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Internetworking
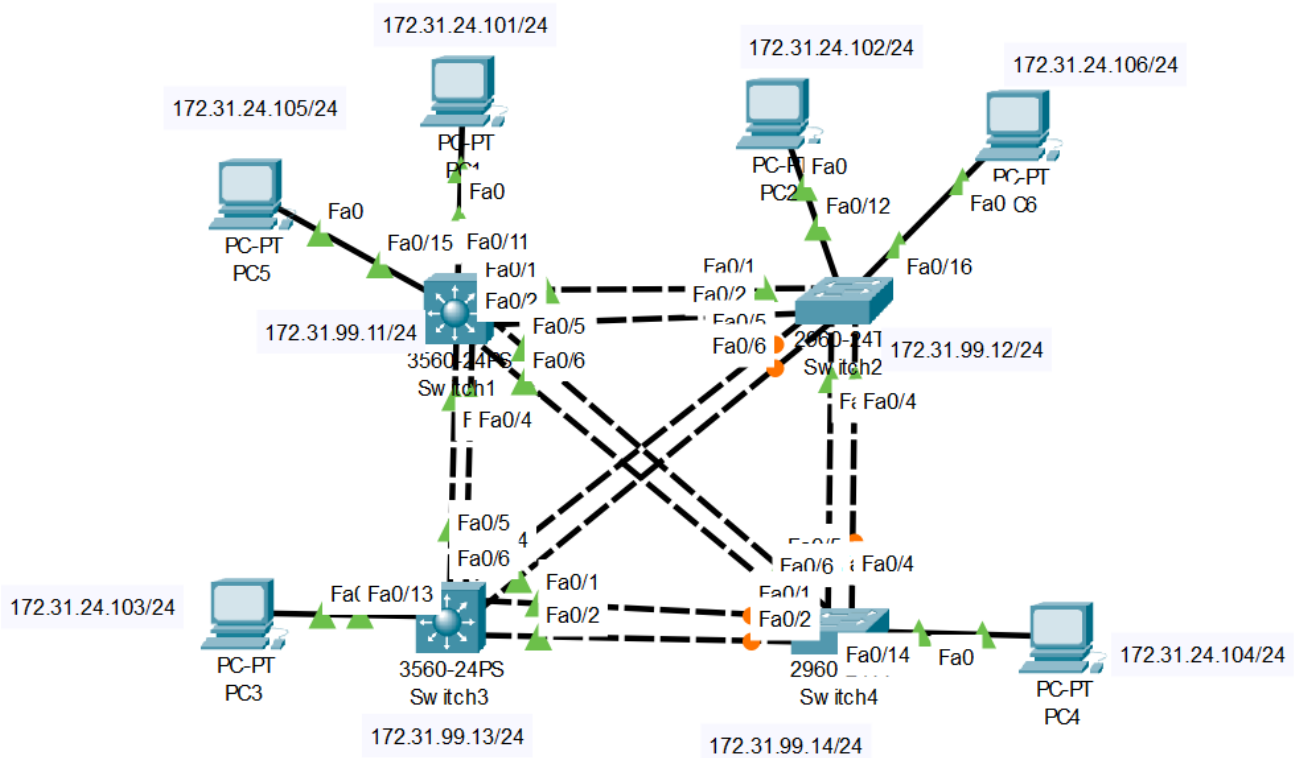
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Lab 1

Description: In this lab, I created several different VLANs and limited the access of PCs to them. I also was able to utilize trunk protocol and visually understand spanning tree protocol.

Topology/Diagram:

Syntax:

CLI	Command	Description	Mode
Cisco IOS	vtp domain <<name>>	sets the domain name of VTP	Global Config
Cisco IOS	vtp mode server	sets up the device as a VTP server	Global Config
Cisco IOS	vtp mode client	sets up the device as a VTP client	Global Config
Cisco IOS	name <<name>>	Names the vlan	Config-Vlan
Cisco IOS	int f0/12	enters config for fastEthernet0/12	Global Config
Cisco IOS	int range f0/1-6	config mode for range of interfaces	Global Config
Cisco IOS	switchport mode access	sets up an interface for limited access to certain vlan	Interface Config
Cisco IOS	switchport mode trunk	sets up an interface to communicate across vlans	Interface Config
Cisco IOS	switchport access vlan 56	limits interface access to vlan 56	Interface Config
Cisco IOS	switchport trunk encapsulation dot1q	changes interface's trunk encapsulation type	Interface Config
Cisco IOS	spanning-tree vlan 13,24,56 root primary	sets the device to be the root STP bridge for the specified vlans	Global Config
Cisco IOS	show spanning-tree	displays spanning tree protocol status and information	Privilege
Cisco IOS	spanning-tree vlan 13,24,56 root secondary	sets the device to be the secondary STP bridge for the specified vlans	Global Config
Cisco IOS	show vtp status	displays status of VTP cofiguration	Privilege

Verification:
Verify each PC is able to reach the other PCs within the same VLAN.

```
C:\>ping 172.31.24.103

Pinging 172.31.24.103 with 32 bytes of data:

Reply from 172.31.24.103: bytes=32 time<1ms TTL=128
Reply from 172.31.24.103: bytes=32 time<1ms TTL=128
Reply from 172.31.24.103: bytes=32 time<1ms TTL=128
Reply from 172.31.24.103: bytes=32 time<1ms TTL=128

Ping statistics for 172.31.24.103:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

PC1 (VLAN PC1+PC3):

PC2 (VLAN PC2+PC4):

```
C:\>ping 172.31.24.104

Pinging 172.31.24.104 with 32 bytes of data:

Reply from 172.31.24.104: bytes=32 time<1ms TTL=128
Reply from 172.31.24.104: bytes=32 time=1ms TTL=128
Reply from 172.31.24.104: bytes=32 time<1ms TTL=128
Reply from 172.31.24.104: bytes=32 time=2ms TTL=128

Ping statistics for 172.31.24.104:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms
```

PC3 (VLAN PC1+PC3):

```
C:\>ping 172.31.24.101

Pinging 172.31.24.101 with 32 bytes of data:

Reply from 172.31.24.101: bytes=32 time<1ms TTL=128
Reply from 172.31.24.101: bytes=32 time=1ms TTL=128
Reply from 172.31.24.101: bytes=32 time<1ms TTL=128
Reply from 172.31.24.101: bytes=32 time<1ms TTL=128

Ping statistics for 172.31.24.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC4 (VLAN PC2+PC4):

```
C:\>ping 172.31.24.102

Pinging 172.31.24.102 with 32 bytes of data:

Reply from 172.31.24.102: bytes=32 time=1ms TTL=128
Reply from 172.31.24.102: bytes=32 time<1ms TTL=128
Reply from 172.31.24.102: bytes=32 time<1ms TTL=128
Reply from 172.31.24.102: bytes=32 time<1ms TTL=128

Ping statistics for 172.31.24.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC5 (VLAN PC5+PC6):

```
C:\>ping 172.31.24.106

Pinging 172.31.24.106 with 32 bytes of data:

Reply from 172.31.24.106: bytes=32 time<1ms TTL=128
Reply from 172.31.24.106: bytes=32 time=1ms TTL=128
Reply from 172.31.24.106: bytes=32 time=1ms TTL=128
Reply from 172.31.24.106: bytes=32 time=1ms TTL=128

Ping statistics for 172.31.24.106:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC6 (VLAN PC5+PC6):

```
C:\>ping 172.31.24.105

Pinging 172.31.24.105 with 32 bytes of data:

Reply from 172.31.24.105: bytes=32 time=17ms TTL=128
Reply from 172.31.24.105: bytes=32 time<1ms TTL=128
Reply from 172.31.24.105: bytes=32 time<1ms TTL=128
Reply from 172.31.24.105: bytes=32 time=1ms TTL=128

Ping statistics for 172.31.24.105:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 17ms, Average = 4ms
```

Verify each Switch is able to reach the other Switches within the topology:

Switch1:

```
Switch1#ping 172.31.99.12

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.12, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Switch1#ping 172.31.99.13

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.13, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Switch1#ping 172.31.99.14

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.14, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
```

Switch2:

```
Switch2#ping 172.31.99.11

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.11, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Switch2#ping 172.31.99.13

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.13, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Switch2#ping 172.31.99.14

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.14, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Switch3:

```
Switch3#ping 172.31.99.11

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.11, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Switch3#ping 172.31.99.12

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.12, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Switch3#ping 172.31.99.14

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.14, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Switch4:

```
Switch4#ping 172.31.99.11

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.11, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Switch4#ping 172.31.99.12

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.12, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Switch4#ping 172.31.99.13

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.99.13, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Display the status of STP and highlight the portion of the screenshot displaying the switch that is the root bridge.

```
VLAN0013
  Spanning tree enabled protocol ieee
  Root ID    Priority    24589
             Address     0001.97AB.5135
             This bridge is the root
             Hello Time   2 sec  Max Age 20 sec   Forward Delay 15 sec

  Bridge ID  Priority    24589  (priority 24576 sys-id-ext 13)
             Address     0001.97AB.5135
             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
Fa0/3            Desg FWD 19        128.3    P2p
Fa0/2            Desg FWD 19        128.2    P2p
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/4            Desg FWD 19        128.4    P2p
Fa0/6            Desg FWD 19        128.6    P2p
Fa0/11           Desg FWD 19        128.11   P2p


VLAN0024
  Spanning tree enabled protocol ieee
  Root ID    Priority    24600
             Address     0001.97AB.5135
             This bridge is the root
             Hello Time   2 sec  Max Age 20 sec   Forward Delay 15 sec

  Bridge ID  Priority    24600  (priority 24576 sys-id-ext 24)
             Address     0001.97AB.5135
             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
Fa0/3            Desg FWD 19        128.3    P2p
Fa0/2            Desg FWD 19        128.2    P2p
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/4            Desg FWD 19        128.4    P2p
Fa0/6            Desg FWD 19        128.6    P2p


VLAN0056
  Spanning tree enabled protocol ieee
  Root ID    Priority    24632
             Address     0001.97AB.5135
             This bridge is the root
             Hello Time   2 sec  Max Age 20 sec   Forward Delay 15 sec

  Bridge ID  Priority    24632  (priority 24576 sys-id-ext 56)
```

Conclusion:
Everything worked smoothly with this lab. I had to do some research regarding the VTP server portion, but it did not cause any issues. I found scripts especially useful for this lab.