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CSCI 4273

Network Systems
Lab Assignment 1 - Ethernet Switching Lab Due Tuesday, September 22nd by 11:55 PM

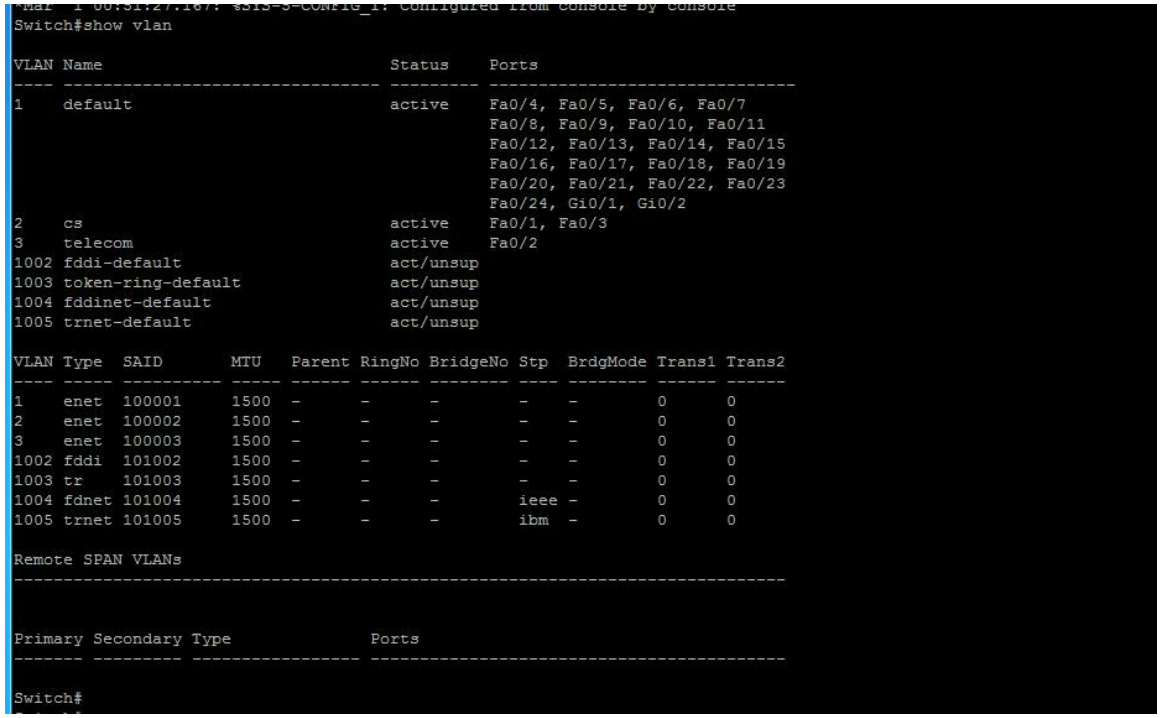
Lab report question #1: *Does it matter what IP address each PC gets to the switches? Explain the addressing mechanism that switches use to route data between hosts in a broadcast domain. Why do we need to assign IP addresses to each PC?*

It does matter what the IP address to each PC switch is to identify the port. They should all be different. 192.168 which is the private class C network. After that we are using the addressing mechanism 1.1, 2.1, 3.1. The first number in front of the decimal relays to the first port and so on. We assign IP address to each PC because we need identify who is on the network.

COPY OUTPUT 1: Show results of the following command:
Switch#show vlan

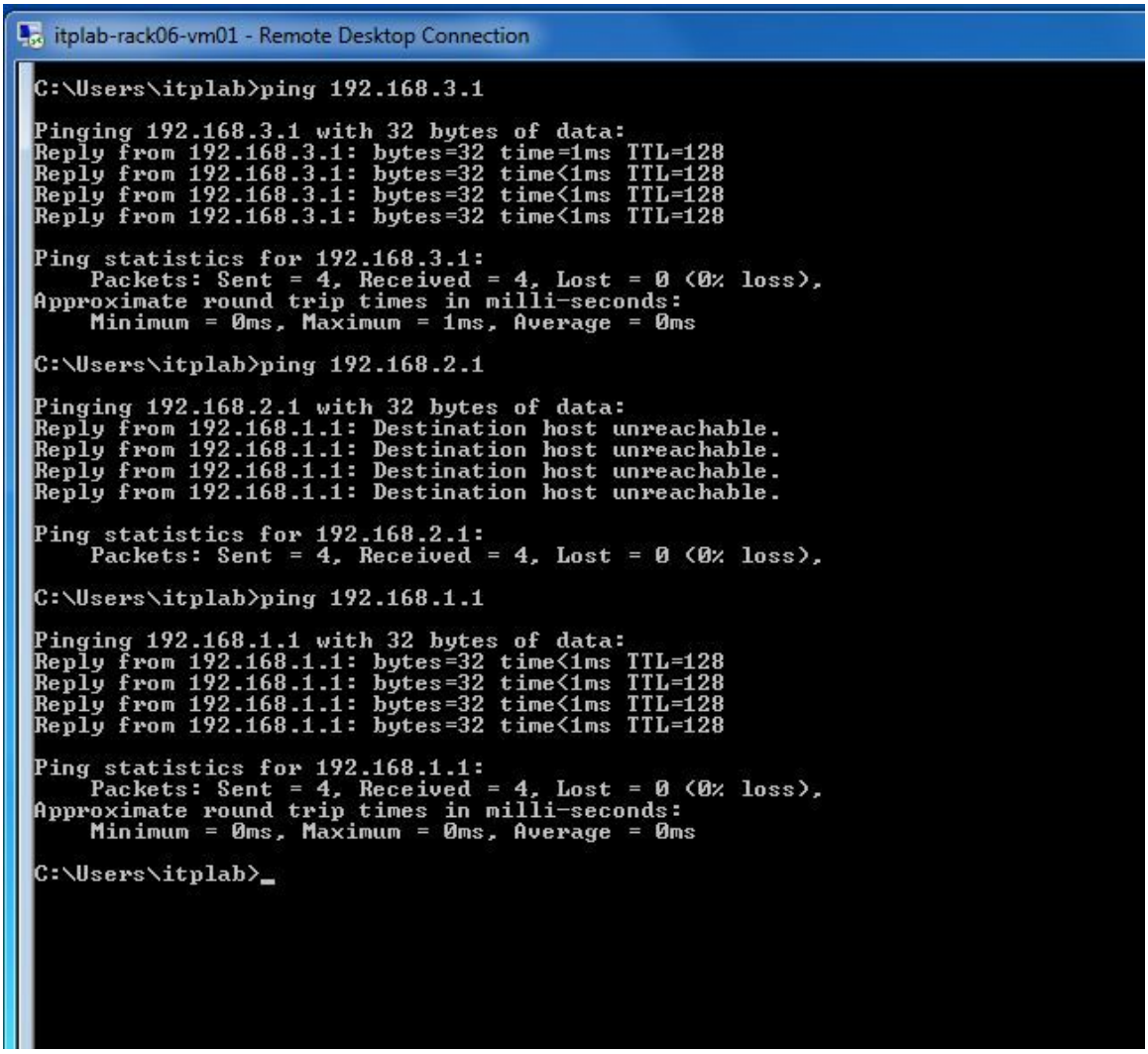
```
Switch#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                Gi0/1, Gi0/2
2    cs                               active
3    telecom                          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
2    enet  100002     1500  -      -      -        -    -        0      0
3    enet  100003     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
------- --------- ----------------- ------------------------------------------

Switch#
```

COPY OUTPUT 2: Show results of the following command:
Switch#show vlan



```
Switch#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/4, Fa0/5, Fa0/6, Fa0/7
                                                Fa0/8, Fa0/9, Fa0/10, Fa0/11
                                                Fa0/12, Fa0/13, Fa0/14, Fa0/15
                                                Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                                Fa0/24, Gi0/1, Gi0/2
2    cs                               active    Fa0/1, Fa0/3
3    telecom                          active    Fa0/2
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
2    enet  100002     1500  -      -      -        -    -        0      0
3    enet  100003     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
------- --------- ----------------- ------------------------------------------

Switch#
```

COPY OUTPUT 3: Show results of pinging each workstation from workstation 1.



Lab report question #2: *Why can't you ping computers on different VLANs with this configuration? What are the benefits and drawbacks to this (speaking in terms of a business or organization, for example)?*

You cannot ping other computers on different VLANs because the signal sent isn't within the VLAN. They are virtually disconnected from each other. The benefits would be people outside your VLAN couldn't access your computer. They might harm your computer. The drawbacks are you cannot access a computer remotely. To access the computer you must physically be in the location of it. What if the computer is hundreds of miles away?

Lab report question #3: *Why are you able you ping from computers connected to one switch, to computers connected to the other?*

You are able to ping from computers connected to one switch, to computers connected to the other because we used a crossover cable. These cables are used to

connect similar devices. This effectively creates an extension of the first switch.

COPY OUTPUT 4: Show results of the following command.
Switch#show spanning-tree

```
Switch#show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID     Priority    32769
              Address     0025.455e.8a00
              This bridge is the root
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32769  (priority 32768 sys-id-ext 1)
              Address     0025.455e.8a00
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  15  sec

Interface           Role Sts Cost      Prio.Nbr Type
------------------- ---- --- --------- -------- --------------------------------
Fa0/1               Desg FWD 19        128.3    P2p
Fa0/2               Desg FWD 19        128.4    P2p
Fa0/11              Desg FWD 19        128.13   P2p
Fa0/12              Desg FWD 19        128.14   P2p


Switch#
```

COPY OUTPUT 5: Show results of the following command.
Switch#show mac address-table dynamic

```
Switch#show mac address-table dynamic
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
   1    0014.6af4.c590    DYNAMIC     Fa0/1
   1    0014.6af4.c591    DYNAMIC     Fa0/2
   1    3cdf.1ed8.fa0d    DYNAMIC     Fa0/11
   1    3cdf.1ed8.fa0e    DYNAMIC     Fa0/12
Total Mac Addresses for this criterion: 4
Switch#
```

Lab report question #4: *What are these commands showing? Are both links between the two switches active? Why or Why Not?*

Show spanning-tree: Prints the spanning set of network nodes. Shows us the bridge which is the cross over cable. Also shows us which switch interface is

blocked, forwarded, and the VM. In the bottom half of the output: the Role, port STP state, and the type status information are shown, as well as the priority number, interface, and cost. The role of each node is Desg for designated, the port STP state is FWD for forwarding state, the type status information is P2p for point-to-point connection, and the interface and cost are as shown.

Show mac address-table dynamic: Shows the mac address of the ports. The type is shown as well. All ports are on Vlan 1, and the type for MAC-addresses is Dynamic, as declared by the command.

No, not all links between the two switches are active. One is blocked because it would be redundant to have an infinite loop.

Lab report question #5: *Why is spanning tree configured to be on by default?*

The spanning tree is configured to be on by default to prevent cycles and make shortest path algorithm.

Lab report question #6: *Which port is the MAC address of the computer on the other switch listed under? Why is this?*

It is listed under port 11, because that is the port we moved VM3 to on the second switch to demonstrate the spanning tree algorithm. The crossover cable connected the original port to the port on the second switch.

COPY OUTPUT 6: Show results of the following command.
Switch#show spanning-tree
(output while on S2)

```
Switch>show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID     Priority    32769
              Address     0025.455e.8a00
              Cost        19
              Port        13 (FastEthernet0/11)
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32769  (priority 32768 sys-id-ext 1)
              Address     3cdf.1ed8.fa00
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  300 sec

Interface           Role Sts Cost      Prio.Nbr Type
------------------- ---- --- --------- -------- --------------------------------
Fa0/3               Desg FWD 19        128.5    P2p
Fa0/11              Root FWD 19        128.13   P2p
Fa0/12              Altn BLK 19        128.14   P2p


Switch>
```

COPY OUTPUT 7: Show results of the following command .
Switch#show mac address-table dynamic
(output while on S2)

```
Switch>show mac address-table dynamic
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
   1    0014.6af4.c592    DYNAMIC     Fa0/3
   1    0025.455e.8a0d    DYNAMIC     Fa0/11
   1    0050.56a0.0ea6    DYNAMIC     Fa0/11
   1    0050.56a0.3e9c    DYNAMIC     Fa0/11
   1    0050.56a0.4e3d    DYNAMIC     Fa0/3
Total Mac Addresses for this criterion: 5
Switch>
```

Lab report question #7: *What is different about the output of these commands, and why?*

The difference about the output of these commands are one is seen from switch's 1 perspective and the other from its perspective. This is because we are running the program from switch 1 and the second run was from switch 2.

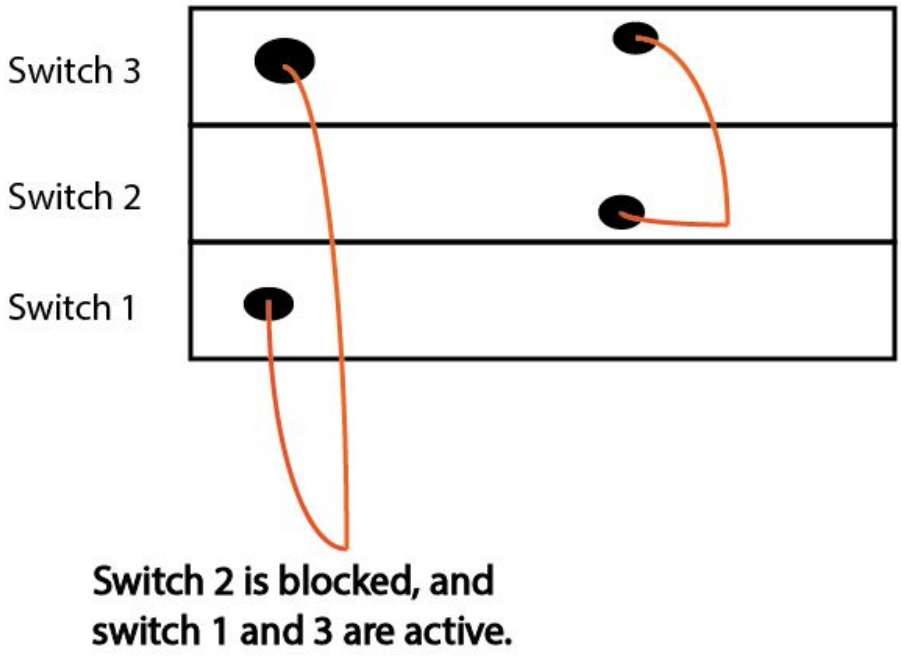
COPY OUTPUT 8: Show results of the following command.
Switch#show spanning-tree
(output while on S3)

```
Switch#show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID     Priority    32769
              Address     0017.5af7.7300
              This bridge is the root
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32769  (priority 32768 sys-id-ext 1)
              Address     0017.5af7.7300
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time 300

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa1/0/1          Desg FWD 19        128.3    P2p
Fa1/0/2          Desg FWD 19        128.4    P2p
```

Lab report question #8: *What are these commands showing? What is the root bridge (switch)? Which ports on each switch are active and blocked? (on paper and scan or use Microsoft Paint/Word, etc) DRAW THE STATE OF YOUR NETWORK, LABELING EACH SWITCH, INTERFACE, LINK AND STATE OF EACH INTERFACE (blocked or active).*

The previous command was showing how many VLAN's were connected. It also was showing us which interfaces were Forwarded or Blocked. After unplugging a crossover cable and typing the same command (*show spanning-tree*), the output showed us the new configuration. We don't have one of the VM plugged into a switch anymore so therefore it isn't being recognized.

The ports on switch 2 are blocked, because there is no crossover cable connecting from switch 1 to switch 2. The ports on switch 1 and 3 are active because the ethernet cables are plugged in on switch 1 with a crossover cable to 3, so the ports on switch 3 are active, but there is no direct connection to switch 2 from switch 1.



COPY OUTPUT 9: Show results of the following command:
Switch#show spanning-tree

```
Switch#show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID     Priority    24577
              Address     3cdf.1ed8.fa00
              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     3cdf.1ed8.fa00
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time  15  sec

Interface           Role Sts Cost      Prio.Nbr Type
------------------- ---- --- --------- -------- --------------------------------
Fa0/2               Desg FWD 19        128.4    P2p
Fa0/11              Desg FWD 19        128.13   P2p
Fa0/12              Desg FWD 19        128.14   P2p


Switch#
```

LAB REPORT QUESTION 9: *What happened to the STP state here? Why do we have to wait a few seconds before executing the show spanning-tree command?*

The state of our STP changed from being Blocked to actually Forwarded. We need to wait 10 seconds after removing one of the active links because we still want a link even though it was unplugged. In order for us to retrieve that link it must ping a local VLAN and connect. That takes about 10 seconds.

COPY OUTPUT 10: Show results of the following command:
Switch#show spanning-tree