# Office VLAN Network Project Report

◆ Introduction

This project demonstrates how to configure a **Cisco Catalyst 2960 Switch** with **VLANs** in **Cisco Packet Tracer** to simulate an office network.

The network is designed for a small office with three departments:

- **HR** → VLAN 10

- **IT** → VLAN 20

- **Finance** → VLAN 30

Each department has 2 PCs connected to a central switch. VLANs are used to separate departments for security and traffic management.
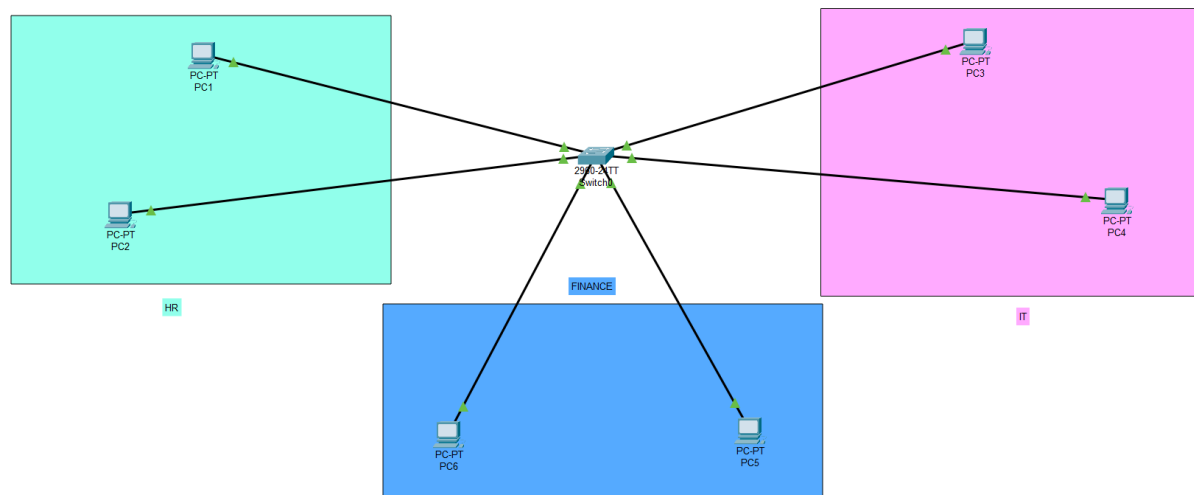
◆ Objectives

- Create and configure VLANs on a Cisco 2960 switch

- Assign switch ports to appropriate VLANs

- Assign IP addresses to devices based on subnets

- Test connectivity within VLANs

- Show isolation between different VLANs

◆ Hardware & Tools

- Cisco Packet Tracer (Simulation Software)

- Cisco Catalyst 2960 Switch (Layer 2 switch)

- 6 PCs

- Copper Straight-Through cables (PC ↔ Switch connections)

◆ IP Addressing Plan

Department	VLAN ID	Subnet	Gateway (Reserved)	PCs
HR	10	192.168.10.0/24	192.168.10.1	192.168.10.2, 192.168.10.3
IT	20	192.168.20.0/24	192.168.20.1	192.168.20.2, 192.168.20.3
Finance	30	192.168.30.0/24	192.168.30.1	192.168.30.2, 192.168.30.3

PC1 — ▯ ▢ ✕

Physical   Config   **Desktop**   Programming   Attributes

Interface   FastEthernet0   ▽

IP Configuration

◯ DHCP   ⦿ Static

IPv4 Address   192.168.10.2

Subnet Mask   255.255.255.0

Default Gateway   0.0.0.0

DNS Server   0.0.0.0

IPv6 Configuration

◯ Automatic   ⦿ Static

IPv6 Address   /

Link Local Address   FE80::20D:BDFF:FED0:9430

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication   MD5   ▽

Username

Password

PC3 — □ ✕

Physical   Config   Desktop   Programming   Attributes

IP Configuration   X

Interface   FastEthernet0   ⌄

IP Configuration

○ DHCP   ◉ Static

IPv4 Address   192.168.20.2

Subnet Mask   255.255.255.0

Default Gateway   0.0.0.0

DNS Server   0.0.0.0

IPv6 Configuration

○ Automatic   ◉ Static

IPv6 Address   /

Link Local Address   FE80::290:21FF:FEC8:4153

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication   MD5   ⌄

Username

Password

☐ Top

PC5   — □ X

Physical   Config   Desktop   Programming   Attributes

IP Configuration   X

Interface   FastEthernet0   ▾

IP Configuration

○ DHCP   ● Static

IPv4 Address   192.168.30.2

Subnet Mask   255.255.255.0

Default Gateway   0.0.0.0

DNS Server   0.0.0.0

IPv6 Configuration

○ Automatic   ● Static

IPv6 Address   /

Link Local Address   FE80::240:BFF:FE25:3DE5

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication   MD5   ▾

Username

Password

☐ Top

◆ Configuration Steps

1. Create VLANs

```
Switch> enable
Switch# configure terminal

Switch(config)# vlan 10
Switch(config-vlan)# name HR
Switch(config)# vlan 20
Switch(config-vlan)# name IT
Switch(config)# vlan 30
Switch(config-vlan)# name Finance
```

2. Assign Ports to VLANs

```
// HR VLAN
Switch(config)# interface range fastEthernet 0/1-2
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 10


// IT VLAN
Switch(config)# interface range fastEthernet 0/3-4
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 20


// Finance VLAN
Switch(config)# interface range fastEthernet 0/5-6
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 30
```

IOS Command Line Interface

```
Translating "config"...domain server (255.255.255.255)
% Unknown command or computer name, or unable to find computer address

Switch>enable
Switch#config
Configuring from terminal, memory, or network [terminal]? terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#vlan 10
S1(config-vlan)#name HR
S1(config-vlan)#exit
S1(config)#vlan 20
S1(config-vlan)#name IT
S1(config-vlan)#exit
S1(config)#vlan 30
S1(config-vlan)#name FINANCE
S1(config-vlan)#exit
S1(config)#interface fastEthernet0/1
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 10
S1(config-if)#exit
S1(config)#interface fastEthernet0/2
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 10
S1(config-if)#exit
S1(config)#interface fastEthernet0/3
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 20
S1(config-if)#exit
S1(config)#interface fastEthernet0/4
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 20
S1(config-if)#exit
S1(config)#interface fastEthernet0/5
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#exit
S1(config)#interface fastEthernet0/6
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#exit
S1(config)#
```

3. Verify VLANs

Switch# show vlan brief

```
S1>show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    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
10   HR                               active    Fa0/1, Fa0/2
20   IT                               active    Fa0/3, Fa0/4
30   FINANCE                          active    Fa0/5, Fa0/6
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S1>
```
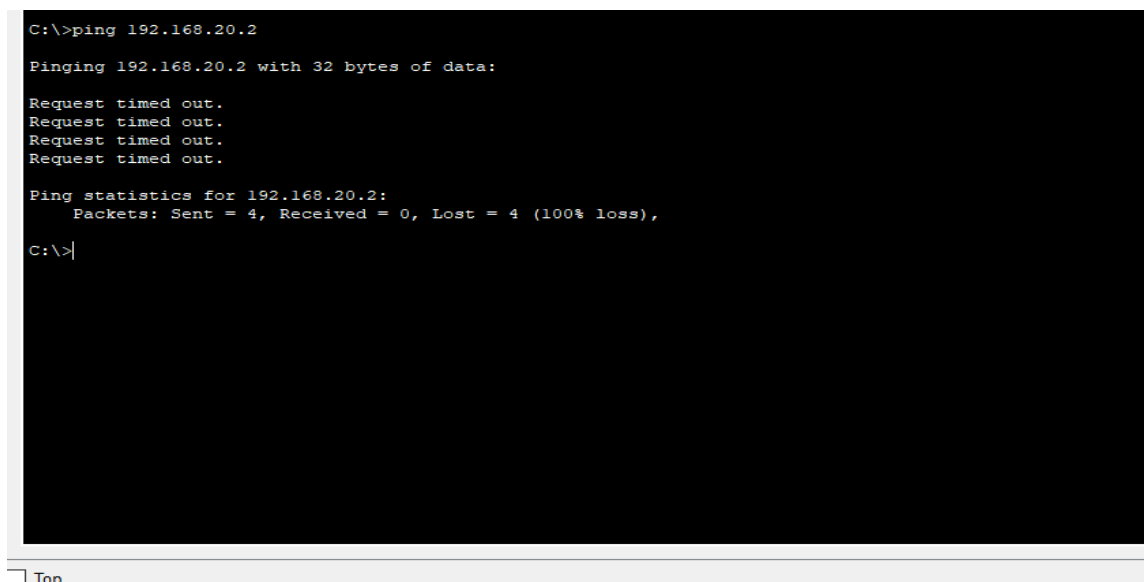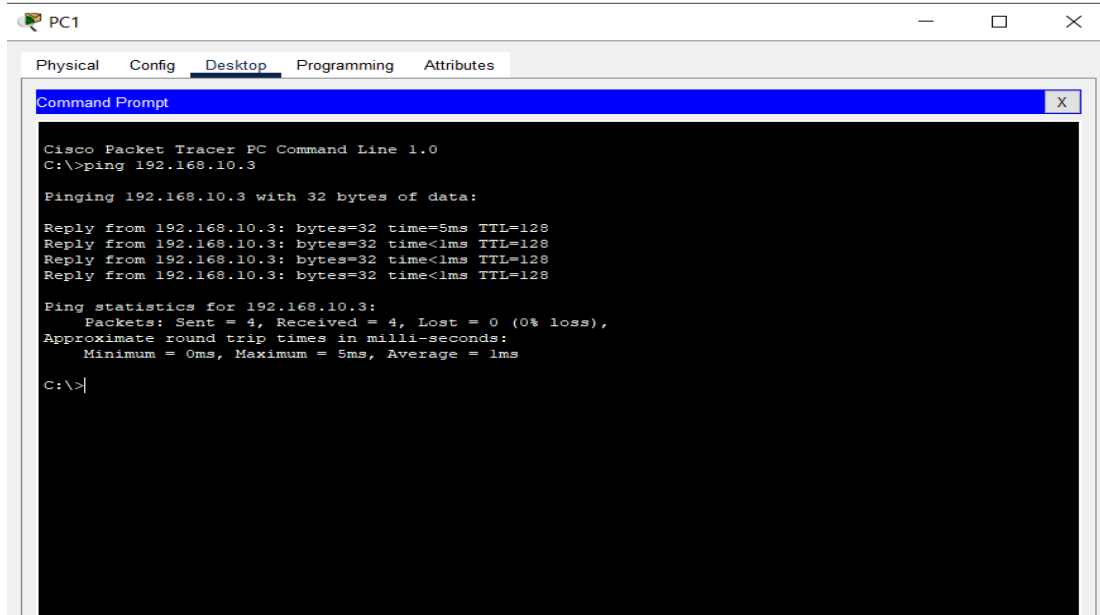
◆ **Testing**

- PC1 ↔ PC2 (HR VLAN) → Ping successful

- PC3 ↔ PC4 (IT VLAN) → Ping successful

- PC5 ↔ PC6 (Finance VLAN) → Ping successful

- PC1 (HR) ↔ PC3 (IT) → Ping failed (different VLANs)

PC1

Physical | Config | Desktop | Programming | Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.3

Pinging 192.168.10.3 with 32 bytes of data:

Reply from 192.168.10.3: bytes=32 time=5ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 5ms, Average = 1ms

C:\>
```

```
C:\>ping 192.168.20.2

Pinging 192.168.20.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.20.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Top

PC3

Physical | Config | Desktop | Programming | Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.20.2

Pinging 192.168.20.2 with 32 bytes of data:

Reply from 192.168.20.2: bytes=32 time=3ms TTL=128
Reply from 192.168.20.2: bytes=32 time=8ms TTL=128
Reply from 192.168.20.2: bytes=32 time=6ms TTL=128
Reply from 192.168.20.2: bytes=32 time=5ms TTL=128

Ping statistics for 192.168.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 3ms, Maximum = 8ms, Average = 5ms

C:\>
```

PC5

Physical | Config | Desktop | Programming | Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

◆ Cables Used

- **PC ↔ Switch** → Copper Straight-Through (standard connection)

- Reason: Different devices (PC & Switch) require straight-through cables.

◆ About Cisco 2960 Switch

The **Cisco Catalyst 2960** is a Layer 2 switch widely used in CCNA training and enterprise networks.

- Supports VLANs, trunking, and port security

- Provides 24–48 FastEthernet ports

- Used here as the backbone for departmental segregation

◆ Future Work

- Add **Router-on-a-Stick** for inter-VLAN communication

- Implement **Port Security** to prevent unauthorized device access

- Add **Spanning Tree Protocol (STP)** for loop prevention in multi-switch setup

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◆ Skills Demonstrated

- VLAN creation and management

- Switch port assignment

- Subnetting per VLAN

- Isolation and communication testing

- Network documentation for GitHub

◆ Conclusion

This project successfully demonstrates how to set up VLANs on a Cisco 2960 switch in Packet Tracer. Each department was isolated into its own VLAN, ensuring secure and efficient communication.

📂 Project files, including the `.pkt` simulation and screenshots, are available in this repository.