

# An-Najah National University



**Networks-Lab**  
**Dr. Muhannad Al-Jabi**  
**Thursday 8:00am – 2:00pm**  
**Summer Semester**

Experiment Information		
Experiment Name: VLANs		Experiment Number: #5
Performed: 14 of July, 2021		Submitted: 24 of July, 2021
Partner Students		
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## **Introduction:**

A virtual LAN (VLAN) is a switched network that is logically split by function, project team, or application, regardless of the users' physical locations. A VLAN can be created on any switch port, and unicast, broadcast, and multicast packets are routed and flooded to stations in the VLAN. Each VLAN is treated as a logical network, and packets intended for stations outside the VLAN must be routed through a router or bridge.

## **Objectives:**

- ✓ Learn how to configure a switch layer2 Cisco router.
- ✓ Learn how to configure a switch layer3 Cisco router.
- ✓ Learn how to configure VLANs and Trunking.
- ✓ Learn how to connect two VLANs using Cisco devices.

## **Procedure:**

### ➤ **Network Connections:**

- ✓ Plug all devices above with electricity and turn them on.
- ✓ Connect one terminal of patch cord to PC1 and the other terminal with switch1 (port 1).
- ✓ Connect one terminal of patch cord to PC2 and the other terminal with switch1 (port 2).
- ✓ Connect one terminal of rollover cable with console line of a switch and the other terminal with PC1 (COM port or USB converter).

### ➤ **Using Cisco Switch:**

- Configure your PCs:
  - PC1 (IP: 192.168.0.101 /24)
  - PC2 (IP: 192.168.0.102 /24)
- Ping between PCs your PCs.

```
C:\Users\NetworksPC>ping 192.168.0.102

Pinging 192.168.0.102 with 32 bytes of data:
Reply from 192.168.0.102: bytes=32 time<1ms TTL=128
Reply from 192.168.0.102: bytes=32 time<1ms TTL=128
Reply from 192.168.0.102: bytes=32 time<1ms TTL=128
Reply from 192.168.0.102: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\NetworksPC>
```

- You must erase all VLANs else the default VLAN 1. To show VLANs list enter **sh vlan**.

VLAN	Name	Status
1	default	active
2	vlan2	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	Bridge
1	enet	100001	1500	-	-	-
2	enet	100002	1500	-	-	-
1002	fddi	101002	1500	-	-	-
1003	tr	101003	1500	-	-	-
1004	fdnet	101004	1500	-	-	-
1005	trnet	101005	1500	-	-	-

--More--

```
Switch(vlan)#no vlan 2
Deleting VLAN 2...
```

- Then restart switch and return to privilege mode.

```
Switch>en
Switch#reload
Proceed with reload? [confirm]
```

- Ping between PC1 and PC2:

```
C:\Users\NetworksPC>ping 192.168.0.102

Pinging 192.168.0.102 with 32 bytes of data:
Reply from 192.168.0.102: bytes=32 time=1ms TTL=128
Reply from 192.168.0.102: bytes=32 time<1ms TTL=128
Reply from 192.168.0.102: bytes=32 time<1ms TTL=128
Reply from 192.168.0.102: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

➤ Configure a second VLAN.

```
Switch(vlan)#vlan 2 name vlan2
VLAN 2 added:
  Name: vlan2
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#sh vlan brief
```

VLAN	Name	Status
1	default	active
2	vlan2	active
1002	fddi-default	act/unsup
1003	token-ring-default	act/unsup
1004	fddinet-default	act/unsup
1005	trnet-default	act/unsup

```
Switch#
```

Note That:

- **sh vlan brief**: Displays a brief table of the VLANs, including the port membership for each VLAN.
- **sh vlan brief name vlan2**: Displays a brief information of the specific vlan (vlan2).

➤ Assign ports f0/2 to vlan2.

```
Switch (config)# interface f0/2
Switch (config-if)#switchport mode access
Switch (config-if)#switchport access vlan 2
Switch (config-if)#exit
Switch #sh vlan brief
```

➤ Ping between PC1 and PC2.

```
C:\Users\NetworksPC>ping 192.168.0.102

Pinging 192.168.0.102 with 32 bytes of data:
Reply from 192.168.0.101: Destination host unreachable.
Reply from 192.168.0.101: Destination host unreachable.
Reply from 192.168.0.101: Destination host unreachable.
Reply from 192.168.0.101: Destination host unreachable.

Ping statistics for 192.168.0.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss).
```

- ❖ Note that the connection between the PCs is failed because they are in the different LANs.

➤ **Network Connections:**

- ✓ Plug all devices above with electricity and turn them on.
- ✓ Connect one terminal of patch cord to PC1 and the other terminal with switch1.
- ✓ Connect one terminal of patch cord to Fast Ethernet0/0 of Router (cisco 2610xm) and the other terminal with switch2 (3550) port 10.
- ✓ Reconnect one terminal of patch cord to PC2 and the other terminal with switch2 (port 2).

➤ **Using Cisco Switch 2950 and 3550:**

- Ping between PC1 and PC2.

```
C:\Users\NetworksPC>ping 192.168.0.102

Pinging 192.168.0.102 with 32 bytes of data:
Reply from 192.168.0.102: bytes=32 time=1ms TTL=128
Reply from 192.168.0.102: bytes=32 time=1ms TTL=128
Reply from 192.168.0.102: bytes=32 time<1ms TTL=128
Reply from 192.168.0.102: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.0.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- Configure a second VLAN in switch 3550.

```
Switch #vlan database
Switch (vlan) vlan 2 name vlan2
Switch (vlan)#Exit
Switch #sh vlan brief
```

- Assign ports 2 to vlan2.

```
Switch (config)# interface f0/2
Switch (config-if)#switchport mode access

Switch (config-if)#switchport access vlan 2
Switch (config-if)#exit
```

- Ping between PC1 and PC2.

```
C:\Users\NetworksPC>ping 192.168.0.102

Pinging 192.168.0.102 with 32 bytes of data:
Reply from 192.168.0.101: Destination host unreachable.
Reply from 192.168.0.101: Destination host unreachable.
Reply from 192.168.0.101: Destination host unreachable.
Request timed out.

Ping statistics for 192.168.0.102:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
```

- Because PC1 was connected to Fa0/3 from the first switch, which is on the default VLAN, and PC2 was connected to Fa0/2 from switch2, which is assigned to vlan2, we lose the connection between the two PCs. The two PCs are on separate LANs and are unable to communicate with one another.
- We'll need to connect the switches with a trunk. Each VLAN on the first switch has access to the second switch's equivalent VLAN.
- On the switch (3550), configure the trunk on FastEthernet port 20 as a trunk port. Connect a crossed cable from this port to the other switch (2950) port 20.

```
Switch # config t
Switch (config)#Interface f0/20

Switch (config_if)#Switchport trunk encap dot1q
Switch (config_if)#Switchport mode trunk
Switch (config_if)#exit
```

```
Switch (config_if)#Switchport trunk allowed vlan all
Switch (config_if)#Switchport mode trunk
```

- Ping between PC1 and PC2.

```
C:\Users\NetworksPC>ping 192.168.0.101

Pinging 192.168.0.101 with 32 bytes of data:
Reply from 192.168.0.101: bytes=32 time=1ms TTL=128
Reply from 192.168.0.101: bytes=32 time=1ms TTL=128
Reply from 192.168.0.101: bytes=32 time=1ms TTL=128
Reply from 192.168.0.101: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.0.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\NetworksPC>
```

- **Conclusion.**

On the same switch, we learnt how to create VLANs. We also learnt what Trunking is and how to utilize it to connect VLANs across switches.