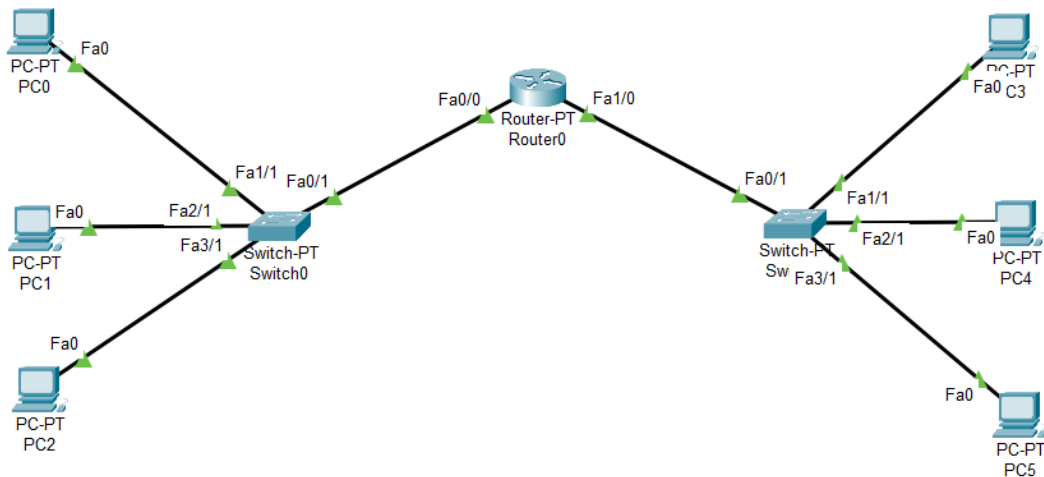
8) Configure GigabitEthernet0/0 and GigabitEthernet0/1 interfaces.

```
R1(config)#interface GigabitEthernet0/0
R1(config-if)#ip address 192.168.0.1 255.255.255.192
R1(config-if)#no shutdown

R1(config)#interface GigabitEthernet0/1
R1(config-if)#ip address 192.168.0.65 255.255.255.192
R1(config-if)#no shutdown
```

Output
Ping the PCs.

6) Static Routing

```
Router 1
--------

Step 1 : Configuring and assigning the IP address on router.

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 15.0.0.1 255.0.0.0
```

```
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit
Router(config)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed
state to up

*************************************************************************

Step 2 : Check the routing table on router.

Router#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 not set

C    10.0.0.0/8 is directly connected, FastEthernet0/0
C    15.0.0.0/8 is directly connected, Serial2/0

*************************************************************************

Step 3 : Administratively define the static route.

Router(config)#ip route 20.0.0.0 255.0.0.0 15.0.0.2

*************************************************************************

Step 4 : Check the routing table of the router.

Router#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 not set

C    10.0.0.0/8 is directly connected, FastEthernet0/0
C    15.0.0.0/8 is directly connected, Serial2/0
S    20.0.0.0/8 [1/0] via 15.0.0.2

*************************************************************************
```

```
Step 5 : Verify the connection of both host.

HOST 1
------

IP Address : 10.0.0.10
Subnet Mask : 255.0.0.0
Default Gateway : 10.0.0.1

PC>ping 20.0.0.10

Pinging 20.0.0.10 with 32 bytes of data:

Reply from 20.0.0.10: bytes=32 time=140ms TTL=126
Reply from 20.0.0.10: bytes=32 time=140ms TTL=126
Reply from 20.0.0.10: bytes=32 time=156ms TTL=126
Reply from 20.0.0.10: bytes=32 time=156ms TTL=126

Ping statistics for 20.0.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 140ms, Maximum = 156ms, Average = 148ms

*********************************************************************

Router 2
--------

Step 1 : Configuring and assigning the IP address on router.

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 15.0.0.1 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit
Router(config)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed
state to up

*********************************************************************
```

```
Step 2 : Check the routing table on router.

Router#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 not set

S    10.0.0.0/8 [1/0] via 15.0.0.1
C    15.0.0.0/8 is directly connected, Serial2/0
C    20.0.0.0/8 is directly connected, FastEthernet0/0

*************************************************************************

Step 3 : Administratively define the static route.

Router(config)#ip route 10.0.0.0 255.0.0.0 15.0.0.1

*************************************************************************

Step 4 : Check the routing table of the router.

Router#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 not set

C    10.0.0.0/8 is directly connected, FastEthernet0/0
C    15.0.0.0/8 is directly connected, Serial2/0
S    20.0.0.0/8 [1/0] via 15.0.0.2
```

■■■

```
Step 5 : Verify the connection of both host.

HOST 2
------

IP Address : 20.0.0.10
Subnet Mask : 255.0.0.0
Default Gateway : 20.0.0.1

PC>ping 10.0.0.10
```

```
Pinging 10.0.0.10 with 32 bytes of data:

Reply from 10.0.0.10: bytes=32 time=141ms TTL=126
Reply from 10.0.0.10: bytes=32 time=141ms TTL=126
Reply from 10.0.0.10: bytes=32 time=125ms TTL=126
Reply from 10.0.0.10: bytes=32 time=156ms TTL=126

Ping statistics for 10.0.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 125ms, Maximum = 156ms, Average = 140ms
```
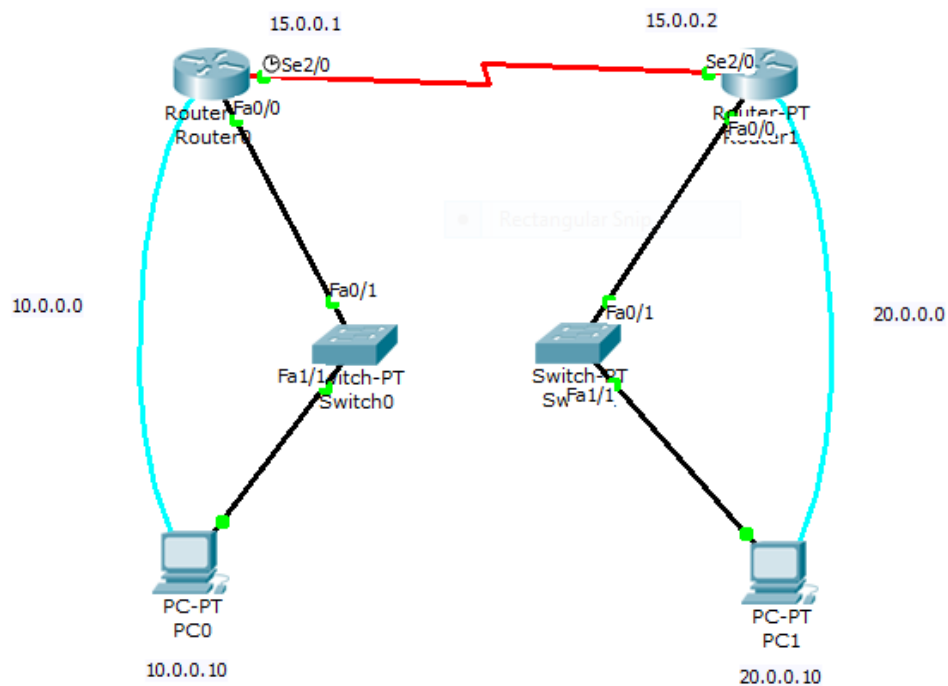

7) RIP

```
Router 1
--------

Step 1 : Configuring and assigning the IP address on router.

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
```

```
Router(config)#interface Serial2/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit


************************************************************************

Step 2 : Check the routing table on router.

Router#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 not set

C    192.168.1.0/24 is directly connected, FastEthernet0/0

************************************************************************

Step 3 : Administratively define the RIP networks.

Router(config)#router rip
Router(config-router)#network 192.168.1.0
Router(config-router)#network 10.0.0.0
Router(config-router)#exit

************************************************************************

Step 4 : Check the routing table of the router.

Router#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 not set

C    10.0.0.0/8 is directly connected, Serial2/0
C    192.168.1.0/24 is directly connected, FastEthernet0/0
R    192.168.2.0/24 [120/1] via 10.0.0.2, 00:00:17, Serial2/0

************************************************************************
```

```
Step 5 : Verify the connection of both host.

IP Address : 192.168.1.2
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.1.1

PC>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=156ms TTL=126
Reply from 192.168.2.2: bytes=32 time=156ms TTL=126
Reply from 192.168.2.2: bytes=32 time=124ms TTL=126
Reply from 192.168.2.2: bytes=32 time=140ms TTL=126

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 124ms, Maximum = 156ms, Average = 144ms

**********************************************************************

Router 2
--------

Step 1 : Configuring and assigning the IP address on router.
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 10.0.0.2 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed
state to up
Router(config-if)#exit
```

▪▪

```
Step 2 : Check the routing table on router.

Router#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 not set

C    192.168.2.0/24 is directly connected, FastEthernet0/0

***********************************************************************

Step 3 : Administratively define the RIP networks.

Router(config)#router rip
Router(config-router)#network 192.168.2.0
Router(config-router)#network 10.0.0.0
Router(config-router)#exit

***********************************************************************

Step 4 : Check the routing table of the router.

Router#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 not set

C    10.0.0.0/8 is directly connected, Serial2/0
R    192.168.1.0/24 [120/1] via 10.0.0.1, 00:00:12, Serial2/0
C    192.168.2.0/24 is directly connected, FastEthernet0/0

***********************************************************************

Step 5 : Verify the connection of both host.

IP Address : 192.168.2.2
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.2.1

PC>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=128ms TTL=126
Reply from 192.168.1.2: bytes=32 time=156ms TTL=126
Reply from 192.168.1.2: bytes=32 time=157ms TTL=126
Reply from 192.168.1.2: bytes=32 time=140ms TTL=126
```
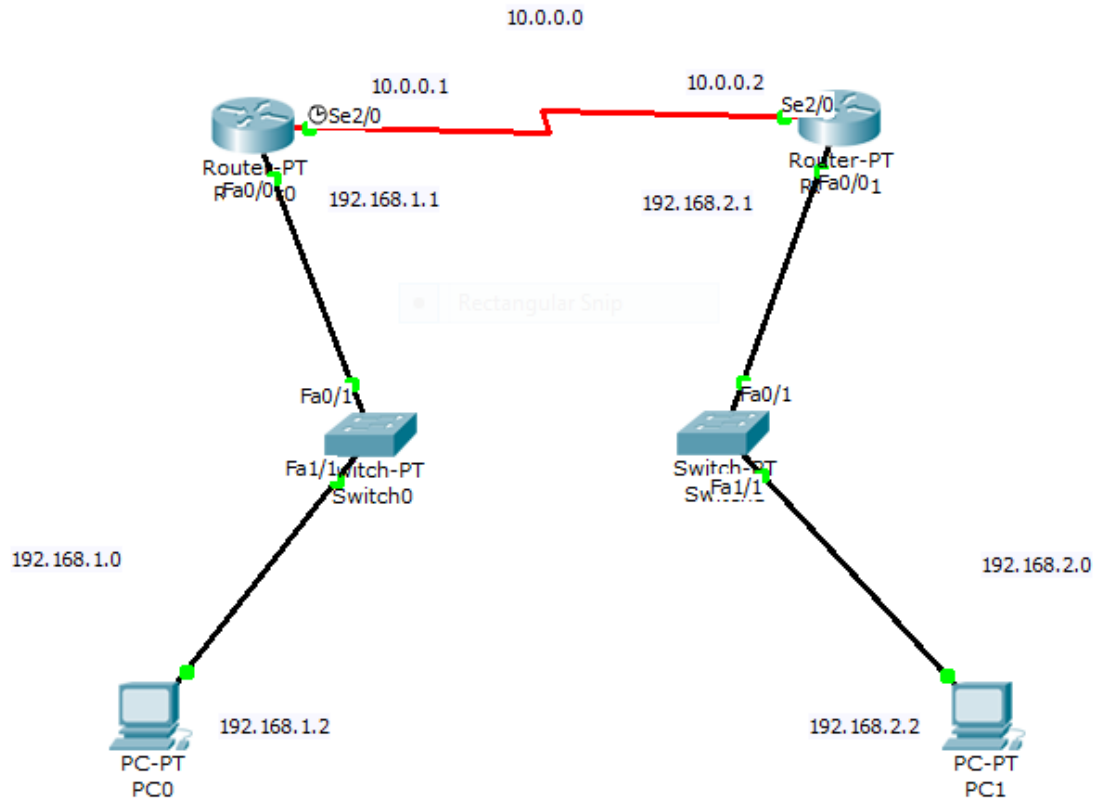
```
Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 128ms, Maximum = 157ms, Average = 145ms
```


8) EIGRP

```
Step 1 : Configuring and assigning the IP address on routers.

Router 1
--------

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
```

```
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit

*************************************************************

Router 2
--------

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 10.0.0.2 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed
state to up

Router(config-if)#exit

*************************************************************

Step 2 : Check the routing table of routers.

Router 1
--------

Router#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 not set

C    10.0.0.0/8 is directly connected, Serial2/0
C    192.168.2.0/24 is directly connected, FastEthernet0/0
```

```
*************************************************************

Router 2
--------

Router#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 not set

C    10.0.0.0/8 is directly connected, Serial2/0
C    192.168.1.0/24 is directly connected, FastEthernet0/0

*************************************************************

Step 3 : Administratively define the EIGRP networks.

Router 1
--------

Router(config)#router eigrp 1
Router(config-router)#network 192.168.1.0 255.255.255.0
Router(config-router)#network 10.0.0.0 255.0.0.0
Router(config-router)#exit

*************************************************************

Router 2
--------

Router(config)#router eigrp 1
Router(config-router)#network 192.168.2.0 255.255.255.0
Router(config-router)#network 10.0.0.0 255.0.0.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 10.0.0.1 (Serial2/0) is up: new
adjacency

Router(config-router)#exit

*************************************************************

Step 4 : Check the routing table of the routers.

Router 1
--------

Router#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 not set

C    10.0.0.0/8 is directly connected, Serial2/0
C    192.168.1.0/24 is directly connected, FastEthernet0/0
D    192.168.2.0/24 [90/20514560] via 10.0.0.2, 00:01:46, Serial2/0

*************************************************************

Router 2
--------

Router#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 not set

C    10.0.0.0/8 is directly connected, Serial2/0
D    192.168.1.0/24 [90/20514560] via 10.0.0.1, 00:01:15, Serial2/0
C    192.168.2.0/24 is directly connected, FastEthernet0/0

*************************************************************
Step 5 : Verify the connection of both hosts.

Router 1
--------

IP Address : 192.168.1.2
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.1.1

C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=14ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=11ms TTL=126
Reply from 192.168.2.2: bytes=32 time=2ms TTL=126

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
```

```
     Minimum = 1ms, Maximum = 14ms, Average = 7ms


***********************************************************

Router 2
--------

IP Address : 192.168.2.2
Subnet Mask :255.255.255.0
Default Gateway : 192.168.2.1

C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=13ms TTL=126
Reply from 192.168.1.2: bytes=32 time=10ms TTL=126
Reply from 192.168.1.2: bytes=32 time=9ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.2:
     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
     Minimum = 1ms, Maximum = 13ms, Average = 8ms
```
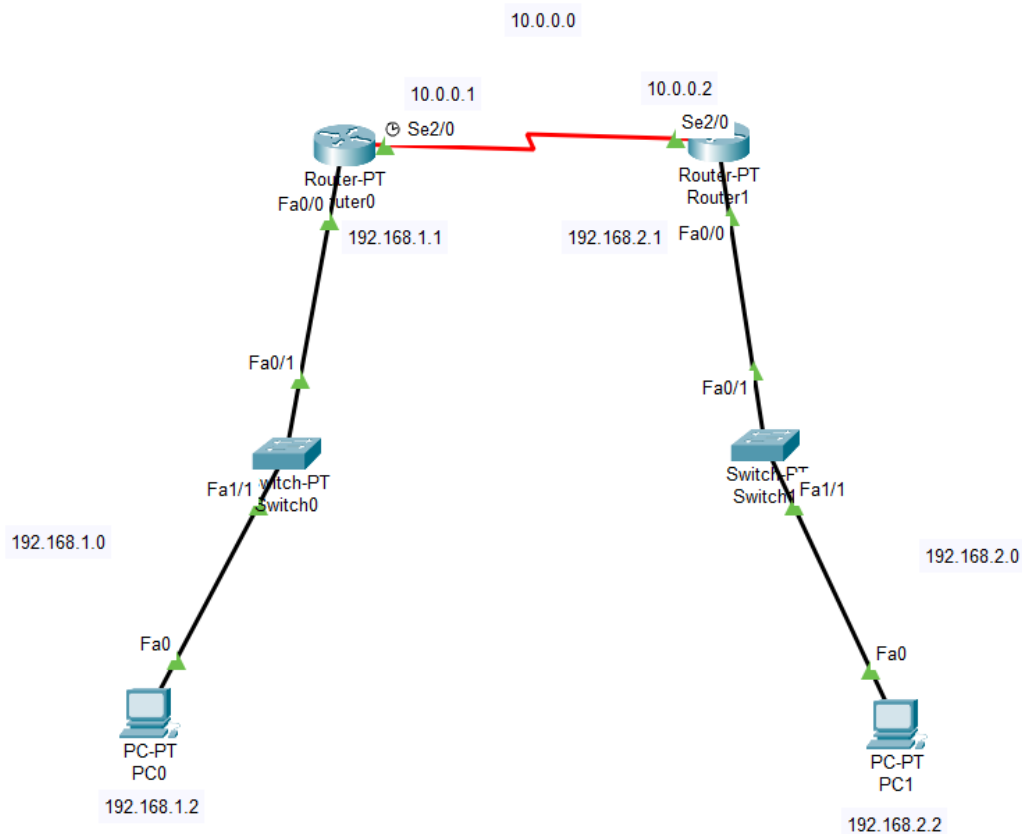

9) OSPF

Step 1 : Configuring and assigning the IP address on router.

```
Router 1
--------

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.10.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 192.168.20.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit

********************************************************************

Router 2
--------

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.30.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 192.168.20.2 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed
state to up

********************************************************************
```

```
Step 2 : Check the routing table of the routers.

Router 1
--------

Router#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 not set

C    192.168.10.0/24 is directly connected, FastEthernet0/0
C    192.168.20.0/24 is directly connected, Serial2/0

********************************************************************

Router 2
--------

Router#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 not set

C    192.168.20.0/24 is directly connected, Serial2/0
C    192.168.30.0/24 is directly connected, FastEthernet0/0

********************************************************************

Step 3 : Administratively define the OSPF networks.

Router 1
--------

Router(config)#router ospf 1
Router(config-router)#network 192.168.10.0 0.0.0.255 area 0
Router(config-router)#network 192.168.20.0 0.0.0.255 area 0
Router(config-router)#exit

********************************************************************
```

```
Router 2
--------

Router(config)#router ospf 1
Router(config-router)#network 192.168.20.0 0.0.0.255 area 0
00:16:55: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.20.1 on Serial2/0 from
LOADING to FULL, Loading Done

Router(config-router)#network 192.168.30.0 0.0.0.255 area 0
Router(config-router)#exit

********************************************************************

Step 4 : Check the routing table of the routers.

Router 1
--------

Router#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 not set

C    192.168.10.0/24 is directly connected, FastEthernet0/0
C    192.168.20.0/24 is directly connected, Serial2/0
O    192.168.30.0/24 [110/65] via 192.168.20.2, 00:02:23, Serial2/0

********************************************************************

Router 2
--------

Router#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 not set

O    192.168.10.0/24 [110/65] via 192.168.20.1, 00:01:28, Serial2/0
C    192.168.20.0/24 is directly connected, Serial2/0
C    192.168.30.0/24 is directly connected, FastEthernet0/0

********************************************************************
```

```
Step 5 : Verify the connection of both hosts.

Host 1
--------

IP Address : 192.168.10.2
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.10.1

C:\>ping 192.168.30.2

Pinging 192.168.30.2 with 32 bytes of data:

Reply from 192.168.30.2: bytes=32 time=13ms TTL=126
Reply from 192.168.30.2: bytes=32 time=1ms TTL=126
Reply from 192.168.30.2: bytes=32 time=1ms TTL=126
Reply from 192.168.30.2: bytes=32 time=11ms TTL=126

Ping statistics for 192.168.30.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 13ms, Average = 6ms

*******************************************************************

Host 2
--------

IP Address : 192.168.30.2
Subnet Mask :255.255.255.0
Default Gateway : 192.168.30.1

C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time=15ms TTL=126
Reply from 192.168.10.2: bytes=32 time=1ms TTL=126
Reply from 192.168.10.2: bytes=32 time=1ms TTL=126
Reply from 192.168.10.2: bytes=32 time=12ms TTL=126

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 15ms, Average = 7ms
```
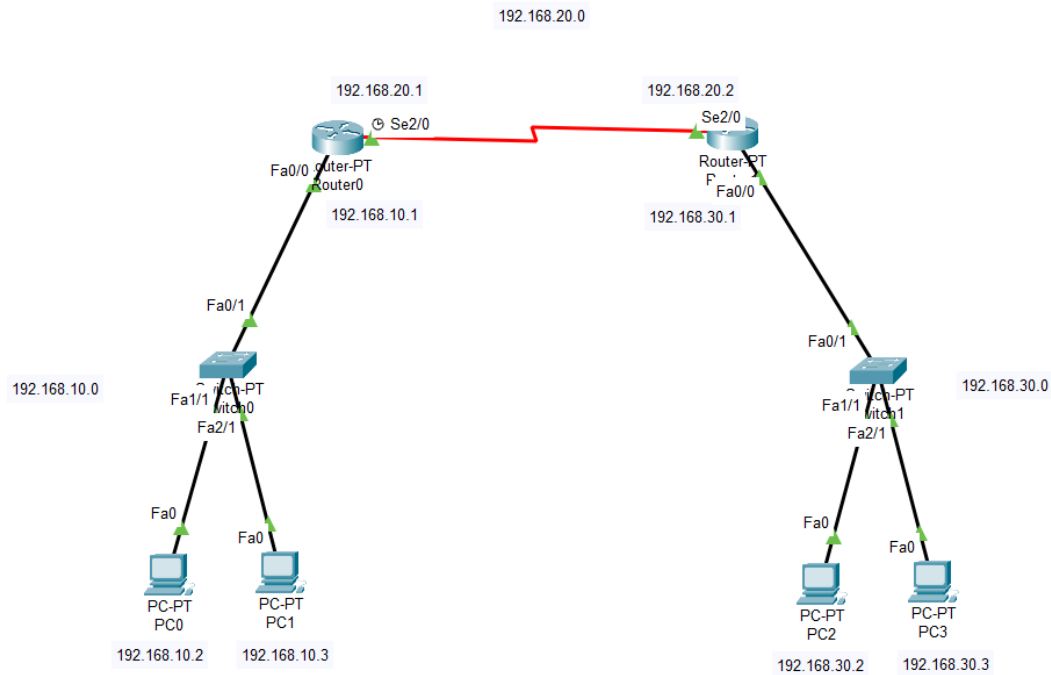
192.168.20.0

192.168.20.1
Se2/0
Fa0/0 Router-PT
Router0
192.168.10.1

192.168.20.2
Se2/0
Router-PT
F Fa0/0
192.168.30.1

Fa0/1

Fa0/1

192.168.10.0
Fa1/1 itch-PT
itch0
Fa2/1

Fa1/1 ch-PT
itch1
Fa2/1
192.168.30.0

Fa0

Fa0
Fa0

Fa0

PC-PT
PC0
192.168.10.2

PC-PT
PC1
192.168.10.3

PC-PT
PC2
192.168.30.2

PC-PT
PC3
192.168.30.3

10) VLAN

Step 1 : Configure the VLAN within the switch.

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#name FrontOffice
Switch(config-vlan)#exit
Switch(config)#vlan 3
Switch(config-vlan)#name BackOffice
Switch(config-vlan)#exit
```

****

Step 2 : Assign the specified interfaces in the specific VLANs
         and define the access ports.

```
Switch(config)#interface FastEthernet0/1
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#interface FastEthernet1/1
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#interface FastEthernet2/1
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#interface FastEthernet3/1
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
```

```
**************************************************************

Step 3 : Verify the connections between hosts.

Host 1
------

PC>ping 192.168.10.3

Pinging 192.168.10.3 with 32 bytes of data:

Reply from 192.168.10.3: bytes=32 time=63ms TTL=128
Reply from 192.168.10.3: bytes=32 time=62ms TTL=128
Reply from 192.168.10.3: bytes=32 time=62ms TTL=128
Reply from 192.168.10.3: bytes=32 time=63ms TTL=128

Ping statistics for 192.168.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 62ms, Maximum = 63ms, Average = 62ms

Host 2
------

PC>ping 192.168.10.5

Pinging 192.168.10.5 with 32 bytes of data:

Reply from 192.168.10.5: bytes=32 time=62ms TTL=128
Reply from 192.168.10.5: bytes=32 time=63ms TTL=128
Reply from 192.168.10.5: bytes=32 time=62ms TTL=128
Reply from 192.168.10.5: bytes=32 time=62ms TTL=128

Ping statistics for 192.168.10.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 62ms, Maximum = 63ms, Average = 62ms
```
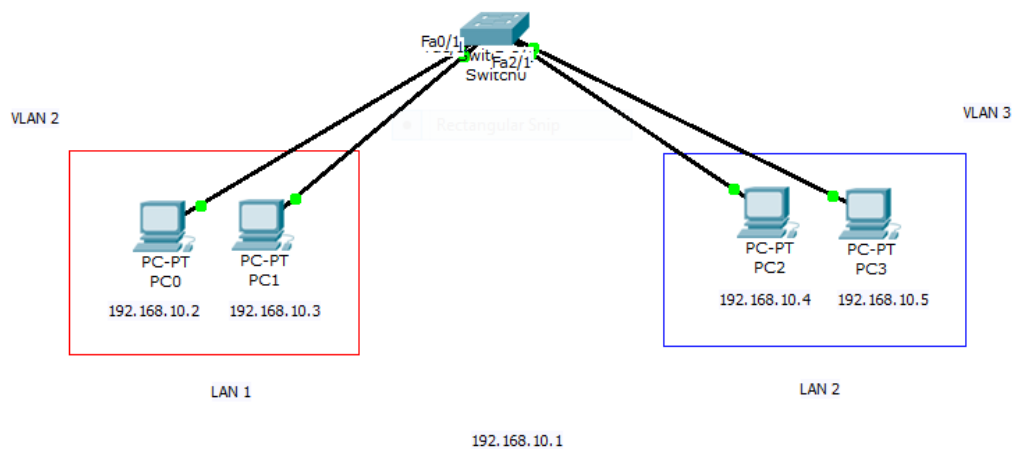
11) Inter VLAN

```
Switch
------

Step 1 : Configure the VLAN within the switch.

Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name FrontOffice
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name MidOfiice
Switch(config-vlan)#exit
Switch(config)#vlan 30
Switch(config-vlan)#name BackOffice
Switch(config-vlan)#exit
Switch(config)#exit

*************************************************************

Step 2 : Assign the specified interfaces in the specific VLANs
         and define the access ports and trunk ports.

Switch(config)#interface FastEthernet1/1
Switch(config-if)#switchport access vlan 10
Switch(config-if)#switchport mode access
Switch(config-if)#exit
Switch(config)#interface FastEthernet2/1
Switch(config-if)#switchport access vlan 20
Switch(config-if)#switchport mode access
Switch(config-if)#exit
Switch(config)#interface FastEthernet3/1
Switch(config-if)#switchport access vlan 30
Switch(config-if)#switchport mode access
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/1
Switch(config-if)#no shutdown
Switch(config-if)#switchport mode trunk
Switch(config-if)#exit

*************************************************************

Step 3 : Verify the connection of hosts.

C:\>ping 192.168.20.2

Pinging 192.168.20.2 with 32 bytes of data:

Reply from 192.168.20.2: bytes=32 time<1ms TTL=127
Reply from 192.168.20.2: bytes=32 time<1ms TTL=127
Reply from 192.168.20.2: bytes=32 time=1ms TTL=127
Reply from 192.168.20.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms


C:\>ping 192.168.30.2

Pinging 192.168.30.2 with 32 bytes of data:

Reply from 192.168.30.2: bytes=32 time<1ms TTL=127
Reply from 192.168.30.2: bytes=32 time<1ms TTL=127
Reply from 192.168.30.2: bytes=32 time<1ms TTL=127
Reply from 192.168.30.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.30.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms


*************************************************************

Router
------


Step 1 : Configure router with dot1Q encapsulation by making each
         of sub-interfaces.

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface FastEthernet0/0.10
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.10,
changed state to up

Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#ip address 192.168.10.1 255.255.255.0
Router(config-subif)#exit
Router(config)#interface FastEthernet0/0.20
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20,
changed state to up

Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
Router(config-subif)#exit
Router(config)#interface FastEthernet0/0.30
```
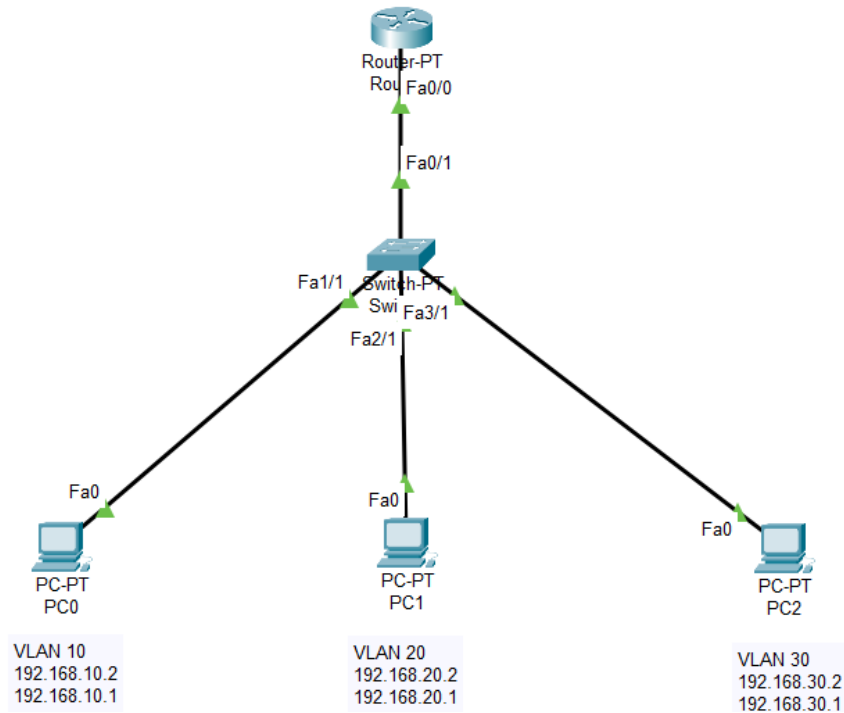
```
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30,
changed state to up

Router(config-subif)#encapsulation dot1Q 30
Router(config-subif)#ip address 192.168.30.1 255.255.255.0
Router(config-subif)#exit
```


12) HTTP

```
Step 1 : Assign IP addresses to PCs.

Host 1
------

IP Address : 10.10.10.1
Subnet Mask : 255.0.0.0
Default Gateway : 10.10.10.0

Host 2
------

IP Address : 10.10.10.2
Subnet Mask : 255.0.0.0
Default Gateway : 10.10.10.0

Host 3
------

IP Address : 10.10.10.3
Subnet Mask : 255.0.0.0
Default Gateway : 10.10.10.0
```

```
*************************************************************

Step 2 : Assign the IP address on server.

IP Address : 10.10.10.0
Subnet Mask : 255.0.0.0

*************************************************************

Step 3 : Verify the connection between server and hosts.

PC>ping 10.10.10.0

Pinging 10.10.10.0 with 32 bytes of data:

Reply from 10.10.10.0: bytes=32 time=63ms TTL=128
Reply from 10.10.10.0: bytes=32 time=31ms TTL=128
Reply from 10.10.10.0: bytes=32 time=62ms TTL=128
Reply from 10.10.10.0: bytes=32 time=62ms TTL=128

Ping statistics for 10.10.10.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 31ms, Maximum = 63ms, Average = 54ms

HTML Document On Server
-----------------------

<html>
<center><font size='+2' color='blue'>Cisco Packet
Tracer</font></center>
<hr>Helo, Good Morning.
<p>Quick Links:
<br><a href='helloworld.html'>A small page</a>
<br><a href='copyrights.html'>Copyrights</a>
<br><a href='image.html'>Image page</a>
<br><a href='image.jpg'>Image</a>
</html>

Webpage at URL http://10.10.10.0
-------------------------------

Helo, Good Morning.

Quick Links:
A small page
Copyrights
Image page
Image
```
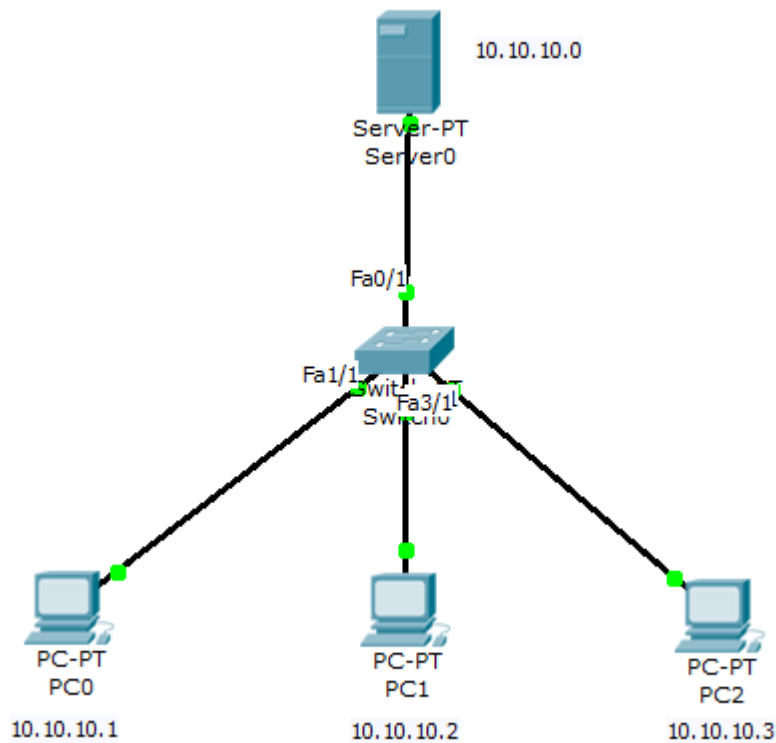
13) FTP

Step 1 : Assign the IP on hosts.

Host 1

IP Address : 10.10.10.1
Subnet Mask : 255.0.0.0
Default Gateway : 10.10.10.0

Host 2

IP Address : 10.10.10.2
Subnet Mask : 255.0.0.0
Default Gateway : 10.10.10.0

****

Step 2 : Assign the IP address on the server.

IP Address : 10.10.10.0
Subnet Mask : 255.0.0.0

****

Step 3 : Verify the connection between server and hosts.

```
PC>ping 10.10.10.0

Pinging 10.10.10.0 with 32 bytes of data:

Reply from 10.10.10.0: bytes=32 time=62ms TTL=128
Reply from 10.10.10.0: bytes=32 time=47ms TTL=128
Reply from 10.10.10.0: bytes=32 time=63ms TTL=128
Reply from 10.10.10.0: bytes=32 time=63ms TTL=128

Ping statistics for 10.10.10.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 47ms, Maximum = 63ms, Average = 58ms

PC>ipconfig

IP Address.....................: 10.10.10.1
Subnet Mask....................: 255.0.0.0
Default Gateway................: 10.10.10.0

PC>ftp 10.10.10.0
Trying to connect...10.10.10.0
Connected to 10.10.10.0
220- Welcome to PT Ftp server
Username:Aswin
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>help
        ?
        cd
        delete
        dir
        get
        help
        passive
        put
        pwd
        quit
        rename
ftp>dir

Listing /ftp directory from 10.10.10.0:
0   : c1841-advipservicesk9-mz.124-15.T1.bin          33591768
1   : c1841-ipbase-mz.123-14.T7.bin                   13832032
2   : c1841-ipbasek9-mz.124-12.bin                    16599160
3   : c2600-advipservicesk9-mz.124-15.T1.bin          33591768
4   : c2600-i-mz.122-28.bin                           5571584
5   : c2600-ipbasek9-mz.124-8.bin                     13169700
6   : c2800nm-advipservicesk9-mz.124-15.T1.bin        50938004
7   : c2800nm-ipbase-mz.123-14.T7.bin                 5571584
8   : c2800nm-ipbasek9-mz.124-8.bin                   15522644
9   : c2950-i6q4l2-mz.121-22.EA4.bin                  3058048
10  : c2950-i6q4l2-mz.121-22.EA8.bin                  3117390
11  : c2960-lanbase-mz.122-25.FX.bin                  4414921
12  : c2960-lanbase-mz.122-25.SEE1.bin                4670455
13  : c3560-advipservicesk9-mz.122-37.SE1.bin         8662192
```
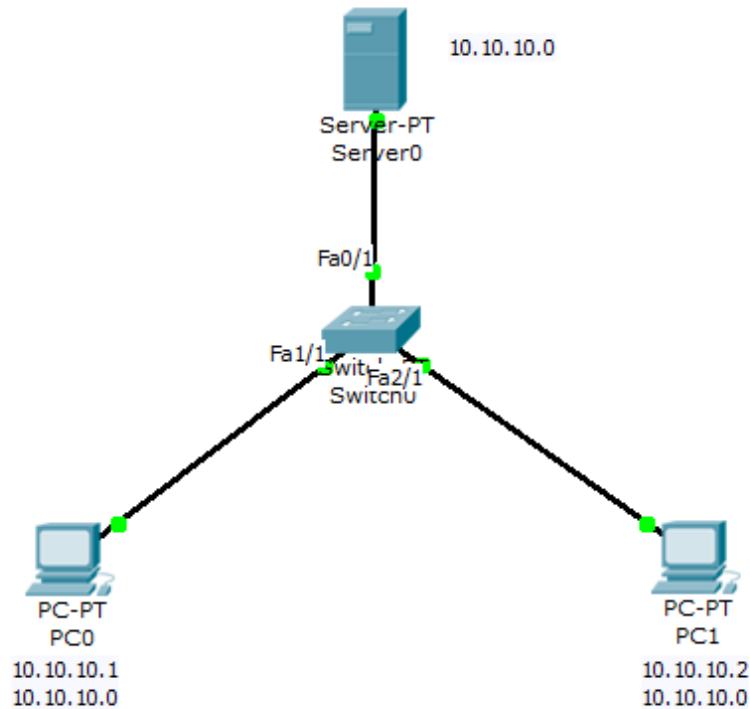
```
14  : pt1000-i-mz.122-28.bin                              5571584
15  : pt3000-i6q4l2-mz.121-22.EA4.bin                     3117390
ftp>delete pt3000-i6q4l2-mz.121-22.EA4.bin

Deleting file pt3000-i6q4l2-mz.121-22.EA4.bin from 10.10.10.0: ftp>
[Deleted file pt3000-i6q4l2-mz.121-22.EA4.bin successfully ]
```

10.10.10.0

Server-PT
Server0

Fa0/1

Fa1/1
Swit Fa2/1
Switch0

PC-PT
PC0
10.10.10.1
10.10.10.0

PC-PT
PC1
10.10.10.2
10.10.10.0

14) DHCP

Step 1 : Configure the router.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#ip dhcp POOL ABC-POOL
```

```
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.254
Router(dhcp-config)#dns-server 192.168.1.1
Router(dhcp-config)#exit

************************************************************

Step 2 : Enable DHCP in all hosts.

IP Address : 192.168.1.3
Subnet Mask : 255.255.255.0
Default Gateway : 0.0.0.0

IP Address : 192.168.1.4
Subnet Mask : 255.255.255.0
Default Gateway : 0.0.0.0

IP Address : 192.168.1.2
Subnet Mask : 255.255.255.0
Default Gateway : 0.0.0.0

************************************************************

Step 3 : Verify the connection of hosts.

PC>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=109ms TTL=128
Reply from 192.168.1.2: bytes=32 time=62ms TTL=128
Reply from 192.168.1.2: bytes=32 time=62ms TTL=128
Reply from 192.168.1.2: bytes=32 time=62ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 62ms, Maximum = 109ms, Average = 73ms
```
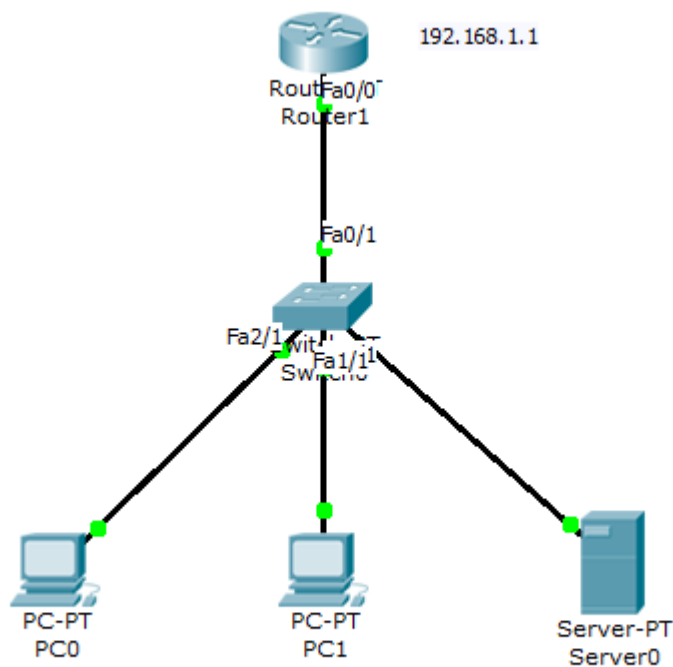
15) TELNET

Step 1 : Assign IP address to the PC.

IP Address : 192.168.1.2
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.1.2

****

Step 2 : Assign IP address to the router.

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
R1(config-if)#exit

****

Step 3 : Assign password to IOS command line.

R1(config)#enable secret aswink

****

```
Step 4 : Assign passwords to the vty ports and IOS command line.

R1(config)#line vty 0 5
R1(config-line)#login
% Login disabled on line 66, until 'password' is set
% Login disabled on line 67, until 'password' is set
% Login disabled on line 68, until 'password' is set
% Login disabled on line 69, until 'password' is set
% Login disabled on line 70, until 'password' is set
% Login disabled on line 71, until 'password' is set
R1(config-line)#password aswin
R1(config-line)#exit

**************************************************************

Step 5 : Save the configuration.

R1#wr
Building configuration...
[OK]

**************************************************************

Step 6 : Verify the connectivity.

PC>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=10ms TTL=255
Reply from 192.168.1.1: bytes=32 time=4ms TTL=255
Reply from 192.168.1.1: bytes=32 time=4ms TTL=255
Reply from 192.168.1.1: bytes=32 time=5ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 10ms, Average = 5ms

**************************************************************

Step 7 : Access the router through telnet.

PC>telnet 192.168.1.1
Trying 192.168.1.1 ...Open


User Access Verification

Password:
R1>enable
Password:
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#
```

PC-PT
PC0
192.168.1.2

Fa0 .... Fa0/0

Router-PT
Router0
192.168.1.1

16) ACL

Step 1 : Configure and assign the IP address on router.

Router 1

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface Serial2/0
R1(config-if)#ip address 15.0.0.1 255.0.0.0
R1(config-if)#clock rate 64000
R1(config-if)#no shutdown

R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 10.0.0.1 255.0.0.0
R1(config-if)#no shutdown
```

Router 2

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface Serial2/0
R2(config-if)#ip address 15.0.0.2 255.0.0.0
R2(config-if)#no shutdown

R2(config)#interface FastEthernet0/0
R2(config-if)#ip address 20.0.0.1 255.0.0.0
R2(config-if)#no shutdown
```

****

Step 2 : Check the routing table on router.

Router 1

```
R1#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 not set

Router 2
--------

R2#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 not set

*****************************************************************

Step 3 : Enable RIP protocol on router.

Router 1
--------

R1(config)#router rip
R1(config-router)#network 10.0.0.0
R1(config-router)#network 15.0.0.0
R1(config-router)#exit

Router 2
--------

R2(config)#router rip
R2(config-router)#network 20.0.0.0
R2(config-router)#network 15.0.0.0
R2(config-router)#exit

*****************************************************************

Step 4 : Check the routing table on router after enabling RIP
         on all routers.

Router 1
--------

R1#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 not set

C    10.0.0.0/8 is directly connected, FastEthernet0/0
C    15.0.0.0/8 is directly connected, Serial2/0
R    20.0.0.0/8 [120/1] via 15.0.0.2, 00:00:04, Serial2/0

Router 2
--------

R2#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 not set

R    10.0.0.0/8 [120/1] via 15.0.0.1, 00:00:13, Serial2/0
C    15.0.0.0/8 is directly connected, Serial2/0
C    20.0.0.0/8 is directly connected, FastEthernet0/0

*****************************************************************

Step 5 : Verify all the connectivity before applying ACL.

C:\>ping 20.0.0.10

Pinging 20.0.0.10 with 32 bytes of data:

Reply from 20.0.0.10: bytes=32 time=15ms TTL=126
Reply from 20.0.0.10: bytes=32 time=1ms TTL=126
Reply from 20.0.0.10: bytes=32 time=10ms TTL=126
Reply from 20.0.0.10: bytes=32 time=29ms TTL=126

Ping statistics for 20.0.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 29ms, Average = 13ms

*****************************************************************

Step 6 : Apply standard ACL on router R2.

R2(config)#access-list 10 deny host 10.0.0.10
R2(config)#access-list 10 permit any
R2(config)#interface FastEthernet0/0
R2(config-if)#ip access-group 10 out
R2(config-if)#exit
```

```
*****************************************************************
```

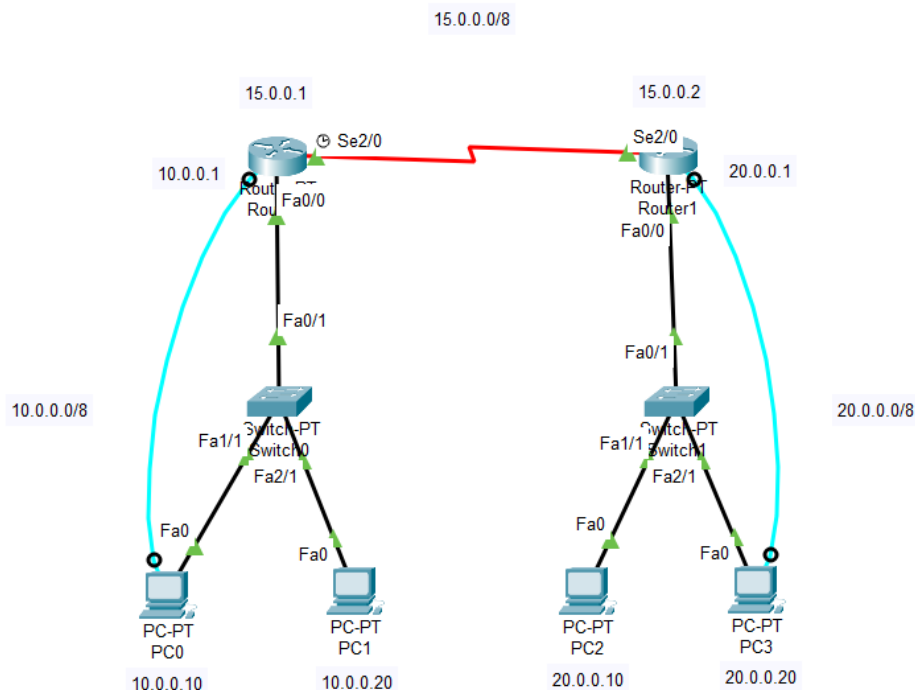Step 7 : Verify ACL configuration and functionality.

C:\>ping 20.0.0.10

Pinging 20.0.0.10 with 32 bytes of data:

Reply from 15.0.0.2: Destination host unreachable.
Reply from 15.0.0.2: Destination host unreachable.
Reply from 15.0.0.2: Destination host unreachable.
Reply from 15.0.0.2: Destination host unreachable.

Ping statistics for 20.0.0.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

17) Extended ACL

Step 1 : Assign IP addresses to the PCs and web server.

IP Address : 10.0.0.2
Subnet Mask : 255.0.0.0
Default Gateway : 10.0.0.1

IP Address : 20.0.0.2
Subnet Mask : 255.0.0.0
Default Gateway : 20.0.0.1

IP Address : 30.0.0.2

```
Subnet Mask : 255.0.0.0
Default Gateway : 30.0.0.1

IP Address : 40.0.0.2 (Web Server)
Subnet Mask : 255.0.0.0
Default Gateway : 40.0.0.1


*************************************************************

Step 2 : Assign IP addresses to routers.

Router 1
--------
Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 15.0.0.1 255.0.0.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#exit
Router(config)#interface FastEthernet1/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0,
changed state to up

Router(config-if)#exit

Router 2
--------
Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 15.0.0.2 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed
state to up

Router(config)#interface FastEthernet1/0
Router(config-if)#ip address 40.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0,
changed state to up

Router(config-if)#exit

****************************************************************

Step 3 : Create extended ACL rules to router nearer to source.
         (Here, Router 1.)
Router(config)#access-list 125 deny tcp host 20.0.0.2 host 40.0.0.2
eq www
Router(config)#access-list 125 permit ip any any

****************************************************************

Step 4 : Apply extended ACL to router interface nearer to source.
         (Here, Router 1 interface.)
Router(config)#interface FastEthernet1/0
Router(config-if)#ip access-group 125 in
Router(config-if)#exit

****************************************************************

Step 5 : Configure RIP protocol. (OSPF or EIGRP can also be done in
         place of RIP.)

Router 1
--------
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 15.0.0.0
```

```
Router(config-router)#exit

Router 2
--------
Router(config)#router rip
Router(config-router)#network 30.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#network 15.0.0.0
Router(config-router)#exit


*************************************************************

Step 6 : Now, HTTP service will not be possible to second PC from
         the web server. That is, the HTML page at URL 40.0.0.2 will
         not be accessible by the second PC. But still packets can
be sent and received.
```