## Exercise 1 - VLAN:

1. **Show run**

```
interface Vlan50
 ip address 10.0.50.1 255.255.255.0
!
```

**show vlan**

```
VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gi1/0/1, Gi1/0/3, Gi1/0/4, Gi1/0/5, Gi1/0/6, Gi1/0/7, Gi1/0/8, Gi1/0/9,
i1/0/11, Gi1/0/12, Gi1/0/13, Gi1/0/14, Gi1/0/15, Gi1/0/16, Gi1/0/17, Gi1/0/18
                                                Gi1/0/19, Gi1/0/20, Gi1/0/21, Gi1/0/22, Gi1/0/23, Gi1/0/24, Ap1/0/1
50   lab6                             active
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
50   enet  100050     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

Remote SPAN VLANs
------------------------------------------------------------------------------


Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
```

2. **Show run**

```
!
interface GigabitEthernet1/0/1
 switchport access vlan 50
 switchport mode access
!
```

**Show vlan**

```
co2061-9300-10#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gi1/0/3, Gi1/0/4, Gi1/0/5, Gi1/0/6, Gi1/0/7, Gi1/0/8, Gi1/0/9, G
Gi1/0/12, Gi1/0/13, Gi1/0/14, Gi1/0/15, Gi1/0/16, Gi1/0/17, Gi1/0/18, Gi1/0/19
                                                Gi1/0/20, Gi1/0/21, Gi1/0/22, Gi1/0/23, Gi1/0/24, Ap1/0/1
50   lab6                             active    Gi1/0/1
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
50   enet  100050     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

Remote SPAN VLANs
------------------------------------------------------------------------------


Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
```

3. **Ping 10.0.50.1**

```
[489labuser@co2061-20 ~]$ ping 10.0.50.1
PING 10.0.50.1 (10.0.50.1) 56(84) bytes of data.
64 bytes from 10.0.50.1: icmp_seq=2 ttl=254 time=0.723 ms
64 bytes from 10.0.50.1: icmp_seq=3 ttl=254 time=0.950 ms
64 bytes from 10.0.50.1: icmp_seq=4 ttl=254 time=0.762 ms
64 bytes from 10.0.50.1: icmp_seq=5 ttl=254 time=0.769 ms
64 bytes from 10.0.50.1: icmp_seq=6 ttl=254 time=0.711 ms
64 bytes from 10.0.50.1: icmp_seq=7 ttl=254 time=0.931 ms
64 bytes from 10.0.50.1: icmp_seq=8 ttl=254 time=0.828 ms
^C
--- 10.0.50.1 ping statistics ---
8 packets transmitted, 7 received, 12% packet loss, time 7005ms
```

**Ping Even computer**

```
co2061-9300-10#ping 10.0.50.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.50.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

Both ping tests seem to succeed after connecting the computer to the switch and setting up the route to the 10.0.50.0/24 network.  However, the even numbered computer fails its first ping to VLAN50. My thoughts are that the computer hadn't set up the route or interface address yet, so it ended up dropping the packet. (Then set it up immediately.) My other thought is that the computer may also have not set up/requested an address with the switch. I'm not really sure why this packet was dropped, but something seems to not have been set up immediately.

## 4. Wireshark Pings

| | | | | | |
|---|---|---|---|---|---|
| 9 | 11.495411988 | 10.0.50.2 | 10.0.50.1 | ICMP | 98 Echo (ping) request id=0x28ac, seq=1/256, ttl=64 (reply in 16 |
| 10 | 11.496058113 | 10.0.50.1 | 10.0.50.2 | ICMP | 98 Echo (ping) reply id=0x28ac, seq=1/256, ttl=254 (request ir |
| 11 | 12.495932454 | 10.0.50.2 | 10.0.50.1 | ICMP | 98 Echo (ping) request id=0x28ac, seq=2/512, ttl=64 (reply in 12 |
| 12 | 12.496640751 | 10.0.50.1 | 10.0.50.2 | ICMP | 98 Echo (ping) reply id=0x28ac, seq=2/512, ttl=254 (request ir |
| 13 | 12.763524169 | 10:b3:c6:12:71:01 | Spanning-tree-(for-br: | STP | 60 RST. Root = 32768/50/10:b3:c6:12:71:00 Cost = 0 Port = 0x806 |
| 14 | 13.439804711 | 10:b3:c6:12:71:01 | 10:b3:c6:12:71:01 | LOOP | 60 Reply |
| 15 | 13.496746131 | 10.0.50.2 | 10.0.50.1 | ICMP | 98 Echo (ping) request id=0x28ac, seq=3/768, ttl=64 (reply in 16 |
| 16 | 13.497413705 | 10.0.50.1 | 10.0.50.2 | ICMP | 98 Echo (ping) reply id=0x28ac, seq=3/768, ttl=254 (request ir |
| 17 | 14.496763412 | 10.0.50.2 | 10.0.50.1 | ICMP | 98 Echo (ping) request id=0x28ac, seq=4/1024, ttl=64 (reply in 1 |
| 18 | 14.497486946 | 10.0.50.1 | 10.0.50.2 | ICMP | 98 Echo (ping) reply id=0x28ac, seq=4/1024, ttl=254 (request i |
| 19 | 14.763953368 | 10:b3:c6:12:71:01 | Spanning-tree-(for-br: | STP | 60 RST. Root = 32768/50/10:b3:c6:12:71:00 Cost = 0 Port = 0x806 |
| 20 | 15.496948975 | 10.0.50.2 | 10.0.50.1 | ICMP | 98 Echo (ping) request id=0x28ac, seq=5/1280, ttl=64 (reply in 2 |
| 21 | 15.497788864 | 10.0.50.1 | 10.0.50.2 | ICMP | 98 Echo (ping) reply id=0x28ac, seq=5/1280, ttl=254 (request i |
| 22 | 16.498692674 | IntelCor_94:7b:4f | 10:b3:c6:12:71:68 | ARP | 42 Who has 10.0.50.1? Tell 10.0.50.2 |
| 23 | 16.499382949 | 10:b3:c6:12:71:68 | IntelCor_94:7b:4f | ARP | 60 10.0.50.1 is at 10:b3:c6:12:71:68 |
| 24 | 16.765035471 | 10:b3:c6:12:71:01 | Spanning-tree-(for-br: | STP | 60 RST. Root = 32768/50/10:b3:c6:12:71:00 Cost = 0 Port = 0x806 |
| 25 | 18.764511684 | 10:b3:c6:12:71:01 | Spanning-tree-(for-br: | STP | 60 RST. Root = 32768/50/10:b3:c6:12:71:00 Cost = 0 Port = 0x806 |
| 26 | 20.764583852 | 10:b3:c6:12:71:01 | Spanning-tree-(for-br: | STP | 60 RST. Root = 32768/50/10:b3:c6:12:71:00 Cost = 0 Port = 0x806 |
| 27 | 22.765924289 | 10:b3:c6:12:71:01 | Spanning-tree-(for-br: | STP | 60 RST. Root = 32768/50/10:b3:c6:12:71:00 Cost = 0 Port = 0x806 |
| 28 | 23.439824212 | 10:b3:c6:12:71:01 | 10:b3:c6:12:71:01 | LOOP | 60 Reply |
| 29 | 24.765465397 | 10:b3:c6:12:71:01 | Spanning-tree-(for-br: | STP | 60 RST. Root = 32768/50/10:b3:c6:12:71:00 Cost = 0 Port = 0x806 |
| 30 | 24.994709101 | 10.0.50.1 | 10.0.50.2 | ICMP | 114 Echo (ping) request id=0x0026, seq=0/0, ttl=254 |
| 31 | 24.994773146 | 10.0.50.2 | 10.0.50.1 | ICMP | 114 Echo (ping) reply id=0x0026, seq=0/0, ttl=64 (request in 30 |
| 32 | 24.995360962 | 10.0.50.1 | 10.0.50.2 | ICMP | 114 Echo (ping) request id=0x0026, seq=1/256, ttl=254 (reply in 3 |
| 33 | 24.995390368 | 10.0.50.2 | 10.0.50.1 | ICMP | 114 Echo (ping) reply id=0x0026, seq=1/256, ttl=64 (request in |
| 34 | 24.995866741 | 10.0.50.1 | 10.0.50.2 | ICMP | 114 Echo (ping) request id=0x0026, seq=2/512, ttl=254 (reply in 3 |
| 35 | 24.995896307 | 10.0.50.2 | 10.0.50.1 | ICMP | 114 Echo (ping) reply id=0x0026, seq=2/512, ttl=64 (request in |
| 36 | 24.996319593 | 10.0.50.1 | 10.0.50.2 | ICMP | 114 Echo (ping) request id=0x0026, seq=3/768, ttl=254 (reply in 3 |
| 37 | 24.996349144 | 10.0.50.2 | 10.0.50.1 | ICMP | 114 Echo (ping) reply id=0x0026, seq=3/768, ttl=64 (request in |
| 38 | 24.996867221 | 10.0.50.1 | 10.0.50.2 | ICMP | 114 Echo (ping) request id=0x0026, seq=4/1024, ttl=254 (reply in |
| 39 | 24.996896841 | 10.0.50.2 | 10.0.50.1 | ICMP | 114 Echo (ping) reply id=0x0026, seq=4/1024, ttl=64 (request ir |

The question here alludes to the idea of something being different with the packets. However, I didn't see anything different when using Wireshark. Regardless of who initializes the pings, it sends ICMP/echo requests to the other device, and it replies. The only difference I saw was that when the VLAN sent them, they are larger. 98 bytes when the computer requests, versus 114 bytes when the VLAN does.

**Exercise 2 - DHCP:**

5. **Show run**

```
ip domain name ece.iastate.edu
ip dhcp excluded-address 10.0.50.1 10.0.50.3
ip dhcp excluded-address 10.0.50.254
!
ip dhcp pool VLAN50
 network 10.0.50.0 255.255.255.0
 default-router 10.0.50.1
 dns-server 4.8.9.50
 lease 0 2
```

6. **P1p1 ip address set by dhcp**

```
p1p1: flags=-28605<UP,BROADCAST,RUNNING,MULTICAST,DYNAMIC>  mtu 1500
        inet 10.0.50.4  netmask 255.255.255.0  broadcast 10.0.50.255
        ether 68:05:ca:94:7b:4f  txqueuelen 1000  (Ethernet)
        RX packets 502  bytes 38812 (37.9 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 100  bytes 14228 (13.8 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 16  memory 0xef1c0000-ef1e0000
```

In our DHCP config, it blocks addresses 10.0.50.1 - .3 and .254. The even numbered computer was given the first address not blocked, 10.0.50.4 via DHCP.

7. **Wireshark DHCP**

| No. | Time | Source | Destination | Protoc | Length | Info |
|---|---|---|---|---|---|---|
| 483 | 739.533842097 | 0.0.0.0 | 255.255.255.255 | DHCP | 342 | DHCP Discover - Transaction ID 0xc6ec4d1f |
| 486 | 741.535669354 | 10.0.50.1 | 10.0.50.4 | DHCP | 342 | DHCP Offer - Transaction ID 0xc6ec4d1f |
| 487 | 741.535908779 | 0.0.0.0 | 255.255.255.255 | DHCP | 342 | DHCP Request - Transaction ID 0xc6ec4d1f |
| 488 | 741.537219921 | 10.0.50.1 | 10.0.50.4 | DHCP | 342 | DHCP ACK - Transaction ID 0xc6ec4d1f |

From the packets being sent, we see the even number computer who has no address broadcast to the entire network. This is a DCHP discover where the computer is trying to find if a DHCP server exists on the network and inform it that is needs an address. The DCHP server replies, giving it an available address. The computer then requests that address (still broadcasting) and the server acknowledges, letting the computer know it can assign that address to its self.

## 8. Reset DHCP

```
co2061-9300-10(config)#no ip dhcp pool VLAN50
co2061-9300-10(config)#no ip dhcp exlcuded-address
                                  ^
% Invalid input detected at '^' marker.

co2061-9300-10(config)#no ip dhcp excluded-address
% Incomplete command.

co2061-9300-10(config)#no ip dhcp excluded-address 10.0.50.1 10.0.50.3
co2061-9300-10(config)#no ip dhcp excluded-address 10.0.50.254
co2061-9300-10(config)#
```

**Switch reset**

```
co2061-9300-10(config)#interface GigabitEthernet1/0/1
co2061-9300-10(config-if)#no switchport access vlan50
                                                ^
% Invalid input detected at '^' marker.

co2061-9300-10(config-if)#no switchport access vlan 50
co2061-9300-10(config-if)#no switchport mode access
co2061-9300-10(config-if)#no switchport
co2061-9300-10(config-if)#exit
co2061-9300-10(config)#interface vlan 50
co2061-9300-10(config-if)#shutdown
co2061-9300-10(config-if)#no ip address 10.0.50.1 255.255.255.0
co2061-9300-10(config-if)#exit
co2061-9300-10(config)#no vlan 50
co2061-9300-10(config)#
```

**What We Learned:**

In this lab we learned how to configure static Ethernet interfaces on cisco switches. We learned how to access the switch provided to us through ssh and then use the internal commands to switch between different command modes on the switch in order to configure the switch and the interfaces. We also learned how to set an IP address for a port using the ip address command and the switchport command while in interface configuration mode. We also learned how to set up a Virtual Local Area Network and use show run and show vlan commands to confirm the configuration of the VLAN. Lastly we learned how to use DHCP to automatically assign IP addresses according to the static addresses that we assigned while setting up VLAN.