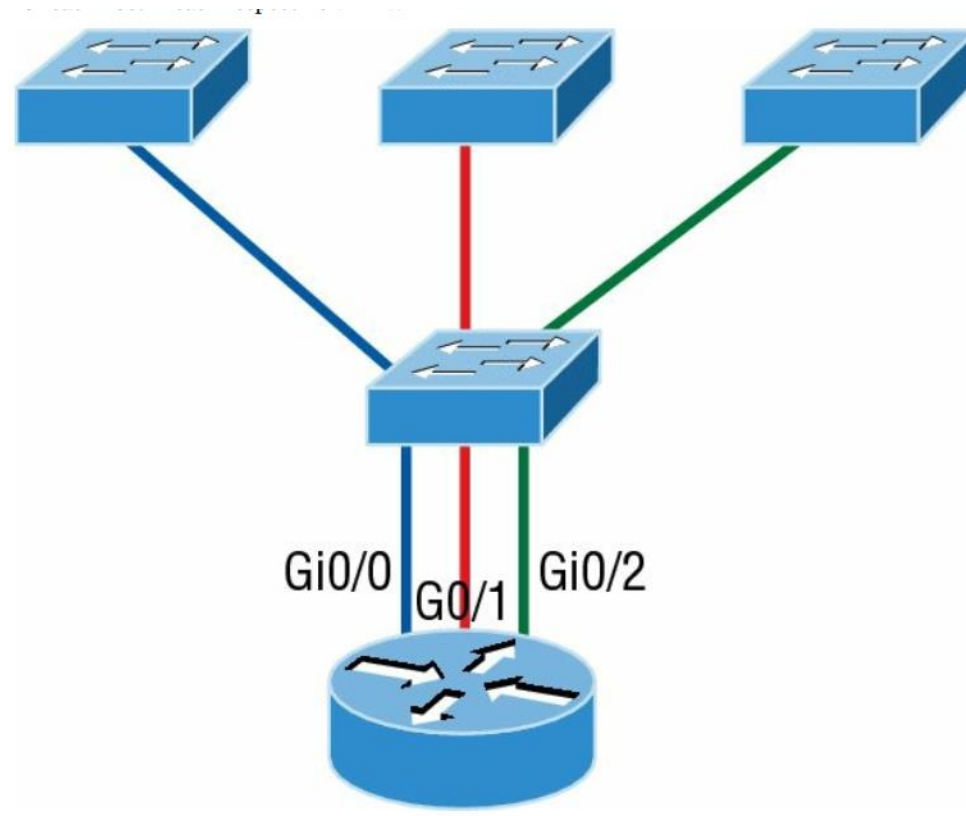


# Inter-VLAN routing

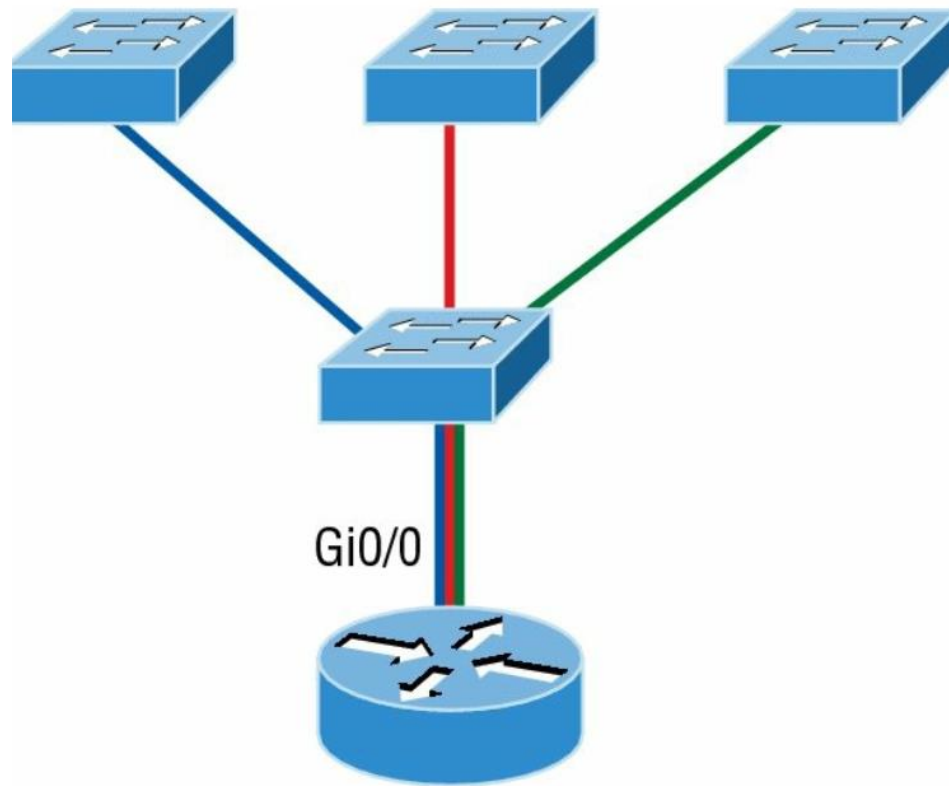
# Inter VLAN Routing(IVR)

- ▶ Inter vlan routing can be done using three methods
  1. Use a router that has an interface for each VLAN
  2. Using Router on stick
  3. Using switched virtual interface (SVI)

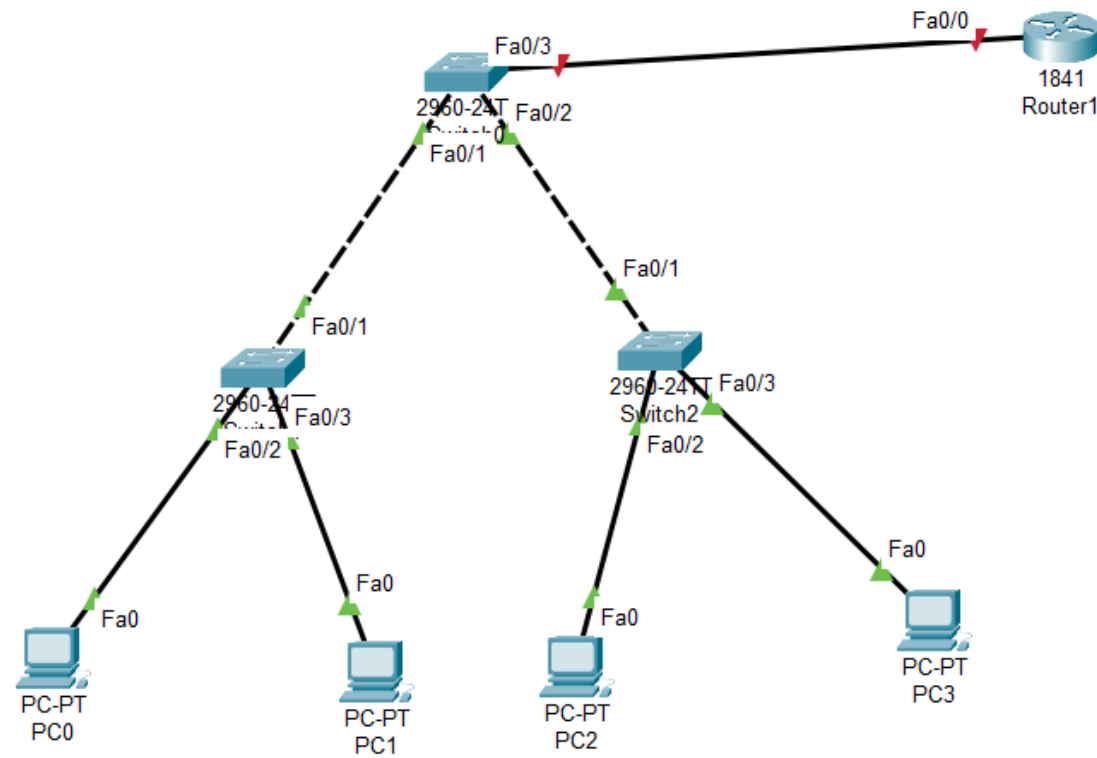
# IVR Using a router that has an interface for each VLAN



# IVR Using Router on stick

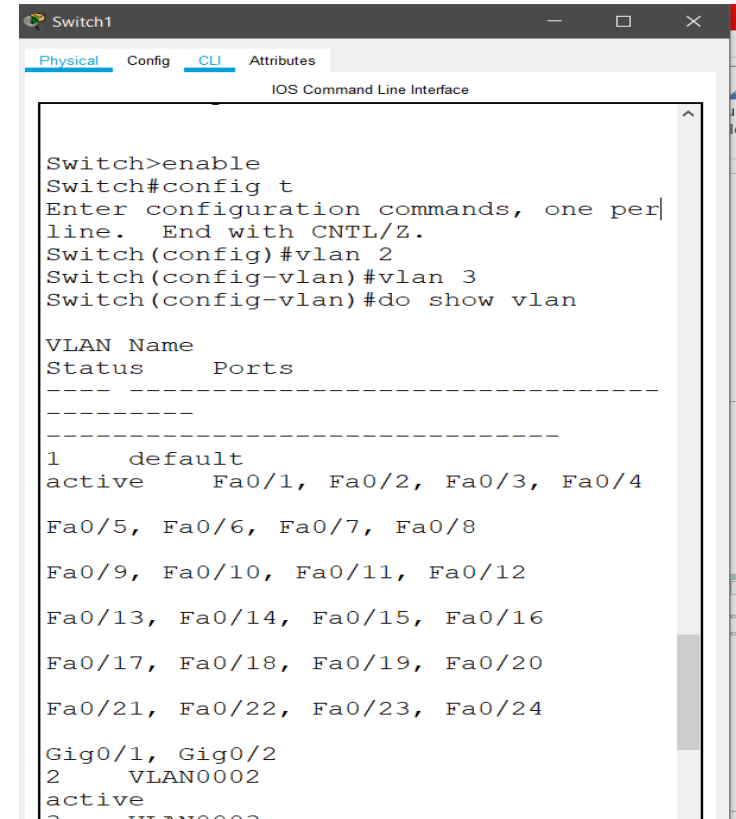


# Implement network



# Create Valns for switch 1

- ▶ Switch>enable
- ▶ Switch#config t
- ▶ Enter configuration commands, one per line. End with CNTL/Z.
- ▶ Switch(config)#vlan 2
- ▶ Switch(config-vlan)#vlan 3
- ▶ Switch(config-vlan)#do show vlan



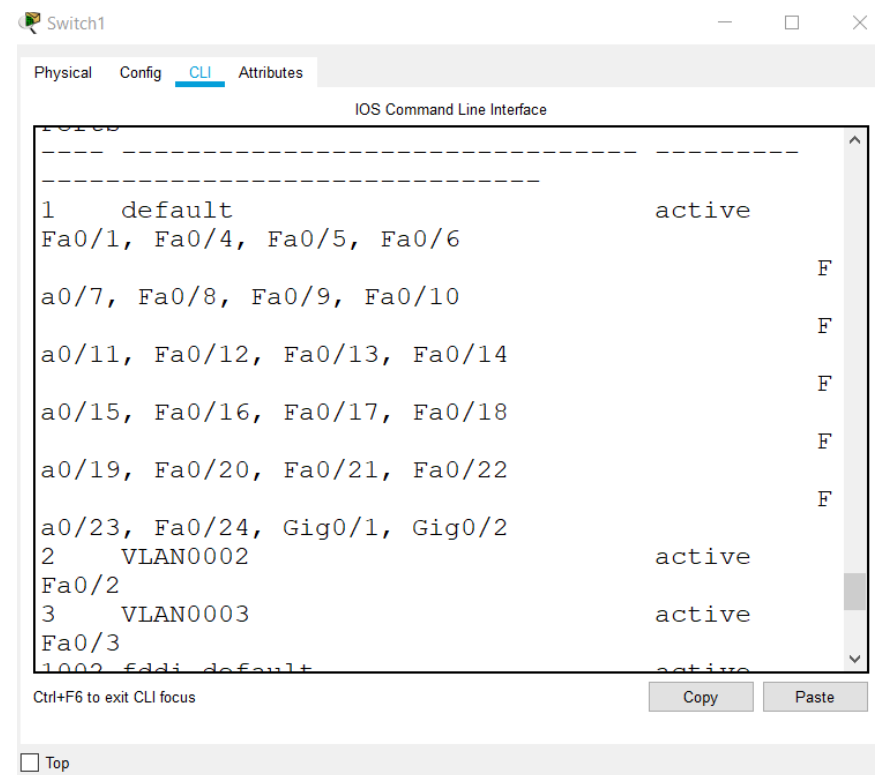
```
Switch1
Physical Config CLI Attributes
IOS Command Line Interface

Switch>enable
Switch#config t
Enter configuration commands, one per
line. End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#vlan 3
Switch(config-vlan)#do 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
Gig0/1, Gig0/2
2          VLAN0002
active
```

# Assign switch ports to the VLANs for switch 1

- ▶ Switch(config)#interface f0/2
- ▶ Switch(config-if)#switchport mode access
- ▶ Switch(config-if)#switchport access vlan 2
- ▶ Switch(config-if)#exit
- ▶ Switch(config)#interface f0/3
- ▶ Switch(config-if)#switchport access vlan 3
- ▶ Switch(config-if)#do show vlan

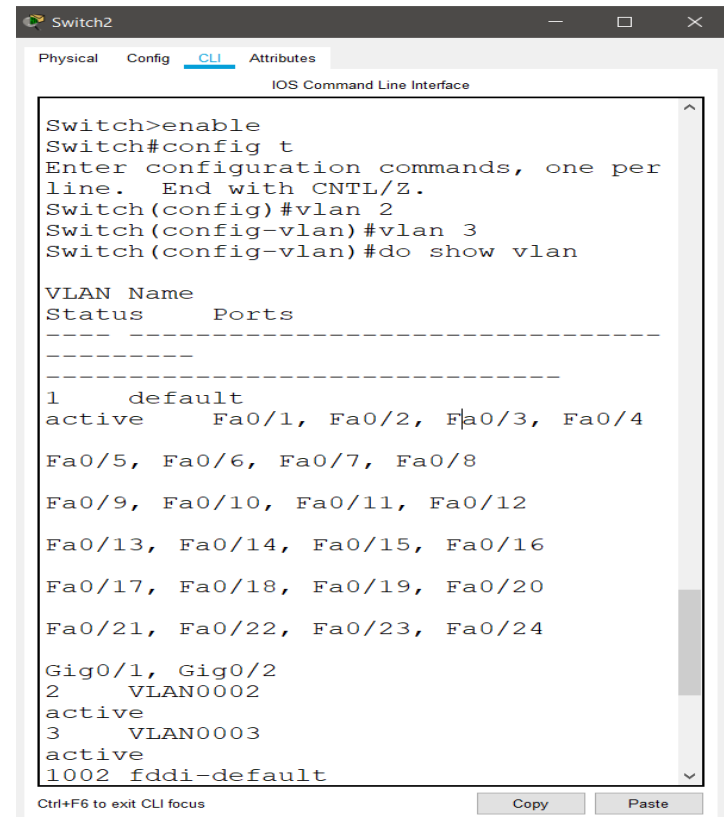


The screenshot shows a network switch's CLI interface with the following configuration:

```
Switch1
Physical Config CLI Attributes
IOS Command Line Interface
-----
1 default active
Fa0/1, Fa0/4, Fa0/5, Fa0/6
a0/7, Fa0/8, Fa0/9, Fa0/10
a0/11, Fa0/12, Fa0/13, Fa0/14
a0/15, Fa0/16, Fa0/17, Fa0/18
a0/19, Fa0/20, Fa0/21, Fa0/22
a0/23, Fa0/24, Gig0/1, Gig0/2
2 VLAN0002 active
Fa0/2
3 VLAN0003 active
Fa0/3
1002 fddi default active
Ctrl+F6 to exit CLI focus
Copy Paste
Top
```

# Create Vlns for switch 2

- ▶ Switch>enable
- ▶ Switch#config t
- ▶ Enter configuration commands, one per line. End with CNTL/Z.
- ▶ Switch(config)#vlan 2
- ▶ Switch(config-vlan)#vlan 3
- ▶ Switch(config-vlan)#do show vlan



The screenshot shows a network switch interface with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the following commands and output:

```
Switch>enable
Switch#config t
Enter configuration commands, one per
line. End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#vlan 3
Switch(config-vlan)#do show vlan
```

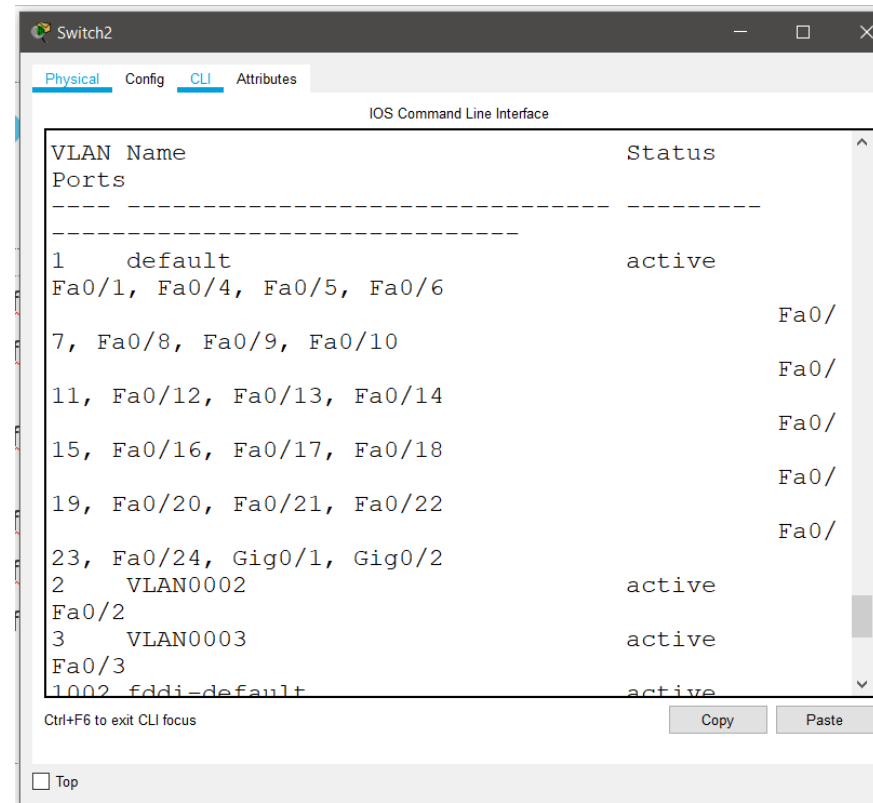
VLAN	Name	Status	Ports
1	default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4 Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9, Fa0/10, Fa0/11, Fa0/12 Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18, Fa0/19, Fa0/20 Fa0/21, Fa0/22, Fa0/23, Fa0/24 Gig0/1, Gig0/2
2	VLAN0002	active	
3	VLAN0003	active	
1002	fddi-default		

At the bottom of the CLI window, there is a status bar with the text "Ctrl+F6 to exit CLI focus" and buttons for "Copy" and "Paste".



# Assign switch ports to the VLANs for switch 2

- ▶ Switch(config)#int f0/2
- ▶ Switch(config-if)#switchport mode access
- ▶ Switch(config-if)#switchport access vlan 2
- ▶ Switch(config-if)#exit
- ▶ Switch(config)#interface f0/3
- ▶ Switch(config-if)#switchport access vlan 3



The screenshot shows a network switch's CLI interface with the following table of VLAN configurations:

VLAN	Name	Status
1	default	active
2	VLAN0002	active
3	VLAN0003	active
1002	fddi-default	active

Below the table, the assigned ports for each VLAN are listed:

- VLAN 1: Fa0/1, Fa0/4, Fa0/5, Fa0/6, 7, Fa0/8, Fa0/9, Fa0/10, 11, Fa0/12, Fa0/13, Fa0/14, 15, Fa0/16, Fa0/17, Fa0/18, 19, Fa0/20, Fa0/21, Fa0/22, 23, Fa0/24, Gig0/1, Gig0/2
- VLAN 2: Fa0/2
- VLAN 3: Fa0/3

The interface also shows a 'Top' button and a 'Copy' button.

# Creat vlan3 for switch 3 and change port mode

- ▶ Switch#configure t
- ▶ Switch(config)#vlan 2
- ▶ Switch(config-vlan)#vlan 3
- ▶ Switch(config-vlan)#exit
- ▶ Switch(config)#interface range f0/1-2
- ▶ Switch(config-if-range)#no shutdown
- ▶ Switch(config-if-range)#switchport mode trunk

# Inter VLAN configuration

- ▶ Change the switch3 interface that connected to router to be trunk
  - ▶ interface range f0/3
  - ▶ Switch(config-if-range)#**switchport mode trunk**

# Configure the router

1. Open the port of router that connected to switch
2. Generate sub interface for each VLAN
3. set the interface to trunk with the **encapsulation** command
4. Give the sub interface IP address and this address would then become the default gateway address for each host in each respective VLAN.
5. Assign static IP addresses to PCs

# Configure the router







- ▶ **Open the port of router that connected to switch**
  - ▶ `n(config)#int f0/0`
  - ▶ `n(config-if)#no shutdown`
- ▶ **Generate sub interface**
- ▶ `n(config-if)#int f0/0.2`
- ▶ `n(config-subif)#encapsulation dot1Q 10`

- ▶ `n(config-if)#int f0/0.2`
- ▶ `n(config-subif)#encapsulation dot1Q 10`
- ▶ `n(config-subif)#ip add 192.168.1.1 255.255.255.0`
- ▶ `n(config-subif)#int f0/0.3`
- ▶ `n(config-subif)#encapsulation dot1Q 20`
- ▶ `n(config-subif)#ip add 192.168.2.1 255.255.255.0`

# Assign static IP addresses to the four PCs

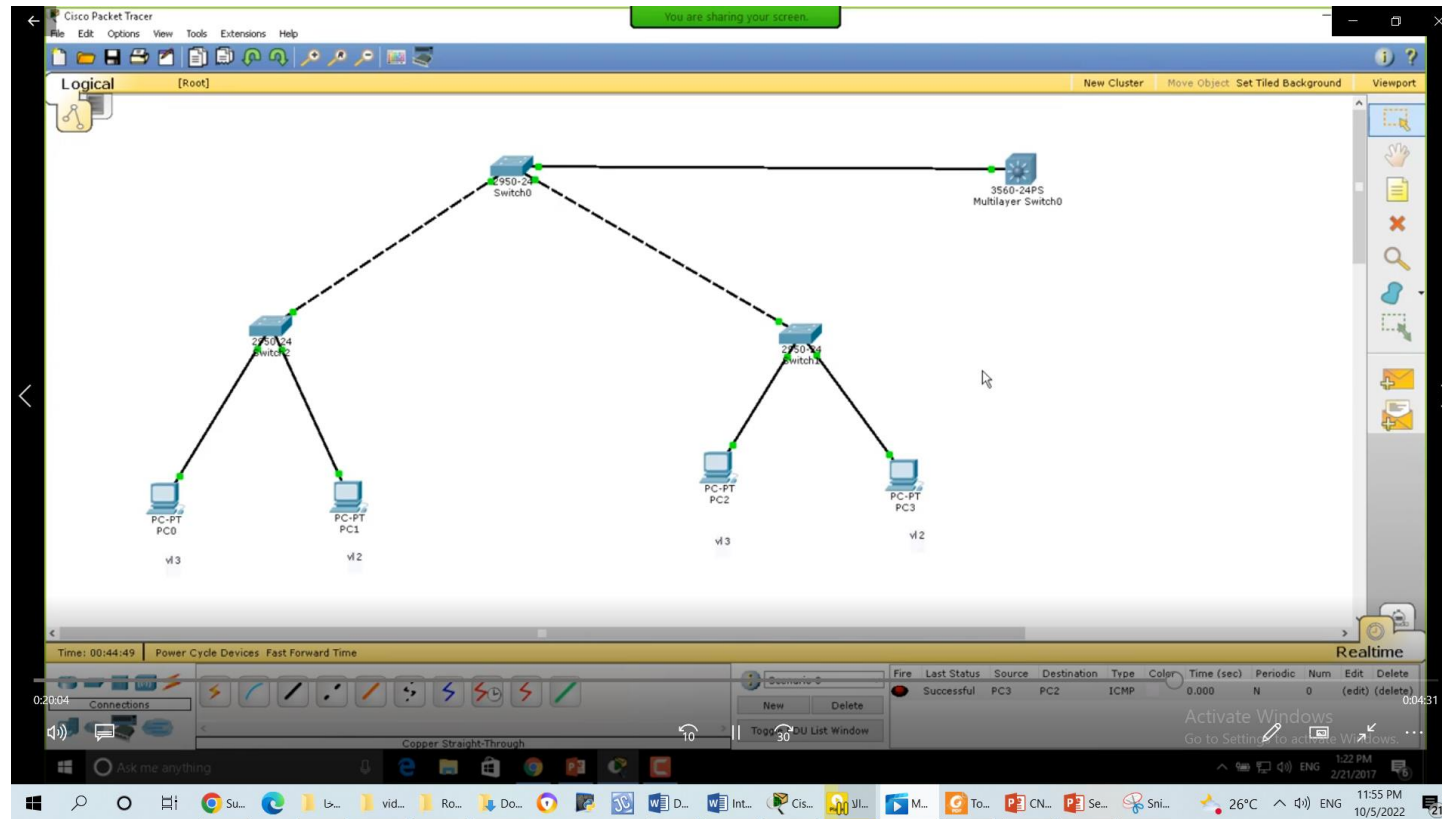
- ▶ **PC0** IP address 192.168.1.10 Subnet mask 255.255.255.0 , 192.168.1.1
- ▶ **PC1:** IP address 192.168.2.10 Subnet mask 255.255.255.0 , 192.168.2.1
- ▶ **PC2:** IP address 192.168.1.20 Subnet mask 255.255.255.0 , 192.168.1.1
- ▶ **PC3:** IP address 192.168.2.20 Subnet mask 255.255.255.0 , 192.168.2.1

# Test connection

<div><div>🕒 Realtime</div><div>🔧 Simulation</div></div>										
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC2	PC3	ICMP		0.000	N	0	(edit)	(delete)
	Successful	PC0	PC1	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC1	PC2	ICMP		0.000	N	2	(edit)	(delete)
-	...	---	---	-----		----	..	-	....	.....



# Inter VLAN Routing using Switch virtual interface



# Configure multi layer switch

## 1. Create vlan10,20

- ▶ Switch(config)#vlan 10
- ▶ Switch(config-vlan)#vlan 20







## 2. Create Interface and assign IP address

- ▶ Switch(config-vlan)#int vlan 10
- ▶ Switch(config-if)#ip add 192.168.1.1 255.255.255.0
- ▶ Switch(config-if)#int vlan 20
- ▶ Switch(config-if)#ip add 192.168.2.1 255.255.255.0

## 3. Activate routing service on MLS

- ▶ Switch(config)#ip routing

# Test connection

Realtime										
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC1	ICMP		0.000	N	0	(edit)	(delete)
	Successful	PC1	PC2	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC2	PC3	ICMP		0.000	N	2	(edit)	(delete)

# **Thank You For Attention**