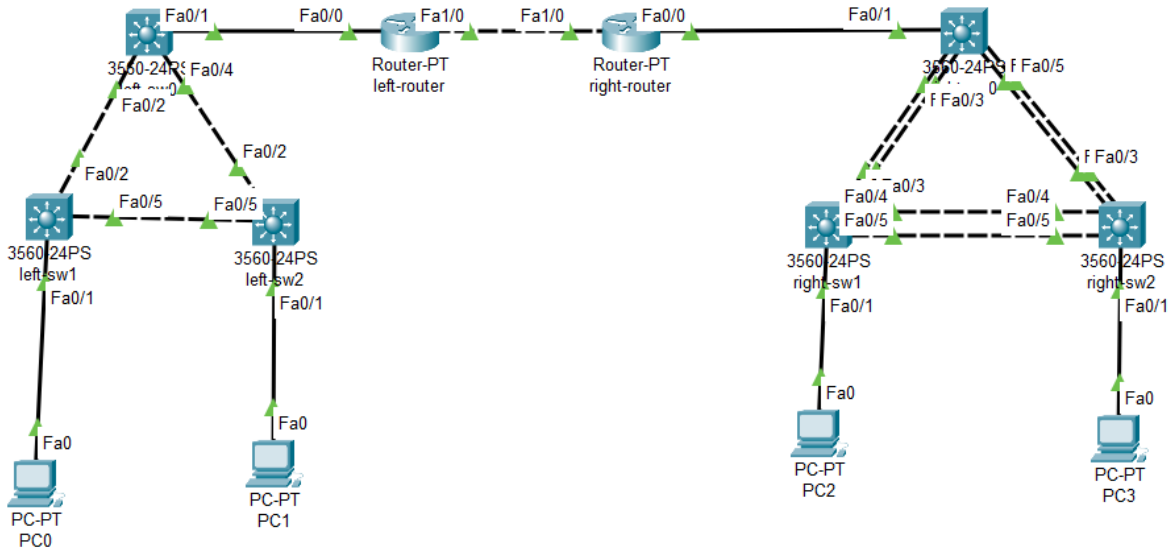
LAB3



Details:

1-Create VLAN.
2-Trunking and access protocols.
3-Spanning tree protocol.
4-Etherchannel protocol.
5- VLAN trunk protocol(VTP).
6- ROS, DHCP.
7-Routing protocol : RIP.
8-Testing and pings between devices.

1-Multilayer switch configuration (left-sw0/ right-sw0):

Basic configuration:

```
switch#conf t
switch(config)#hostname left-sw0 / right-sw0
left-sw0(config)#line con 0
left-sw0(config-line)#logging synchronous
left-sw0(config-line)#no exec-timeout
left-sw0(config)#line vty 0 15
left-sw0(config-line)#logging synchronous
left-sw0(config-line)#no exec-timeout
left-sw0(config-line)#transport input all
left-sw0(config-line)#exit
```

Change interface to trunk and dot1Q protocol:

```
left-sw0(config)#int range f0/1-5
left-sw0(config-if-range)#switchport trunk encapsulation dot1q
left-sw0(config-if-range)#switchport mode trunk
left-sw0(config-if-range)#exit
```

Enable VTP adding domain/ and made mode as server:

```
left-sw0(config)#vtp mode server
left-sw0(config)#vtp domain admin
```

Adding vlan and its name:

```
    left-sw0                                        right-sw0
left-sw0(config)#vlan 10                            vlan 10
left-sw0(config-vlan)#name IT                       name tech-supp
left-sw0(config-vlan)#vlan 20                       vlan 20
left-sw0(config-vlan)#name sales                    name cust-supp
```

Enable RPVST:

```
left-sw0(config)spanning-tree mode rapid-pvst
left-sw0(config)spanning-tree vlan 1 root primary
```

2-Multilayer switch configuration (left-sw1&sw2/ right-sw1&sw2):

Basic configuration:

```
switch#conf t
switch(config)#hostname left-sw1 /right-sw1 /left-sw2 /right-sw2
left-sw1(config)#line con 0
left-sw1(config-line)#logging synchronous
left-sw1(config-line)#no exec-timeout
left-sw1(config)#line vty 0 15
left-sw1(config-line)#logging synchronous
left-sw1(config-line)#no exec-timeout
left-sw1(config-line)#transport input all
left-sw1(config-line)#exit
```

Change interface to trunk and dot1Q protocol:

```
left-sw1(config)#int range f0/2-5
left-sw1(config-if-range)#switchport trunk encapsulation dot1q
left-sw1(config-if-range)#switchport mode trunk
left-sw1(config-if-range)#exit
```

Enable VTP adding domain/ and made mode as server:

```
left-sw1(config)#vtp mode client
```

Assign VLAN to interfaces and change mode to access:

```
left-sw1(config)#int range f0/1
left-sw1(config-if)#switchport mode access
left-sw1(config-if)#switchport access vlan 10 / vlan 20
left-sw1(config-if)#exit
```

Enable RPVST:

```
**********Enable rapit stp         left-sw1/ right-sw1
left-sw1(config)spanning-tree mode rapid-pvst
left-sw1(config)spanning-tree vlan 10 root primary

**********Enable rapit stp         left-sw2/ right-sw2
left-sw1(config)spanning-tree mode rapid-pvst
left-sw1(config)spanning-tree vlan 20 root primary
```

show spanning tree in switch0 to see it becomes the root for vlan 1:

```
VLAN0001
  Spanning tree enabled protocol rstp
  Root ID     Priority    24577
              Address     00E0.8FAD.C84C
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    24577  (priority 24576 sys-id-ext 1)
              Address     00E0.8FAD.C84C
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/2            Desg FWD 19        128.2    P2p
Fa0/4            Desg FWD 19        128.4    P2p
```

show spanning tree in switch0 to see it becomes the root for vlan 10:

```
VLAN0010
  Spanning tree enabled protocol rstp
  Root ID     Priority    32778
              Address     0010.1147.57BC
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32778  (priority 32768 sys-id-ext 10)
              Address     0010.1147.57BC
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/5            Desg FWD 19        128.5    P2p
Fa0/2            Desg FWD 19        128.2    P2p
Fa0/1            Desg FWD 19        128.1    P2p
```

show spanning tree in switch0 to see it becomes the root for vlan 20:

```
VLAN0020
  Spanning tree enabled protocol rstp
  Root ID     Priority    24596
              Address     00D0.D37C.4463
              This bridge is the root
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    24596  (priority 24576 sys-id-ext 20)
              Address     00D0.D37C.4463
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  20

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/2            Desg FWD 19        128.2    P2p
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/5            Desg FWD 19        128.5    P2p
```

Enable etherchannel on right-sw0:

```
right-sw0(config)#int range f0/2-3
right-sw0(config-if-rangeig)#channel-group 1 mode active
right-sw0(config-if-range)#channel-protocol lacp

right-sw0(config)#int range f0/4-5
right-sw0(config-if-rangeig)#channel-group 2 mode active
right-sw0(config-if-range)#channel-protocol lacp
```

Enable etherchannel on right-sw1:

```
right-sw1(config)#int range f0/2-3
right-sw1(config-if-rangeig)#channel-group 1 mode passive
right-sw1(config-if-range)#channel-protocol lacp

right-sw1(config)#int range f0/4-5
right-sw1(config-if-rangeig)#channel-group 2 mode passive
right-sw1(config-if-range)#channel-protocol lacp
```

Enable etherchannel on right-sw2:

```
right-sw2(config)#int range f0/2-3
right-sw2(config-if-rangeig)#channel-group 1 mode passive
right-sw2(config-if-range)#channel-protocol lacp

********** trying to make two etherchannel facing togther passive
right-sw2(config)#int range f0/4-5
right-sw2(config-if-rangeig)#channel-group 2 mode passive
right-sw2(config-if-range)#channel-protocol lacp
```

trying to make two etherchannel facing together passive

show etherchannel on right-sw0:

```
right-sw0#sh etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------

1      Po1(SU)           LACP   Fa0/2(P) Fa0/3(P)
2      Po2(SU)           LACP   Fa0/4(P) Fa0/5(P)
```

show etherchannel on right-sw1:

```
right-sw1(config-if)# do sh etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------

1      Po1(SU)           LACP   Fa0/2(P) Fa0/3(P)
2      Po2(SD)           LACP   Fa0/4(I) Fa0/5(I)
```

show etherchannel on right-sw2:

```
right-sw2#show etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------

1      Po1(SU)           LACP   Fa0/2(P) Fa0/3(P)
2      Po2(SD)           LACP   Fa0/4(I) Fa0/5(I)
```

Cause port 2 on sw1 and sw2 are passive the port appears as stand-alone and down
Make port 2 active on sw1

```
right-sw1(config-if-range)#int r fa 0/4-5
right-sw1(config-if-range)#channel-group 2 mode ac
right-sw1(config-if-range)#channel-group 2 mode active
```

```
right-sw1(config-if-range)#do sh etherchannel summary
Flags:  D - down        P - in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------

1      Po1(SU)           LACP   Fa0/2(P) Fa0/3(P)
2      Po2(SU)           LACP   Fa0/4(P) Fa0/5(P)
```

port 2 changed to in port-channel and in-use

3-left router configuration:

Basic configuration:

```
Router#conf t
Router(config)#hostname left-router
left-router(config)#line con 0
left-router(config-line)#logging synchronous
left-router(config-line)#no exec-timeout
left-router(config)#line vty 0 15
left-router(config-line)#logging synchronous
left-router(config-line)#no exec-timeout
left-router(config-line)#transport input all
```

Adding sub-interfaces for VLANS:

```
**********adding sub-interfaces for vlans
left-router(config-line)#int f0/0
left-router(config-if)#no shutdown
left-router(config-if)#int f0/0.10
left-router(config-subif)#encapsulation dot1Q 10
left-router(config-subif)#ip address 172.17.0.1 255.255.255.0
left-router(config-subif)#int f0/0.20
left-router(config-subif)#encapsulation dot1Q 20
left-router(config-subif)#ip address 172.17.1.1 255.255.255.0
left-router(config-subif)#exit
```

Assign ip address to port 1/0:

```
left-router(config)#int f1/0
left-router(config-if)#ip address 10.0.0.1
left-router(config-if)#no shutdown
```

Making DHCP for left devices:

```
left-router(config)#ip dhcp pool IT
left-router(dhcp-config)#network 172.17.0.0   255.255.255.0
left-router(dhcp-config)#default-router 172.17.0.1
left-router(dhcp-config)#dns-server 8.8.8.8
left-router(dhcp-config)#ip dhcp pool sales
left-router(dhcp-config)#network 172.17.1.0   255.255.255.0
left-router(dhcp-config)#default-router 172.17.1.1
left-router(dhcp-config)##dns-server 8.8.8.8
```

4-left router configuration:

Basic configuration:

```
Router#conf t
Router(config)#hostname left-router
right-router(config)#line con 0
right-router(config-line)#logging synchronous
right-router(config-line)#no exec-timeout
right-router(config)#line vty 0 15
right-router(config-line)#logging synchronous
right-router(config-line)#no exec-timeout
right-router(config-line)#transport input all
```

Adding sub-interfaces for VLANS:

```
right-router(config-line)#int f0/0
right-router(config-if)#no shutdown
right-router(config-if)#exit
right-router(config)#int f0/0.10
right-router(config-subif)#encapsulation dot1Q 10
right-router(config-subif)#ip address 192.168.0.1 255.255.255.128
right-router(config-subif)#int f0/0.20
right-router(config-subif)#encapsulation dot1Q 20
right-router(config-subif)#ip address 192.168.0.129 255.255.255.192
right-router(config-subif)#exit
```

Assign ip address to port 1/0:

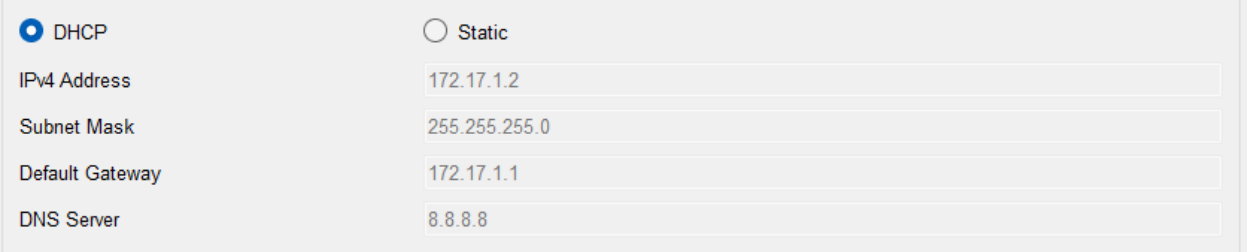
```
right-router(config)#int f1/0
right-router(config-if)#ip address 10.0.0.2
right-router(config-if)#no shutdown
```

Making DHCP for left devices:

```
right-router(dhcp-config)#ip dhcp pool tech-supp
right-router(dhcp-config)#network 192.168.0.0  255.255.255.128
right-router(dhcp-config)#default-router 192.168.1.1
right-router(dhcp-config)#dns-server 8.8.8.8
right-router(dhcp-config)#ip dhcp pool cust-supp
right-router(dhcp-config)#network 192.168.0.128 255.255.255.192
right-router(dhcp-config)#default-router 192.168.1.129
right-router(dhcp-config)##dns-server 8.8.8.8
```

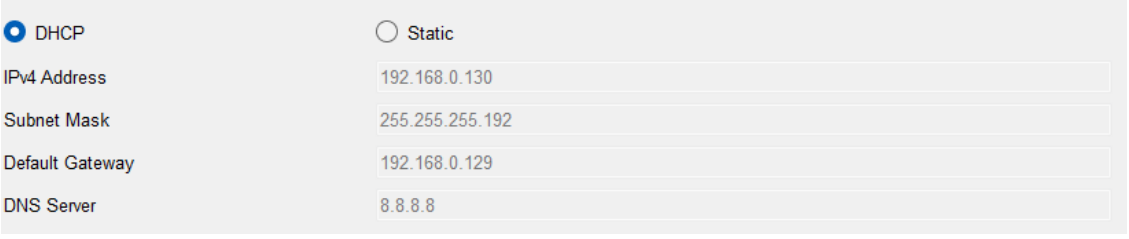
PC0 ip:

PC1 ip:



PC2 ip:

PC3 ip:



Ping from pc0 to pc1:

```
C:\>ping 172.17.1.2

Pinging 172.17.1.2 with 32 bytes of data:

Request timed out.
Reply from 172.17.1.2: bytes=32 time<1ms TTL=127
Reply from 172.17.1.2: bytes=32 time<1ms TTL=127
Reply from 172.17.1.2: bytes=32 time<1ms TTL=127
```

Ping from pc0 to pc2 and pc 3:

```
C:\>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

Reply from 172.17.0.1: Destination host unreachable.
Reply from 172.17.0.1: Destination host unreachable.
Reply from 172.17.0.1: Destination host unreachable.
Reply from 172.17.0.1: Destination host unreachable.

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.0.130

Pinging 192.168.0.130 with 32 bytes of data:

Reply from 172.17.0.1: Destination host unreachable.
Reply from 172.17.0.1: Destination host unreachable.
Reply from 172.17.0.1: Destination host unreachable.
Request timed out.

Ping statistics for 192.168.0.130:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Enable RIP on left and right routers:

Left router:

```
left-router(config)#router rip
right-router(config-router)#network 172.17.0.0
right-router(config-router)#network 172.17.1.0
right-router(config-router)#network 10.0.0.0
right-router(config-router)#ver 2
right-router(config-router)#no auto-summary
```

```
left-router#sh 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

     10.0.0.0/30 is subnetted, 1 subnets
C       10.0.0.0 is directly connected, FastEthernet1/0
     172.17.0.0/24 is subnetted, 2 subnets
C       172.17.0.0 is directly connected, FastEthernet0/0.10
C       172.17.1.0 is directly connected, FastEthernet0/0.20
     192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
R       192.168.0.0/25 [120/1] via 10.0.0.2, 00:00:10, FastEthernet1/0
R       192.168.0.128/26 [120/1] via 10.0.0.2, 00:00:10, FastEthernet1/0
```

right router:

```
right-router(config)#router rip
right-router(config-router)#network 192.168.0.0
right-router(config-router)#network 192.168.0.128
right-router(config-router)#network 10.0.0.0
right-router(config-router)#ver 2
right-router(config-router)#no auto-summary
```

```
right-router#sh 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

     10.0.0.0/30 is subnetted, 1 subnets
C       10.0.0.0 is directly connected, FastEthernet1/0
     172.17.0.0/24 is subnetted, 2 subnets
R       172.17.0.0 [120/1] via 10.0.0.1, 00:00:10, FastEthernet1/0
R       172.17.1.0 [120/1] via 10.0.0.1, 00:00:10, FastEthernet1/0
     192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.0.0/25 is directly connected, FastEthernet0/0.10
C       192.168.0.128/26 is directly connected, FastEthernet0/0.20
```

Ping from pc0 to pc2 and pc 3:

```
C:\>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.0.2: bytes=32 time=1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.0.130

Pinging 192.168.0.130 with 32 bytes of data:

Request timed out.
Reply from 192.168.0.130: bytes=32 time<1ms TTL=126
Reply from 192.168.0.130: bytes=32 time<1ms TTL=126
Reply from 192.168.0.130: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.0.130:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```