



**Date: 04 / 07 /2025**

**Lab Practical #05:**

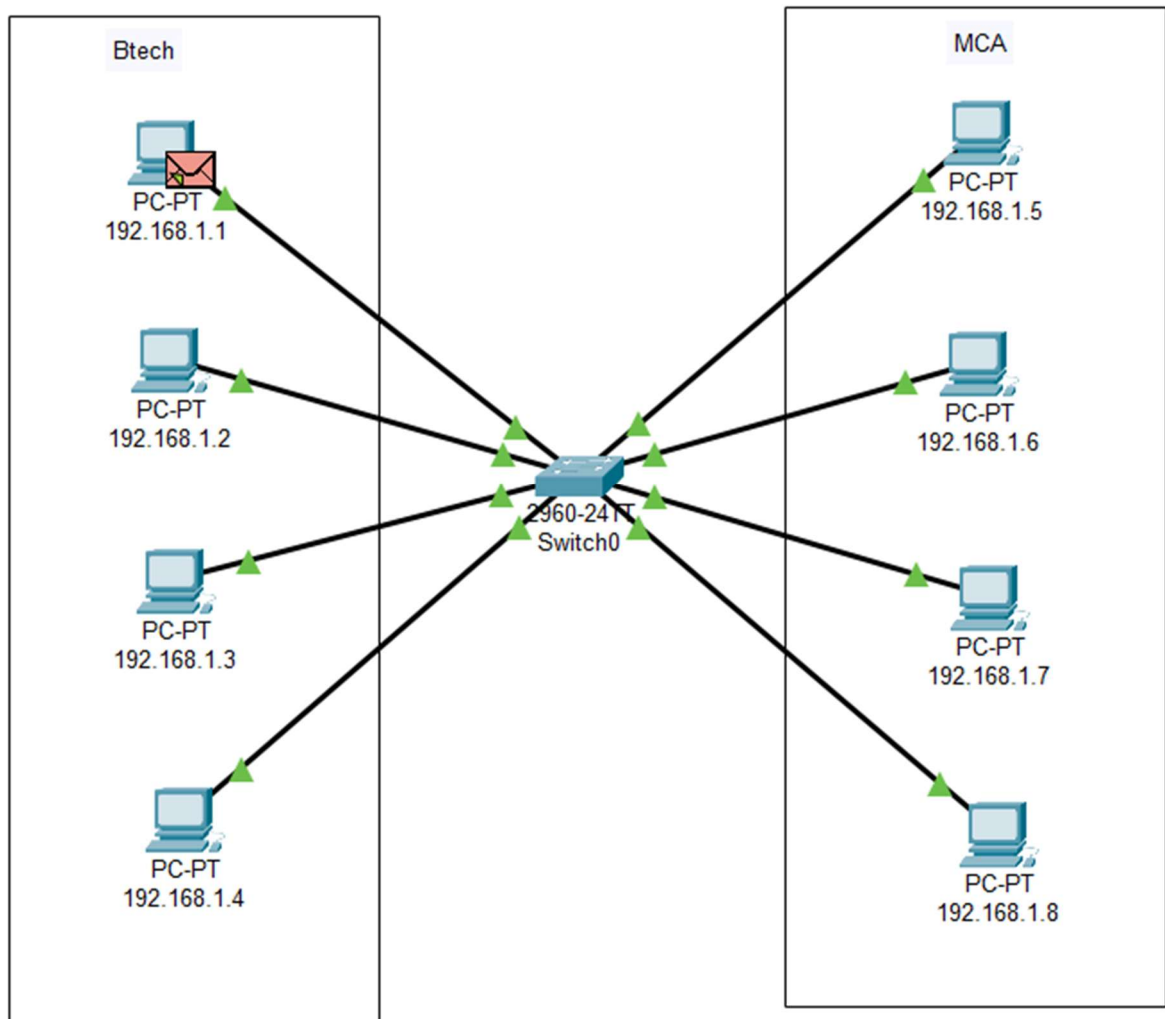
Study the concept of VLAN using packet tracer.

**Practical Assignment #05:**

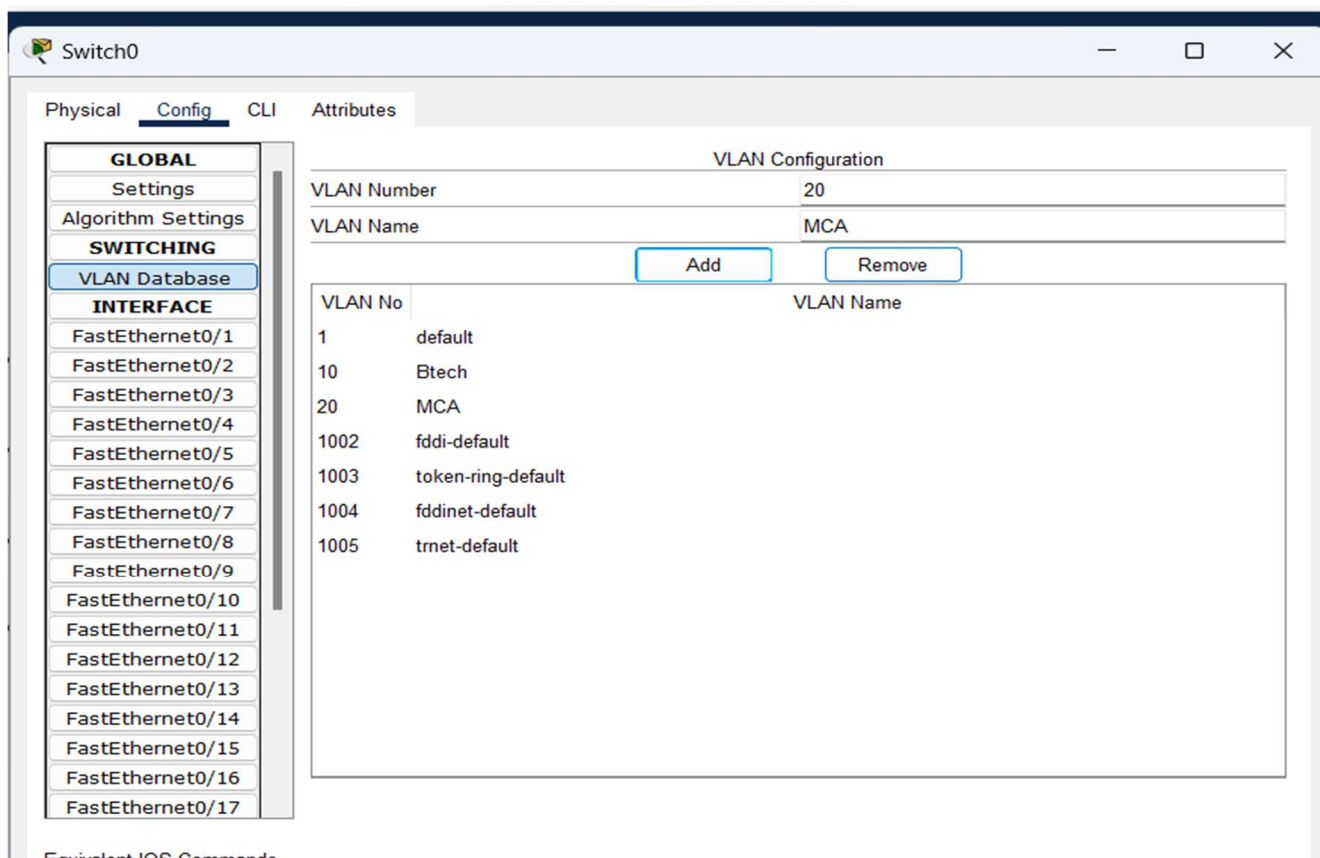
- 1. Implement the different network structures in VLAN and VLAN trunking. Also check connectivity between them using ping command or PDU utility.**

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## 1. VLAN\_1:



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Switch0

Physical **Config** CLI Attributes

**GLOBAL**

- Settings
- Algorithm Settings
- SWITCHING**
- VLAN Database**
- INTERFACE**
- FastEthernet0/1
- FastEthernet0/2
- FastEthernet0/3
- FastEthernet0/4
- FastEthernet0/5
- FastEthernet0/6
- FastEthernet0/7
- FastEthernet0/8
- FastEthernet0/9
- FastEthernet0/10
- FastEthernet0/11
- FastEthernet0/12
- FastEthernet0/13
- FastEthernet0/14
- FastEthernet0/15
- FastEthernet0/16
- FastEthernet0/17

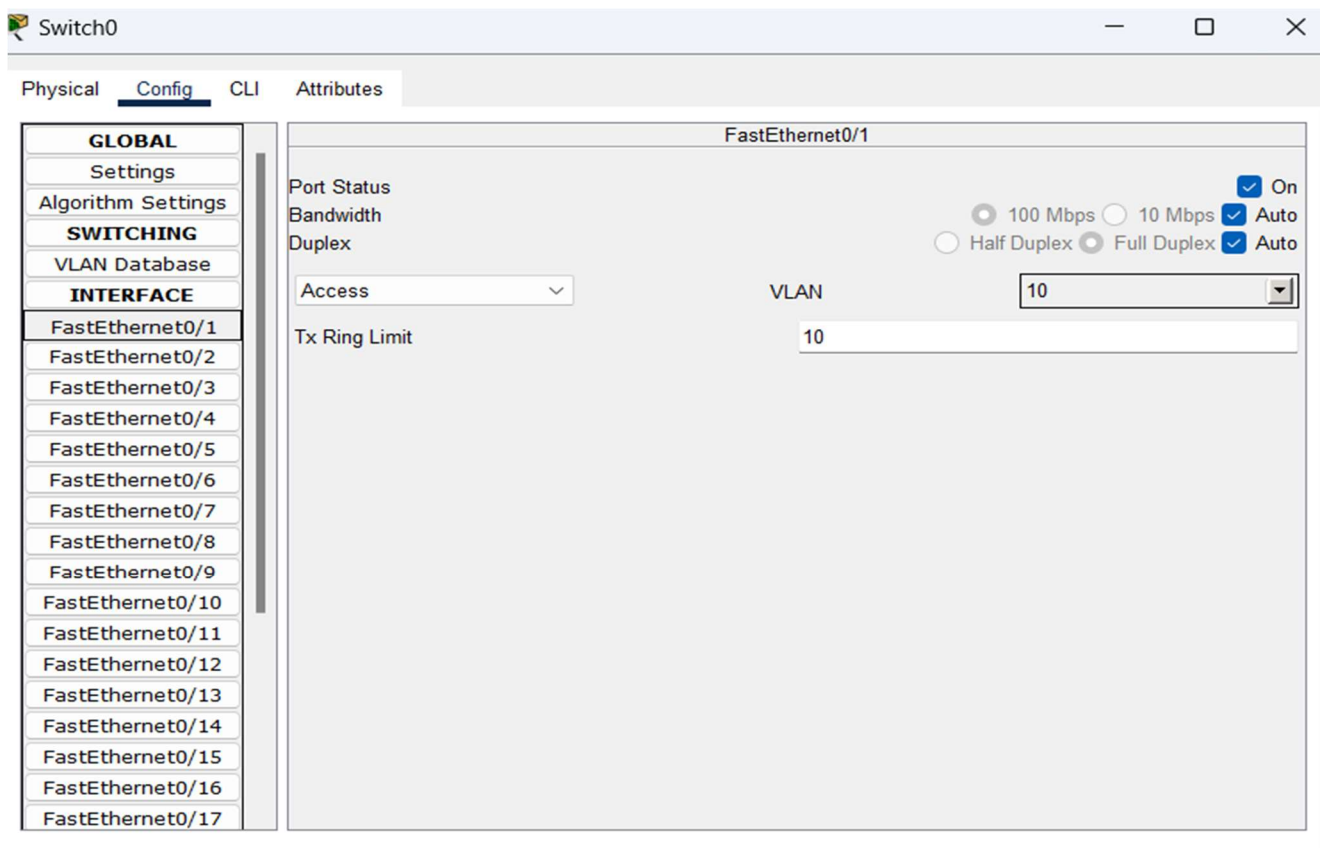
**VLAN Configuration**

VLAN Number: 20

VLAN Name: MCA

VLAN No	VLAN Name
1	default
10	Btech
20	MCA
1002	fddi-default
1003	token-ring-default
1004	fddinet-default
1005	trnet-default

Equivalent IOS Commands



Switch0

Physical **Config** CLI Attributes

**GLOBAL**

- Settings
- Algorithm Settings
- SWITCHING**
- VLAN Database
- INTERFACE**
- FastEthernet0/1
- FastEthernet0/2
- FastEthernet0/3
- FastEthernet0/4
- FastEthernet0/5
- FastEthernet0/6
- FastEthernet0/7
- FastEthernet0/8
- FastEthernet0/9
- FastEthernet0/10
- FastEthernet0/11
- FastEthernet0/12
- FastEthernet0/13
- FastEthernet0/14
- FastEthernet0/15
- FastEthernet0/16
- FastEthernet0/17

**FastEthernet0/1**

Port Status: ☒ On

Bandwidth: ☒ 100 Mbps ☐ 10 Mbps

Duplex: ☐ Half Duplex ☒ Full Duplex

VLAN: 10

Tx Ring Limit: 10

Equivalent IOS Commands

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## 1.1 Steps to Create in Packet Tracer

### 1. Add Devices in Workspace

- Drag one **2960-24TT switch** into workspace.
- Add 8 PCs → split into two groups:
  - **BTECH Group (Left side)** → PC0, PC1, PC2, PC3.
  - **MCA Group (Right side)** → PC4, PC5, PC6, PC7.
- Connect each PC to the switch using **Straight-Through cables**.

### 2. Assign IP Addresses to PCs

On each PC → Desktop → IP Configuration:

- BTECH VLAN(VLAN 10)
  - PC0 → 192.168.1.2 / 255.255.255.0
  - PC1 → 192.168.1.3 / 255.255.255.0
  - PC2 → 192.168.1.4 / 255.255.255.0
  - PC3 → 192.168.1.5 / 255.255.255.0
- MCA VLAN (VLAN 20)
  - PC4 → 192.168.1.6 / 255.255.255.0
  - PC5 → 192.168.1.7 / 255.255.255.0
  - PC6 → 192.168.1.8 / 255.255.255.0
  - PC7 → 192.168.1.9 / 255.255.255.0

Add labels to each PC to display its **IP Address**.

### 3. Create VLANs on Switch

Click on the switch → **Config tab** → **VLAN Database**:

- VLAN 10 → Name: **BTECH** → Add.
- VLAN 20 → Name: **MCA** → Add.

### 4. Assign Switch Ports to VLANs

Go to **Switch** → **Config tab** → **Interfaces**.

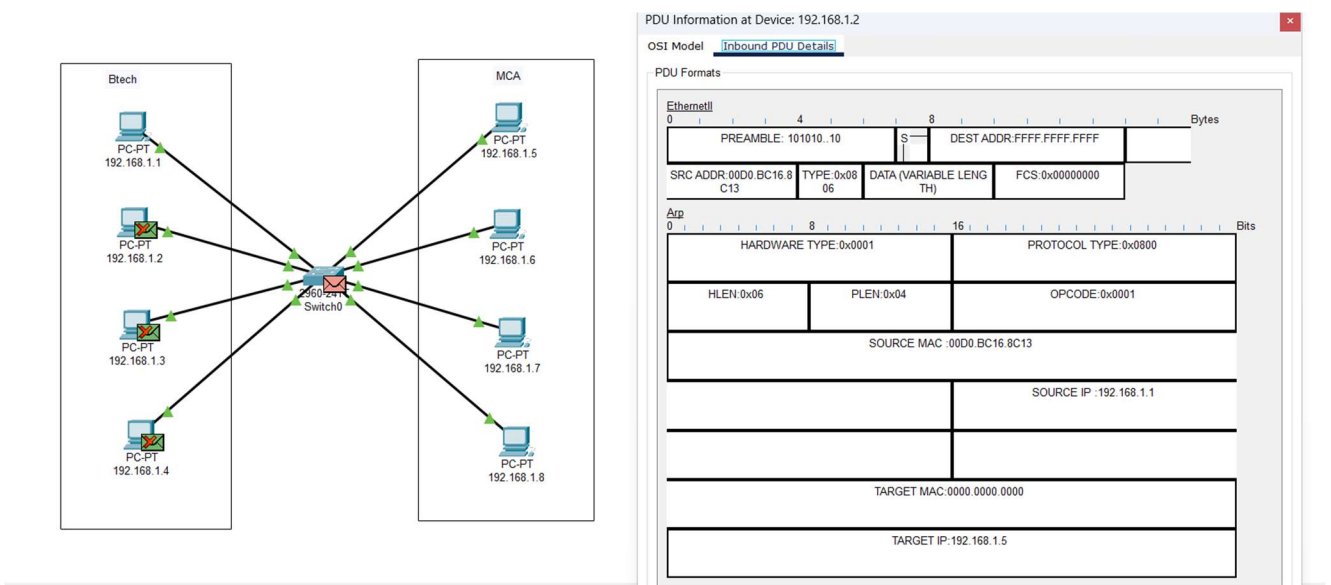
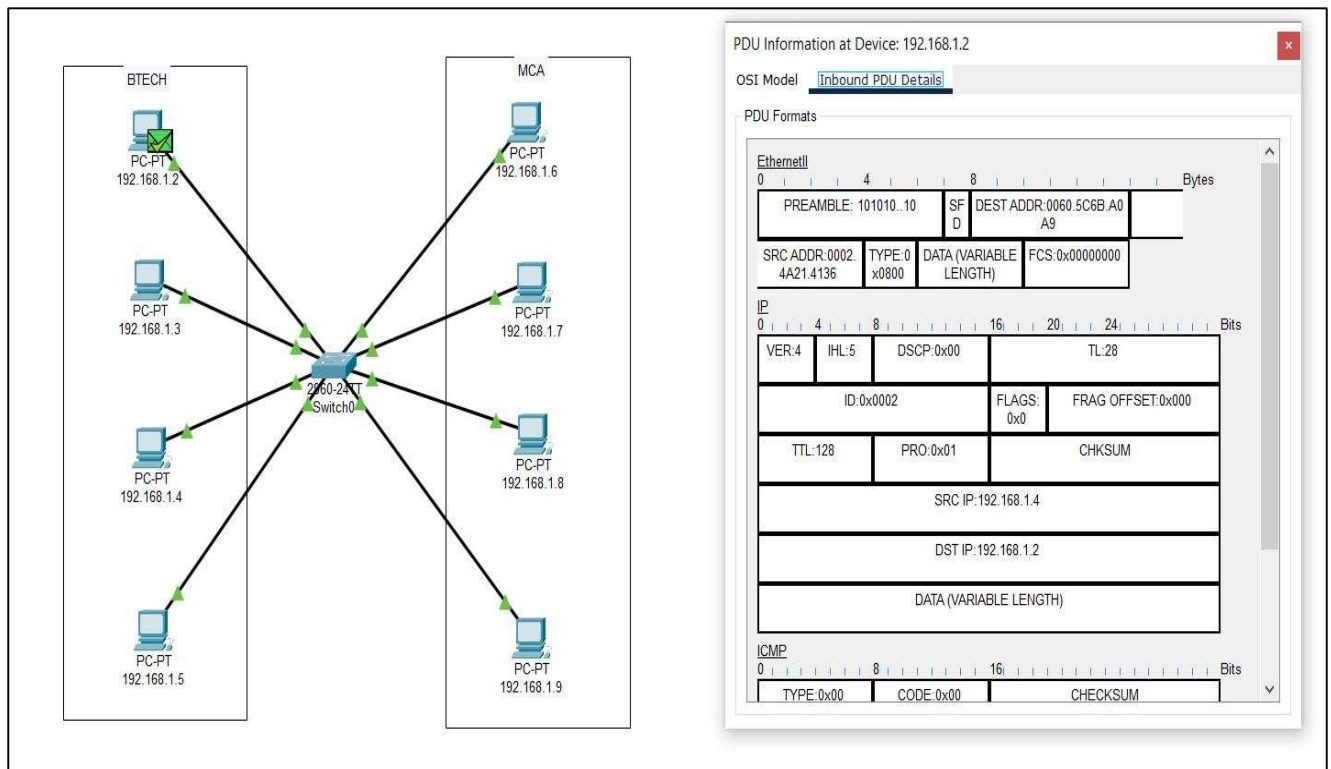
- Assign **FastEthernet 0/1 – 0/4** → VLAN 10 (BTECH).
- Assign **FastEthernet 0/5 – 0/8** → VLAN 20 (MCA).

This ensures each group of PCs belongs to its own VLAN.

### 5. Test VLAN Connectivity

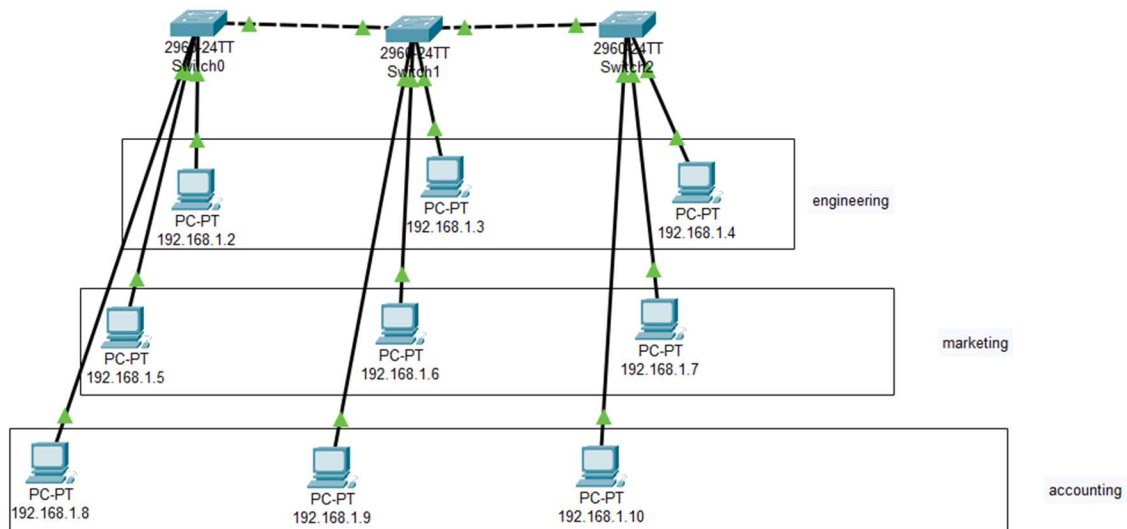
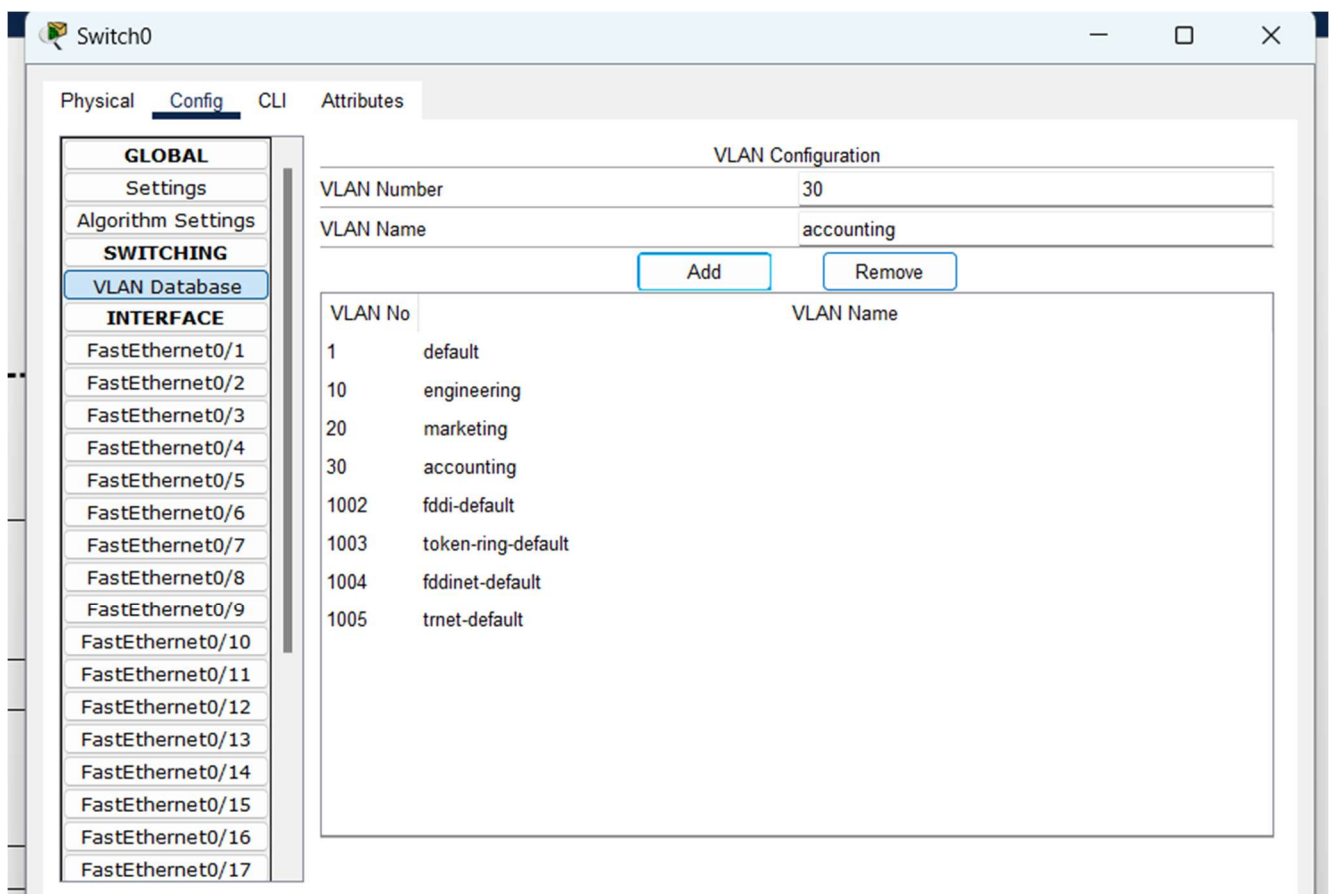
- Open **Command Prompt** on a PC.
- Ping another PC in the **same VLAN** → should be successful.
- Ping a PC in a **different VLAN** → will fail (unless VLAN trunking or router is configured).

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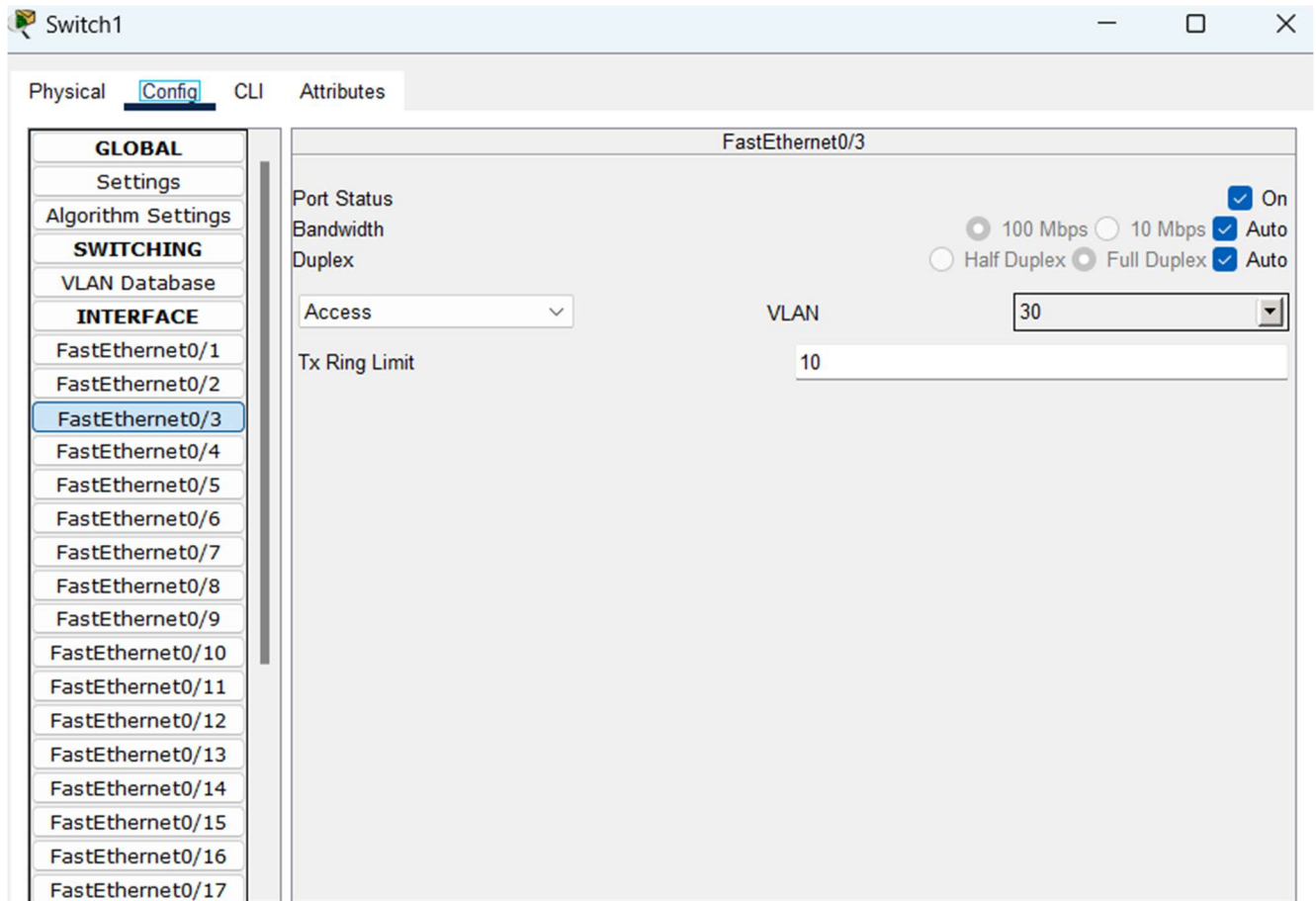
## 2. VLAN\_2:

The screenshot shows the configuration window for Switch0, specifically the VLAN Configuration section. The VLAN Database is displayed, showing the following VLANs:

VLAN No	VLAN Name
1	default
10	engineering
20	marketing
30	accounting
1002	fddi-default
1003	token-ring-default
1004	fddinet-default
1005	trnet-default

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## 2.1 Steps To Create VLAN

### 1. Add Devices in Workspace

- Drag and drop **3 switches (2960-24TT)** into workspace.
- Add 9 PCs and arrange them into 3 groups:
  - Engineering (3 PCs)
  - Marketing (3 PCs)
  - Accounting (3 PCs)
- Connect PCs to switches using **Straight-Through cables**.
- Connect switches together with **crossover cables**.

### 2. Assign IP Addresses to PCs

Configure each PC → Desktop → IP Configuration:

- Engineering VLAN (VLAN 10)
  - PC0 → 192.168.1.2 / 255.255.255.0
  - PC3 → 192.168.1.5 / 255.255.255.0
  - PC6 → 192.168.1.8 / 255.255.255.0

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- Marketing VLAN (VLAN 20)
  - PC1 → 192.168.1.3 / 255.255.255.0
  - PC4 → 192.168.1.6 / 255.255.255.0
  - PC7 → 192.168.1.9 / 255.255.255.0
- Accounting VLAN (VLAN 30)
  - PC2 → 192.168.1.4 / 255.255.255.0
  - PC5 → 192.168.1.7 / 255.255.255.0
  - PC8 → 192.168.1.10 / 255.255.255.0

Add labels to each PC to display its **IP Address**.

### 3. Create VLANs on Each Switch

Click on each switch → **Config tab** → **VLAN Database**:

- VLAN 10 → Name: **Engineering** → Add.
- VLAN 20 → Name: **Marketing** → Add.
- VLAN 30 → Name: **Accounting** → Add.

Do this on **Switch0**, **Switch1**, and **Switch2**

### 4. Assign Ports to VLANs

For each switch → Config tab → select **Interface (FastEthernet)** → assign VLAN.

Example for **Switch0**:

- Port F0/1 → VLAN 10 (PC 192.168.1.2 – Engineering)
- Port F0/2 → VLAN 20 (PC 192.168.1.3 – Marketing)
- Port F0/3 → VLAN 30 (PC 192.168.1.4 – Accounting)

Similarly configure **Switch1** and **Switch2**.

### 5. Configure Trunk Links Between Switches

For switch-to-switch connections:

- Select interface where switches are connected
- Set **Mode** → **Trunk**.
- This allows VLAN 10, 20, and 30 traffic to pass across switches.

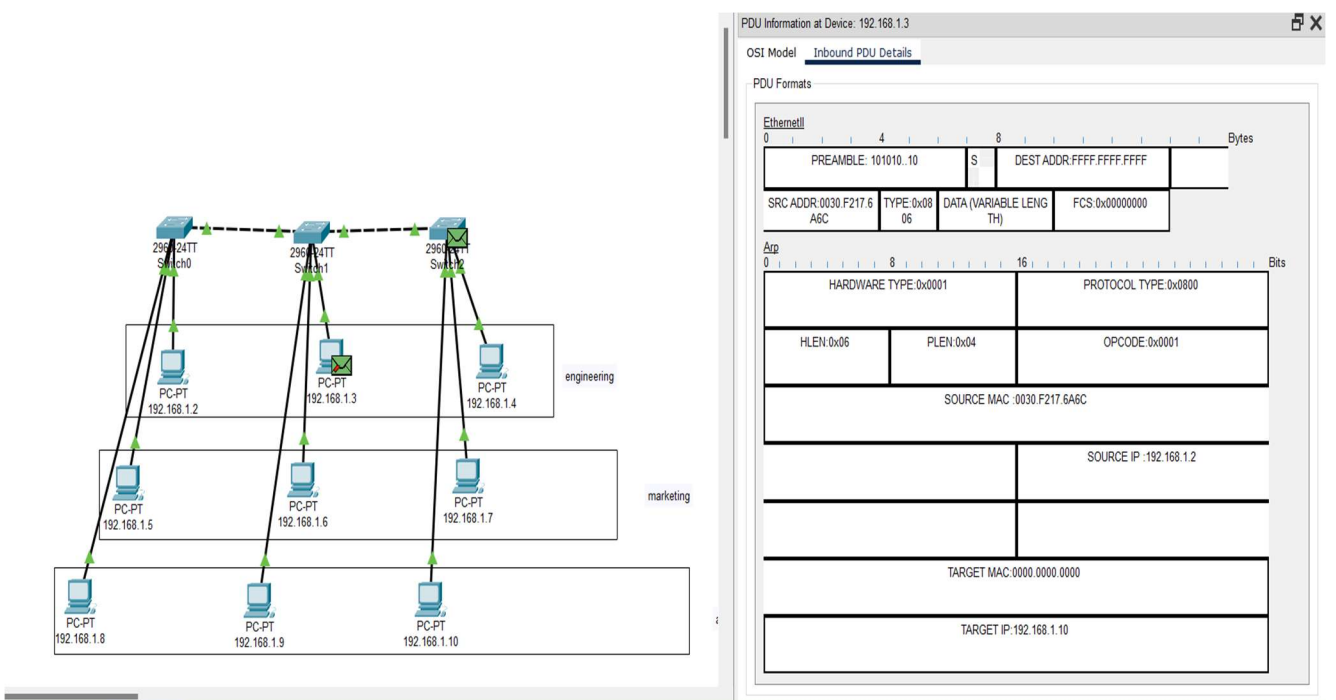
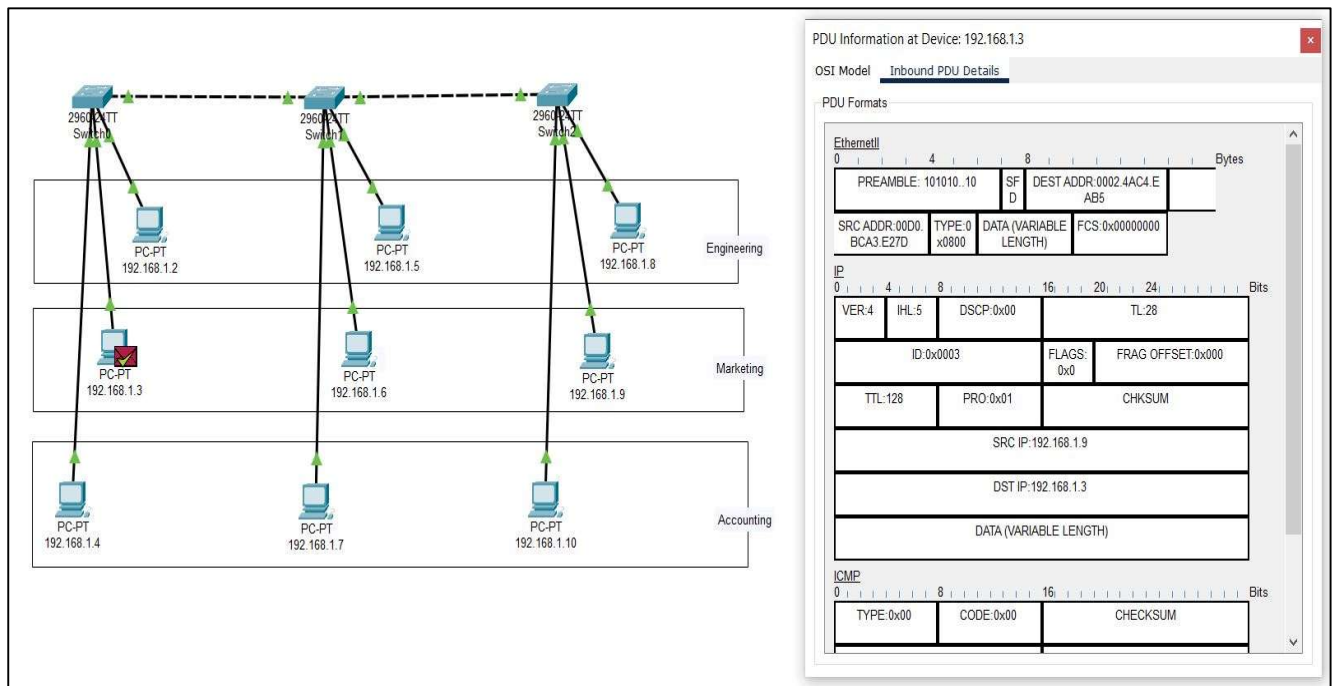
Repeat for all inter-switch connections.

### 6. Test VLAN Connectivity

- Open **Command Prompt** on a PC.
- Ping another PC in the **same VLAN** → should be successful.
- Ping a PC in a **different VLAN** → will fail.

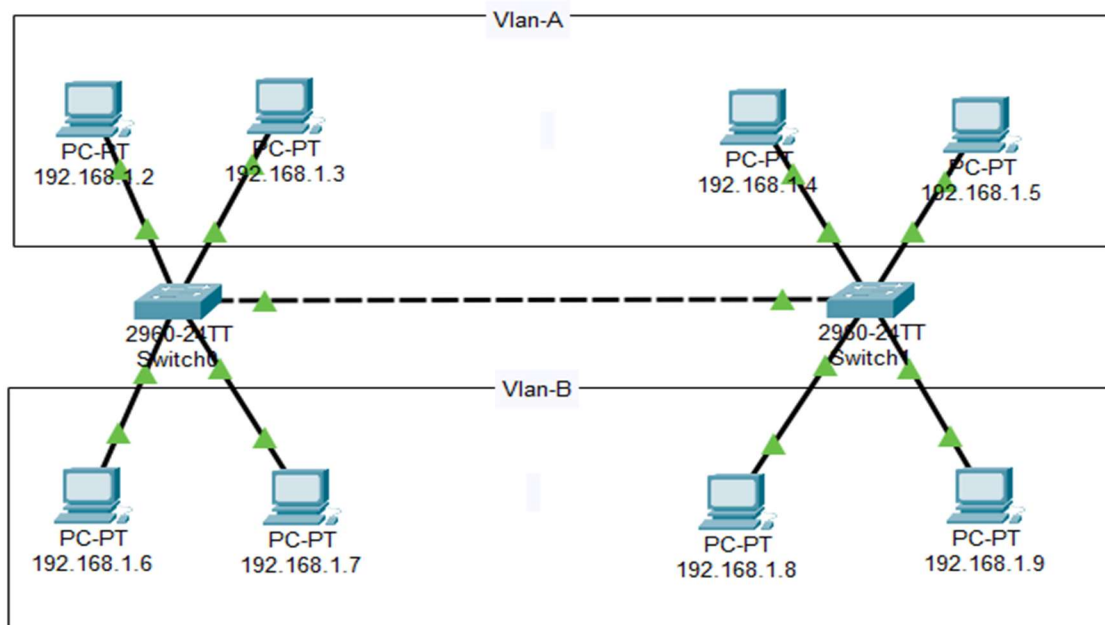


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### 3. VLAN\_3:



Switch0

Physical Config CLI Attributes

**GLOBAL**

Settings

Algorithm Settings

**SWITCHING**

VLAN Database

**INTERFACE**

FastEthernet0/1

FastEthernet0/2

FastEthernet0/3

FastEthernet0/4

FastEthernet0/5

FastEthernet0/6

FastEthernet0/7

FastEthernet0/8

FastEthernet0/9

FastEthernet0/10

FastEthernet0/11

FastEthernet0/12

FastEthernet0/13

FastEthernet0/14

FastEthernet0/15

FastEthernet0/16

FastEthernet0/17

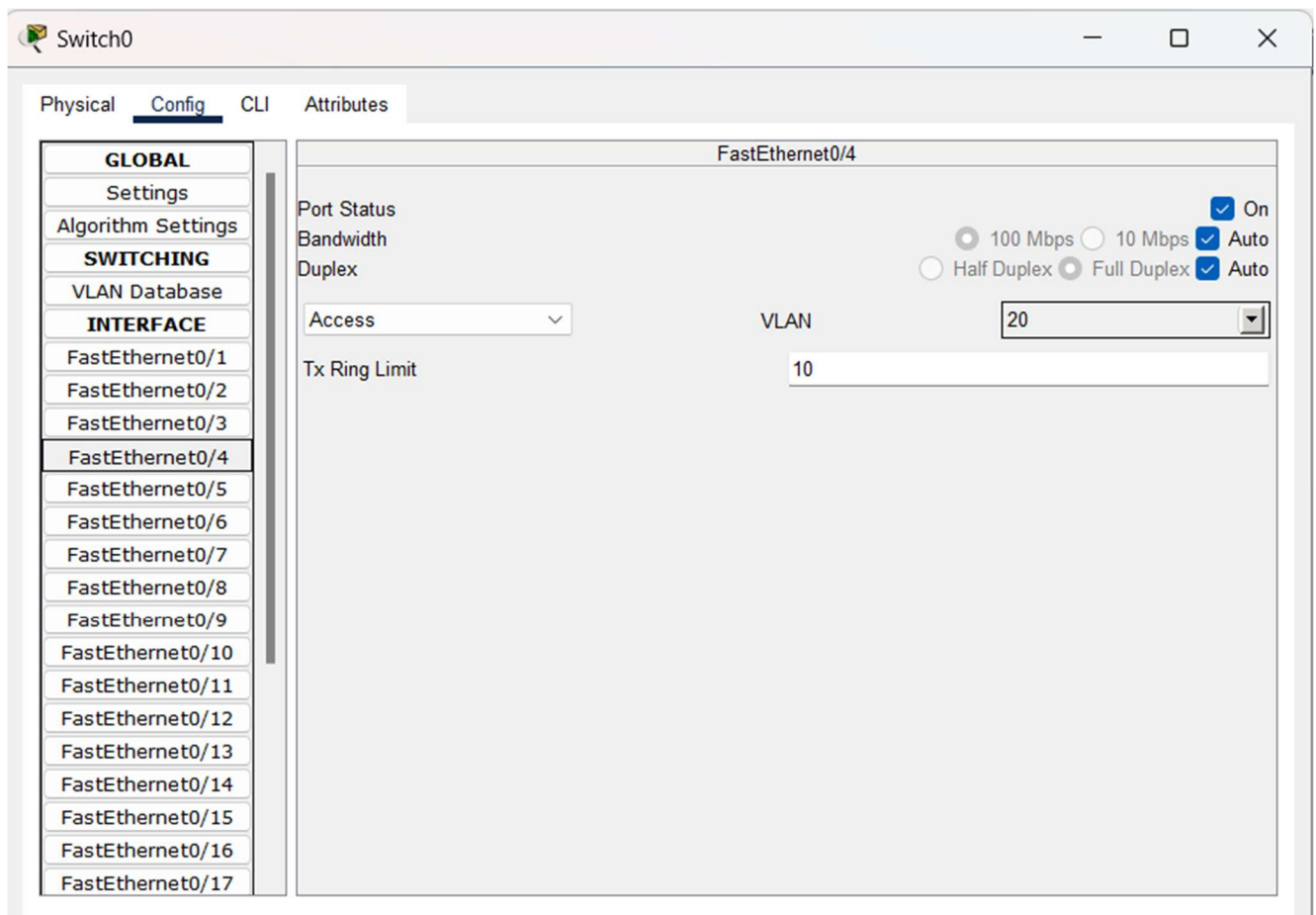
VLAN Configuration

VLAN Number

VLAN Name

Add Remove

VLAN No	VLAN Name
1	default
10	Vlan-A
20	Vlan-B
1002	fddi-default
1003	token-ring-default
1004	fddinet-default
1005	trnet-default



### 3.1 Steps To Create VLAN

#### 1. Add Devices in Workspace

- Drag and drop **2 switches** (2960/2950) into workspace.
- Add **8 PCs** into the workspace.
- Divide them into 2 groups:
  - **VLAN 1** → 4 PCs
  - **VLAN 2** → 4 PCs
- Connect PCs to switches using **Straight-Through cables**.
- Connect the two switches together using a **Crossover cable**.

#### 2. Assign IP Addresses to PCs

Go to each PC → **Desktop** → **IP Configuration** and assign IP addresses:

- **VLAN 1**
  - PC0 → 192.168.1.2 / 255.255.255.0
  - PC1 → 192.168.1.3 / 255.255.255.0
  - PC2 → 192.168.1.6 / 255.255.255.0
  - PC3 → 192.168.1.7 / 255.255.255.0

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- **VLAN 2**
  - PC4 → 192.168.1.4 / 255.255.255.0
  - PC5 → 192.168.1.5 / 255.255.255.0
  - PC6 → 192.168.1.8 / 255.255.255.0
  - PC7 → 192.168.1.9 / 255.255.255.0

Add labels to each PC to display its IP address.

### **3. Create VLANs on Each Switch**

For each switch → **Config tab** → **VLAN Database**:

- VLAN 10 → Name: VLAN\_1 → Add.
- VLAN 20 → Name: VLAN\_2 → Add.

Repeat on both Switches.

### **4. Assign Ports to VLANs**

For each switch → Config tab → select **Interface (FastEthernet)** → assign VLAN.

- **Switch0 Example:**
  - Port F0/1 → VLAN 1 (PC0 – 192.168.1.2)
  - Port F0/2 → VLAN 1 (PC1 – 192.168.1.3)
  - Port F0/3 → VLAN 2 (PC4 – 192.168.1.4)
  - Port F0/4 → VLAN 2 (PC5 – 192.168.1.5)
- **Switch1 Example:**
  - Port F0/1 → VLAN 1 (PC2 – 192.168.1.6)
  - Port F0/2 → VLAN 1 (PC3 – 192.168.1.7)
  - Port F0/3 → VLAN 2 (PC6 – 192.168.1.8)
  - Port F0/4 → VLAN 2 (PC7 – 192.168.1.9)

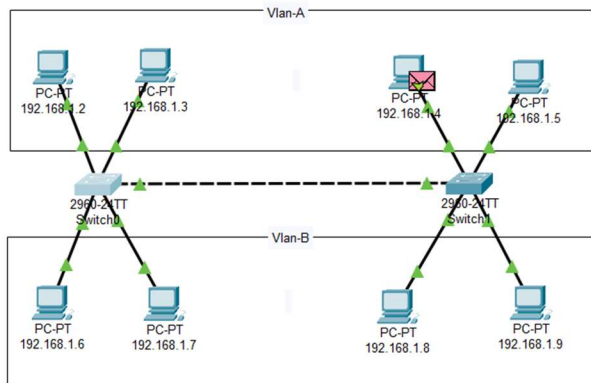
### **5. Configure Trunk Link Between Switches**

- For the interface connecting Switch0 ↔ Switch1 → set to **Trunk mode**.
- This allows both VLAN 1 and VLAN 2 traffic to pass across switches.

### **6. Test VLAN Connectivity**

- Open **Command Prompt** on a PC.
- Ping another PC in the **same VLAN** → should succeed.
- Ping a PC in a **different VLAN** → should fail.

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PDU Information at Device: 192.168.1.4

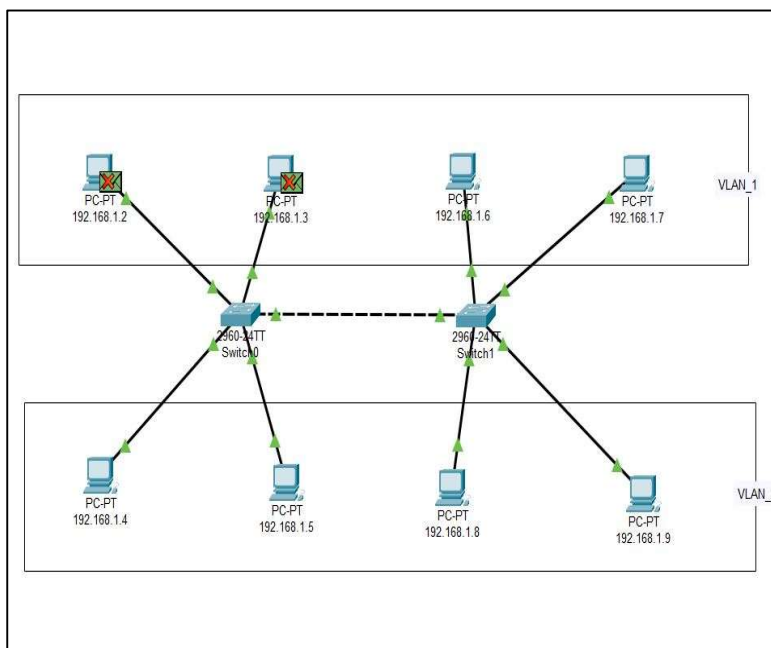
OSI Model Inbound PDU Details

At Device: 192.168.1.4  
Source: 192.168.1.4  
Destination: 192.168.1.3

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer3: IP Header Src. IP: 192.168.1.3, Dest. IP: 192.168.1.4 ICMP Message Type: 0	Layer3
Layer 2: Ethernet II Header 000D.BD55.6320 >> 0090.0C12.E827	Layer2
<b>Layer 1: Port FastEthernet0</b>	Layer1

1. FastEthernet0 receives the frame.

Challenge Me << Previous Layer Next Layer >>



PDU Information at Device: 192.168.1.3

OSI Model Inbound PDU Details

PDU Formats

EthernetII

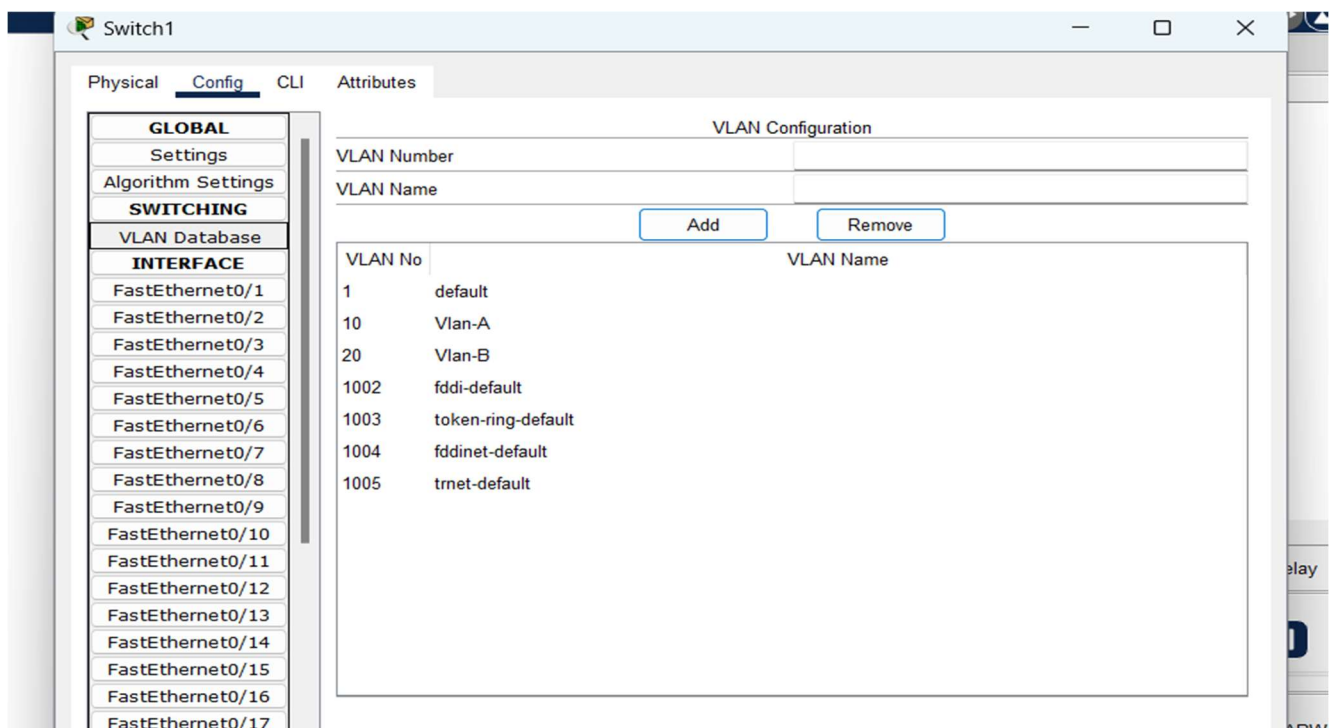
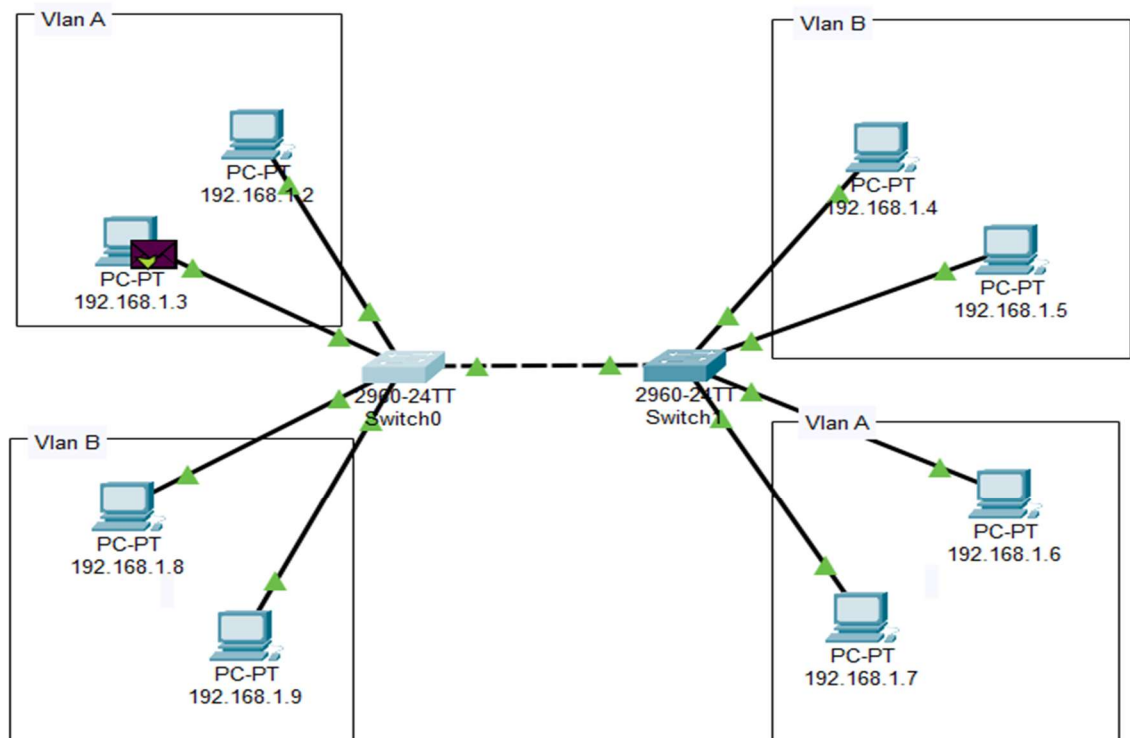
Bytes	
PREAMBLE: 101010...10	DEST.ADDR: FFFF.FFFF.F
SRC ADDR: 0001.C72E.5098	TYPE: 0x0806
DATA (VARIABLE LENGTH)	
FCS: 0x00000000	

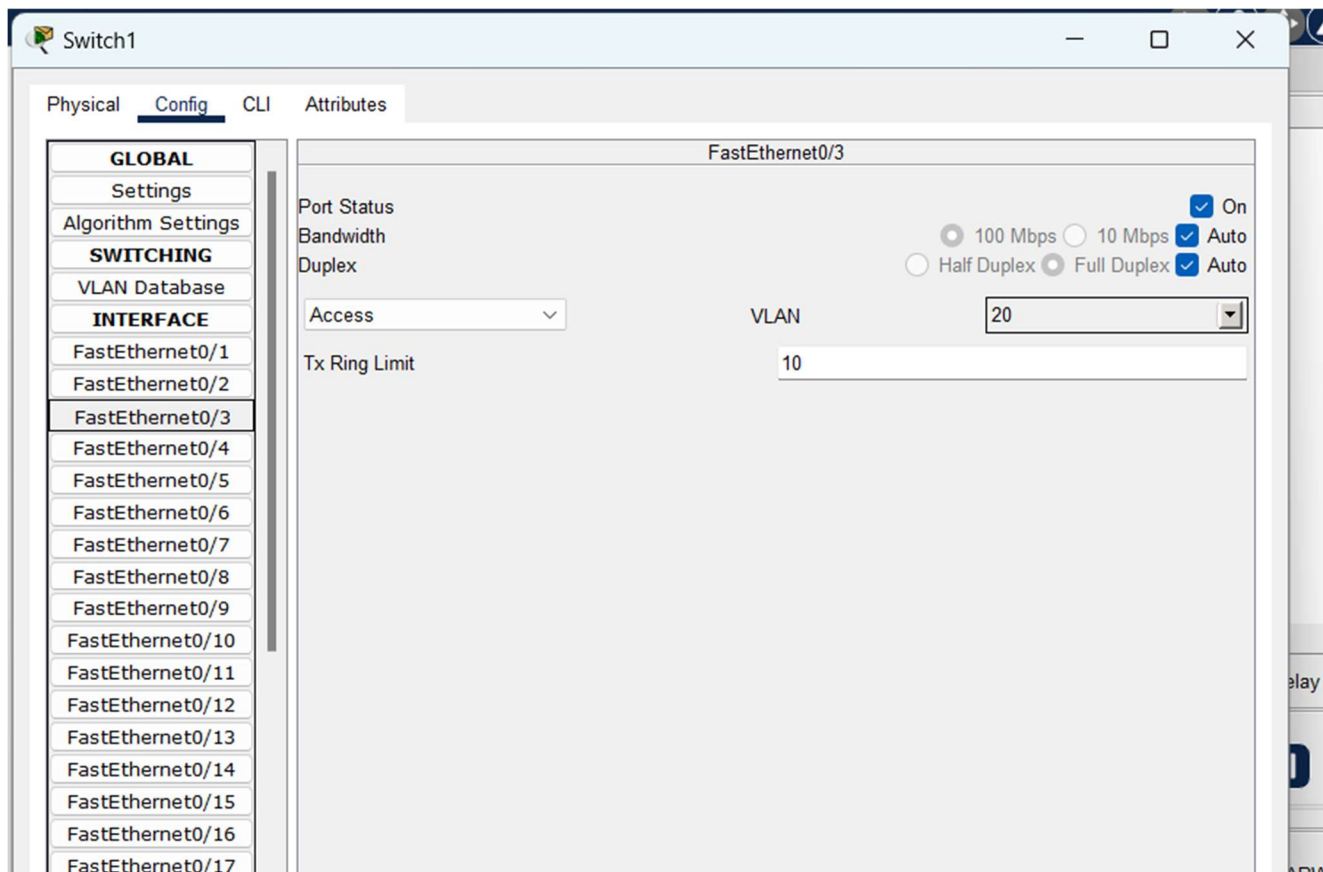
ARP

Bits	
HARDWARE TYPE: 0x0001	PROTOCOL TYPE: 0x0800
HLEN: 0x06	PLEN: 0x04
OPCODE: 0x0001	
SOURCE MAC: 0001.C72E.5098	
SOURCE IP: 192.168.1.6	
TARGET MAC: 0000.0000.0000	
TARGET IP: 192.168.1.4	

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#### 4. VLAN\_4:





## 4.1 Steps To Create VLAN

### 1. Add Devices in Workspace

- Drag and drop **2 switches (2960-24TT)** into the workspace.
- Add **8 PCs** and arrange them into 2 groups:
  - **VLAN 1** group → 4 PCs
  - **VLAN 2** group → 4 PCs
- Connect PCs to switches using **Straight-Through cables**.
- Connect **Switch0 ↔ Switch1** using a **Crossover cable**.

### 2. Assign IP Addresses to PCs

Configure each PC → **Desktop** → **IP Configuration**:

- **VLAN 1**
  - PC0 → 192.168.1.2 / 255.255.255.0
  - PC1 → 192.168.1.3 / 255.255.255.0
  - PC6 → 192.168.1.8 / 255.255.255.0
  - PC7 → 192.168.1.9 / 255.255.255.0
- **VLAN 2**



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- PC2 → 192.168.1.6 / 255.255.255.0
- PC3 → 192.168.1.7 / 255.255.255.0
- PC4 → 192.168.1.4 / 255.255.255.0
- PC5 → 192.168.1.5 / 255.255.255.0

Add **labels** to each PC to display its IP Address.

### 3. Create VLANs on Each Switch

Click on each switch → **Config tab** → **VLAN Database**:

- VLAN 1 → Name: VLAN\_1 → Add.
- VLAN 2 → Name: VLAN\_2 → Add.

Do this on both Switch0 and Switch1.

### 4. Assign Ports to VLANs

- **Switch0:**
  - Port F0/1 → VLAN 1 (PC0 – 192.168.1.2)
  - Port F0/2 → VLAN 1 (PC1 – 192.168.1.3)
  - Port F0/3 → VLAN 2 (PC2 – 192.168.1.6)
  - Port F0/4 → VLAN 2 (PC3 – 192.168.1.7)
- **Switch1:**
  - Port F0/1 → VLAN 2 (PC4 – 192.168.1.4)
  - Port F0/2 → VLAN 2 (PC5 – 192.168.1.5)
  - Port F0/3 → VLAN 1 (PC6 – 192.168.1.8)
  - Port F0/4 → VLAN 1 (PC7 – 192.168.1.9)

### 5. Configure Trunk Link Between Switches

For the interface connecting **Switch0 ↔ Switch1**:

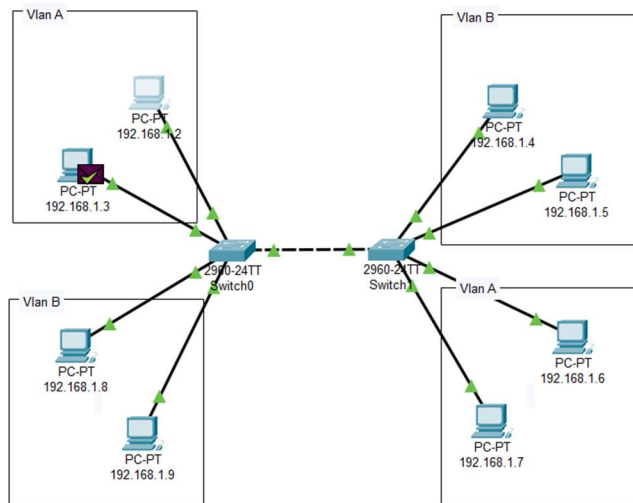
- Select the interface (e.g., FastEthernet 0/24).
- Set **Mode** → **Trunk**.
- This allows VLAN 1 & VLAN 2 traffic to pass across switches.

### 6. Test VLAN Connectivity

- Open **Command Prompt** on a PC.
- Ping another PC in the **same VLAN** → should be successful.
- Ping a PC in a **different VLAN** → will fail.



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PDU Information at Device: 192.168.1.3

OSI Model    Inbound PDU Details

At Device: 192.168.1.3  
Source: 192.168.1.3  
Destination: 192.168.1.2

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
	Layer3
	Layer2
	Layer1

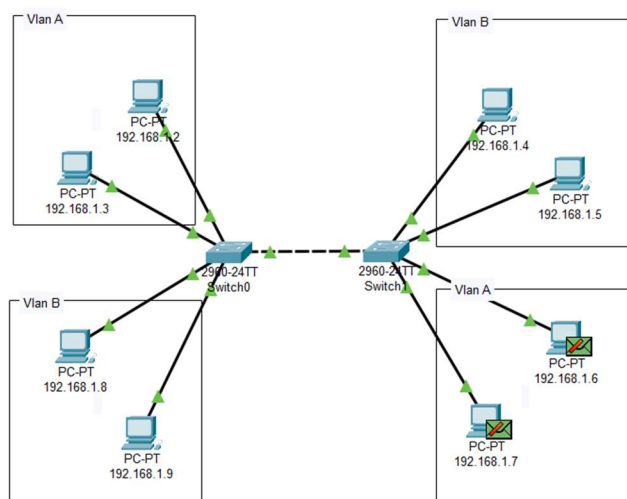
Layer 3: IP Header Src. IP: 192.168.1.2, Dest. IP: 192.168.1.3 ICMP Message Type: 0

Layer 2: Ethernet II Header 0090.2B0B.4609 >> 0090.0CA7.3B8A

Layer 1: Port FastEthernet0

1. FastEthernet0 receives the frame.

[Challenge Me](#)   
 [<< Previous Layer](#)   
 [Next Layer >>](#)



PDU Information at Device: 192.168.1.7

OSI Model    Inbound PDU Details

PDU Formats

EthernetII				Bytes
PREAMBLE: 101010...10		SF D	DEST ADDR: FFFF.FFFF.F	FFF
SRC ADDR: 0090.2B0B.4609	TYPE: 0x0806	DATA (VARIABLE LENGTH)	FCS: 0x00000000	

Arp		Bits
HARDWARE TYPE: 0x0001		PROTOCOL TYPE: 0x0800
HLEN: 0x06	PLEN: 0x04	OPCODE: 0x0001
SOURCE MAC: 0090.2B0B.4609		SOURCE IP: 192.168.1.2
TARGET MAC: 0000.0000.0000		TARGET IP: 192.168.1.4