

Department of Computer Engineering
TE Computer-B (2024-25 Sem I)
Computer Networks and Security
CNS Simulation Assignment 1: VLAN Configuration

[CO1-CO2, BT: L3 (Apply)] [Max Marks: 10]

Date of Assignment 16th July 2025

Last Date of Submission: 21st July 2025

Demonstrate of Virtual LAN (VLAN) using Packet Tracer

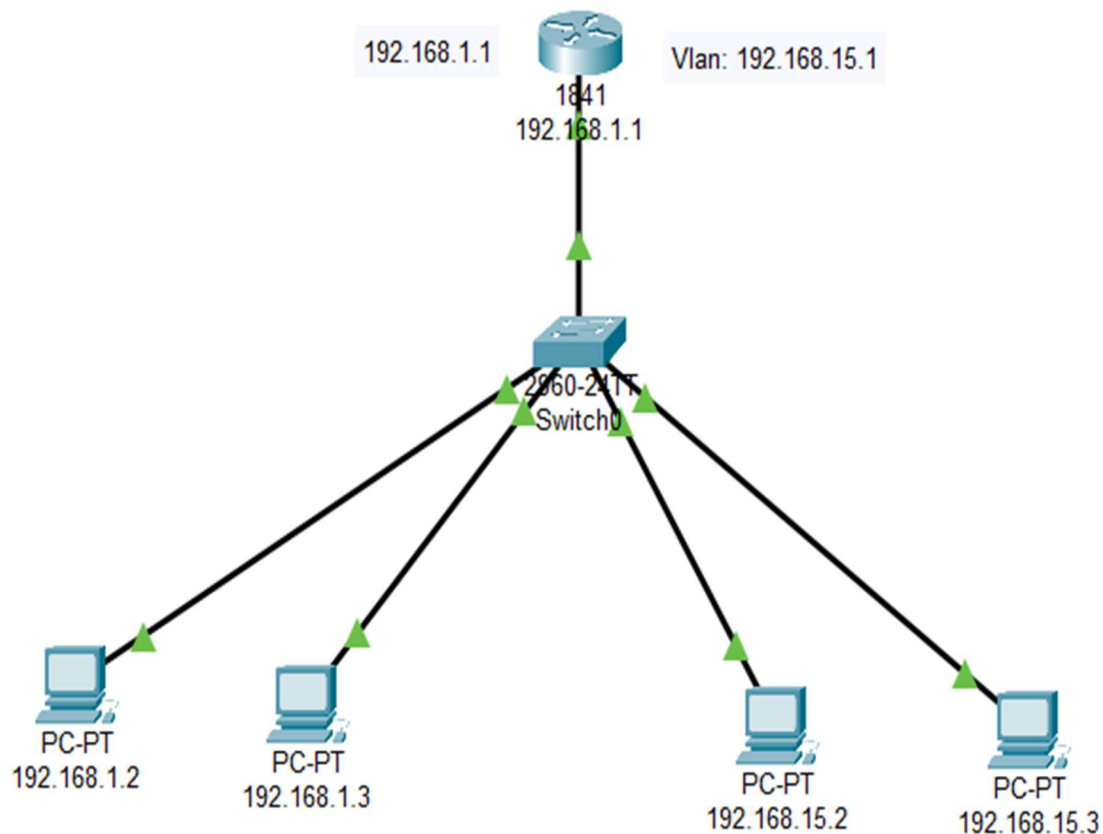
Objective: To configure and demonstrate Virtual LANs (VLANs) using Cisco Packet Tracer by creating two VLANs and testing inter-VLAN communication through a router.

IP Address Series: 192.168.1.1 to 192.168.1.254 for VLAN1 (Device 1 and 2)

192.168.15.1 to 192.168.15.254 for VLAN2 (Device 3 and 4)

Steps Involved:

1. **Network Topology:** 1 Router, 1 Switch, 4 PCs (2 in VLAN1, 2 in VLAN2), Cabling



2. IP Address Configuration of PCs:

Device 1: IP – 192.168.1.2, Subnet Mask – 255.255.255.0, Gateway – 192.168.1.1

Device 2: IP – 192.168.1.3, Subnet Mask – 255.255.255.0, Gateway – 192.168.1.1

Device 3: IP – 192.168.15.2, Subnet Mask – 255.255.255.0, Gateway – 192.168.15.1

Device 4: IP – 192.168.15.3, Subnet Mask – 255.255.255.0, Gateway – 192.168.15.1

The screenshot shows the 'IP Configuration' window for the interface 'FastEthernet0' on a device with IP 192.168.1.3. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The 'IP Configuration' section is active, showing the following settings:

- Interface: FastEthernet0
- IP Configuration:
 - ☐ DHCP
 - ☒ Static
 - IPv4 Address: 192.168.1.3
 - Subnet Mask: 255.255.255.0
 - Default Gateway: 192.168.1.1
 - DNS Server: 0.0.0.0
- IPv6 Configuration:
 - ☐ Automatic
 - ☒ Static
 - IPv6 Address: (empty)
 - Link Local Address: FE80::205:5EFF:FE0D:944E
 - Default Gateway: (empty)
 - DNS Server: (empty)
- 802.1X:
 - ☐ Use 802.1X Security
 - Authentication: MD5
 - Username: (empty)
 - Password: (empty)

A 'Top' button is located at the bottom left of the window.

The screenshot shows the 'IP Configuration' window for the interface 'FastEthernet0' on a device with IP 192.168.1.2. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The 'IP Configuration' section is active, showing the following settings:

- Interface: FastEthernet0
- IP Configuration:
 - ☐ DHCP
 - ☒ Static
 - IPv4 Address: 192.168.1.2
 - Subnet Mask: 255.255.255.0
 - Default Gateway: 192.168.1.1
 - DNS Server: 0.0.0.0
- IPv6 Configuration:
 - ☐ Automatic
 - ☒ Static
 - IPv6 Address: (empty)
 - Link Local Address: FE80::205:5EFF:FEE5:E3B9
 - Default Gateway: (empty)
 - DNS Server: (empty)
- 802.1X:
 - ☐ Use 802.1X Security
 - Authentication: MD5
 - Username: (empty)
 - Password: (empty)

A 'Top' button is located at the bottom left of the window.

192.168.15.2

Physical Config Desktop Programming Attributes

IP Configuration

InterfaceFastEthernet0

IP Configuration

☐ DHCP

☒ Static

IPv4 Address192.168.15.2

Subnet Mask255.255.255.0

Default Gateway192.168.15.1

DNS Server0.0.0.0

IPv6 Configuration

☐ Automatic

☒ Static

IPv6 Address

Link Local AddressFE80::202:17FF:FEC3:A51D

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

AuthenticationMD5

Username

Password

☐ Top

192.168.15.3

Physical Config Desktop Programming Attributes

IP Configuration

InterfaceFastEthernet0

IP Configuration

☐ DHCP

☒ Static

IPv4 Address192.168.15.3

Subnet Mask255.255.255.0

Default Gateway192.168.15.1

DNS Server0.0.0.0

IPv6 Configuration

☐ Automatic

☒ Static

IPv6 Address

Link Local AddressFE80::203:E4FF:FEDE:74A8

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

AuthenticationMD5

Username

Password

☐ Top

3. Configuration of VLAN Database at Switch:

- Go to Switch0 > Config > VLAN Database, enter VLAN Number 15, VLAN Name AshishKumar, and click Add.
- Select GigaEthernet0/3, set mode to Access, and assign it to VLAN 15: AshishKumar from the dropdown.

The screenshot shows the Switch0 configuration window with the 'Config' tab selected. The left sidebar shows the 'VLAN Database' under the 'SWITCHING' section. The main area displays the 'VLAN Configuration' table with the following entries:

VLAN No	VLAN Name
1	default
15	AshishKumar
1002	fdi-default
1003	token-ring-default
1004	fdinet-default
1005	trnet-default

Below the table, the 'Equivalent IOS Commands' section shows the following commands:

```
Switch>enable
Switch#
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface FastEthernet0/3
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#
Switch(config)#vlan 15
Switch(config-vlan)# name AshishKumar
Switch(config-vlan)#
```

The screenshot shows the Switch0 configuration window with the 'Config' tab selected. The left sidebar shows the 'FastEthernet0/3' under the 'INTERFACE' section. The main area displays the 'FastEthernet0/3' configuration with the following settings:

- Port Status: On
- Bandwidth: Auto
- Duplex: Full Duplex
- VLAN: 15
- Tx Ring Limit: 10

The 'VLAN' dropdown menu is open, showing the following options:

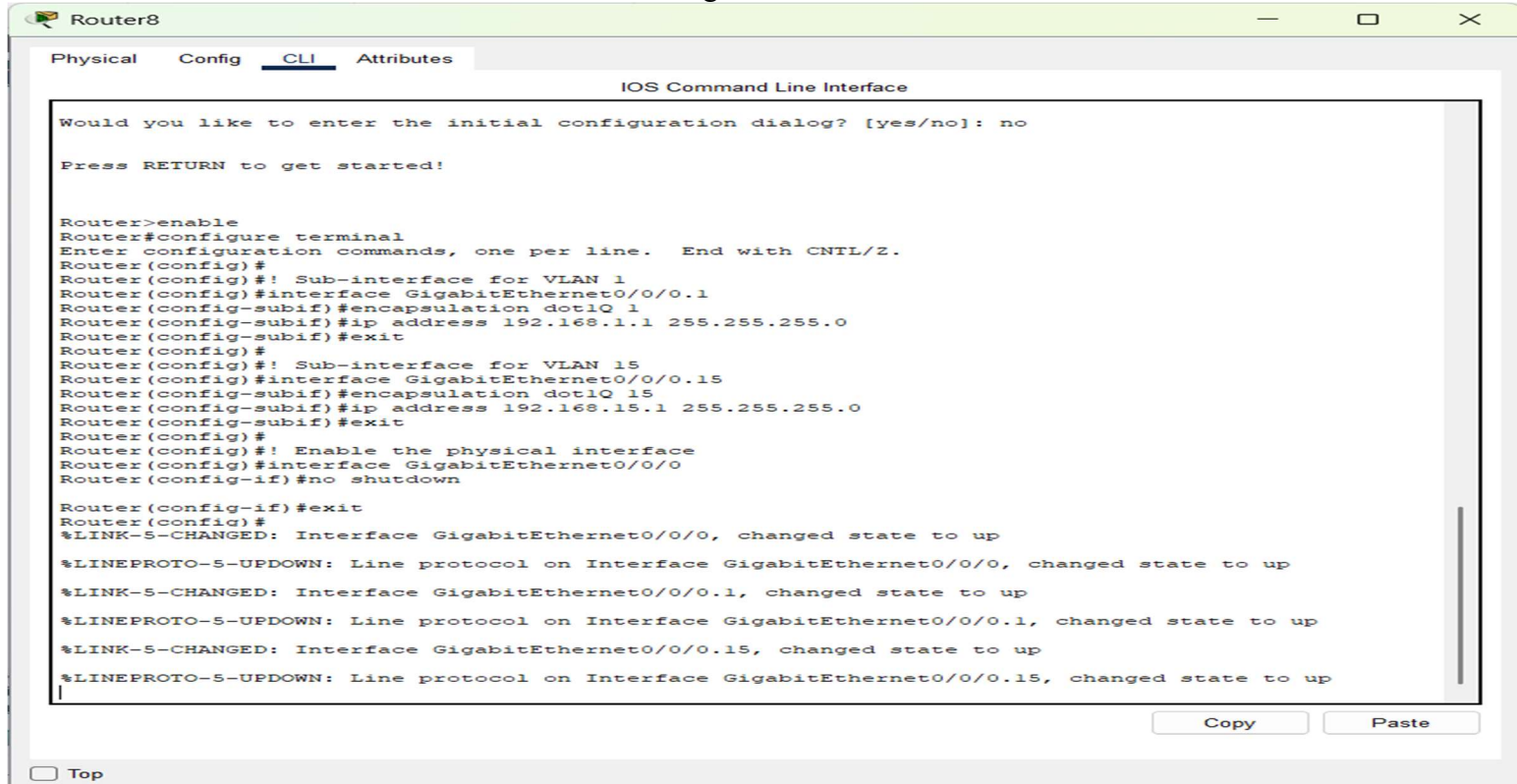
- 1:default
- 15:AshishKumar (selected)
- 1002:fdi-default

Below the configuration, the 'Equivalent IOS Commands' section shows the following commands:

```
Switch(config-vlan)# name AshishKumar
Switch(config-vlan)#
Switch(config-vlan)#end
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface FastEthernet0/3
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#switchport access vlan 15
Switch(config-if)#
```

4. Configuration of router

- Go to **Router CLI**, enter: enable → configure terminal
- Create sub interface for VLAN 1: interface GigabitEthernet0/0.1 → encapsulation dot1Q 1 → ip address 192.168.1.1 255.255.255.0 → exit
- Create sub interface for VLAN 15: interface GigabitEthernet0/0.15 → encapsulation dot1Q 15 → ip address 192.168.15.1 255.255.255.0 → exit
- Activate main interface: interface GigabitEthernet0/0 → no shutdown



Router8

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Would you like to enter the initial configuration dialog? [yes/no]: no

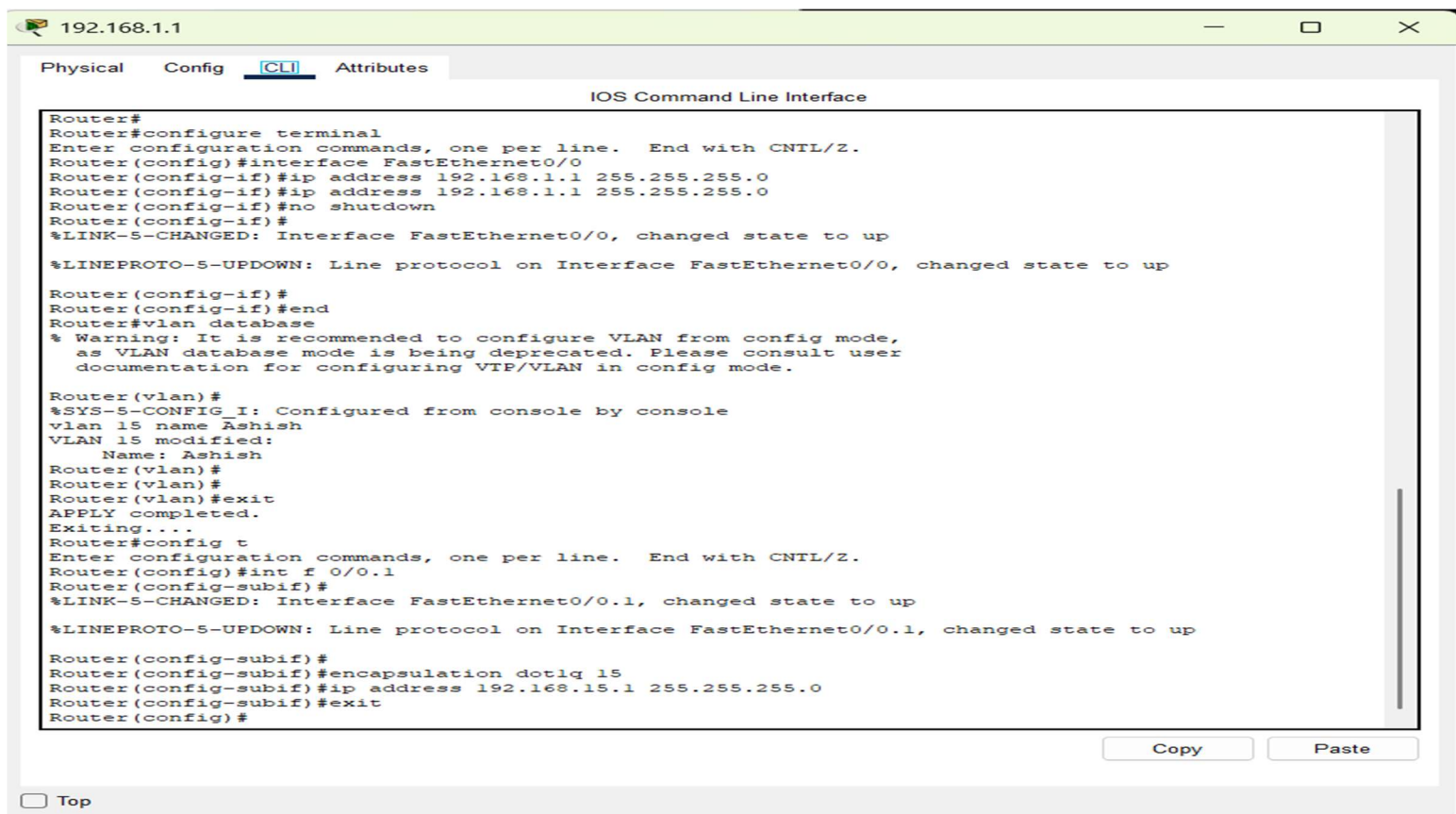
Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#! Sub-interface for VLAN 1
Router(config)#interface GigabitEthernet0/0/0.1
Router(config-subif)#encapsulation dot1Q 1
Router(config-subif)#ip address 192.168.1.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
Router(config)#! Sub-interface for VLAN 15
Router(config)#interface GigabitEthernet0/0/0.15
Router(config-subif)#encapsulation dot1Q 15
Router(config-subif)#ip address 192.168.15.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
Router(config)#! Enable the physical interface
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#no shutdown

Router(config-if)#exit
Router(config)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.1, changed state to up
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0.15, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0.15, changed state to up
|
```

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☐ Top



192.168.1.1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#
Router(config-if)#end
Router#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Router(vlan)#
%SYS-5-CONFIG_I: Configured from console by console
vlan 15 name Ashish
VLAN 15 modified:
  Name: Ashish
Router(vlan)#
Router(vlan)#
Router(vlan)#exit
APPLY completed.
Exiting....
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int f 0/0.1
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up

Router(config-subif)#
Router(config-subif)#encapsulation dot1q 15
Router(config-subif)#ip address 192.168.15.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
```

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☐ Top

5. Ping Testing:

- On PC1, open Command Prompt and ping PC2 (same VLAN): ping 192.168.1.3 — Successful reply received.
- On PC1, ping the Router sub interface for VLAN 15: ping 192.168.15.1 — Successful, confirming router reachability.
- On PC2, ping PC1 (same VLAN): ping 192.168.1.2 — Successful reply.
- On PC2, ping PC3 and PC4 (different VLAN): ping 192.168.15.3 and ping 192.168.15.2 — Both successful, confirming inter-VLAN routing.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.15.1

Pinging 192.168.15.1 with 32 bytes of data:

Reply from 192.168.15.1: bytes=32 time<1ms TTL=255
Reply from 192.168.15.1: bytes=32 time<1ms TTL=255
Reply from 192.168.15.1: bytes=32 time<1ms TTL=255
Reply from 192.168.15.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.15.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.15.2

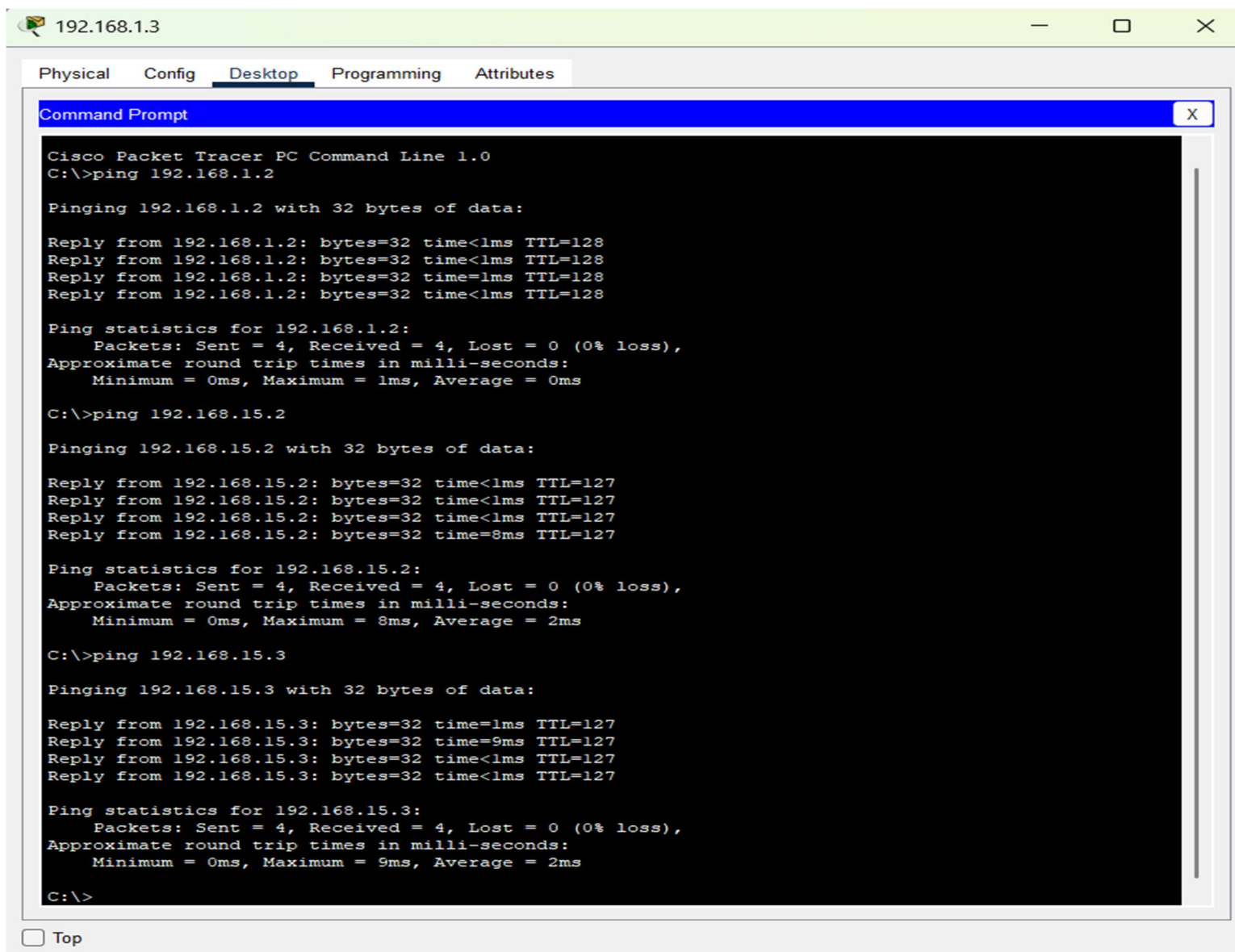
Pinging 192.168.15.2 with 32 bytes of data:

Reply from 192.168.15.2: bytes=32 time<1ms TTL=127
Reply from 192.168.15.2: bytes=32 time<1ms TTL=127
Reply from 192.168.15.2: bytes=32 time=7ms TTL=127
Reply from 192.168.15.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.15.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 7ms, Average = 1ms

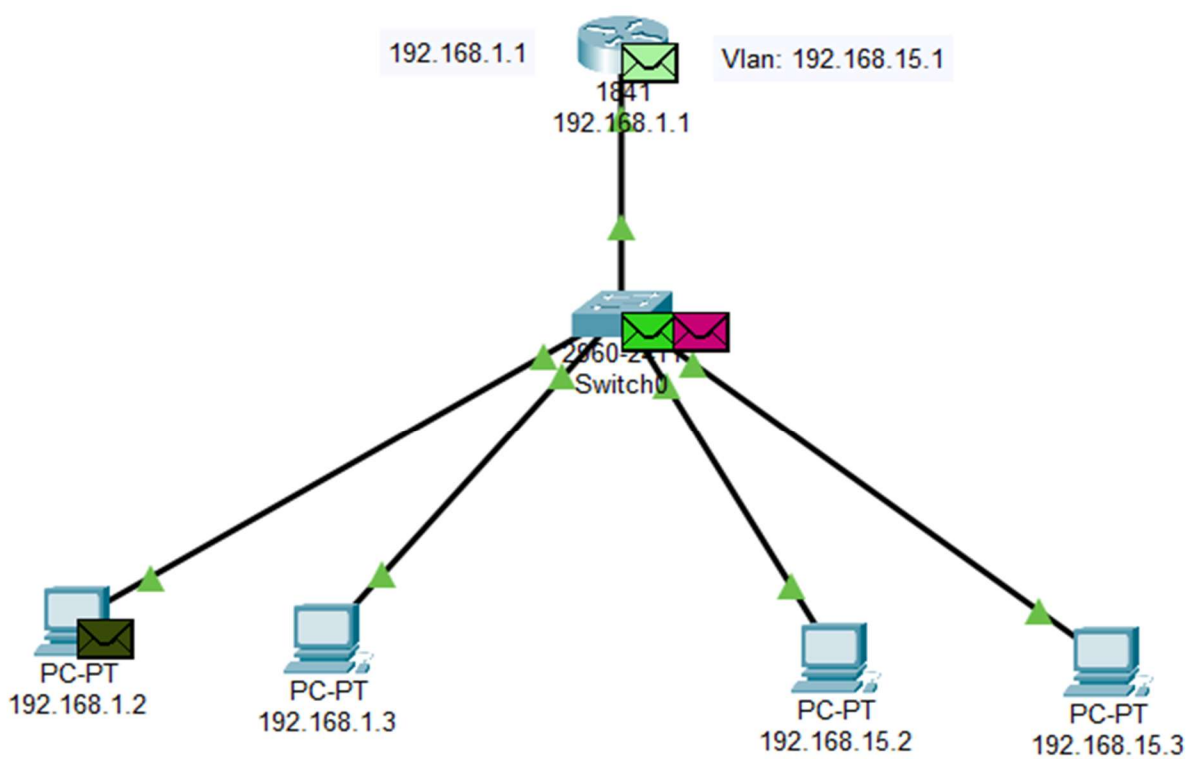
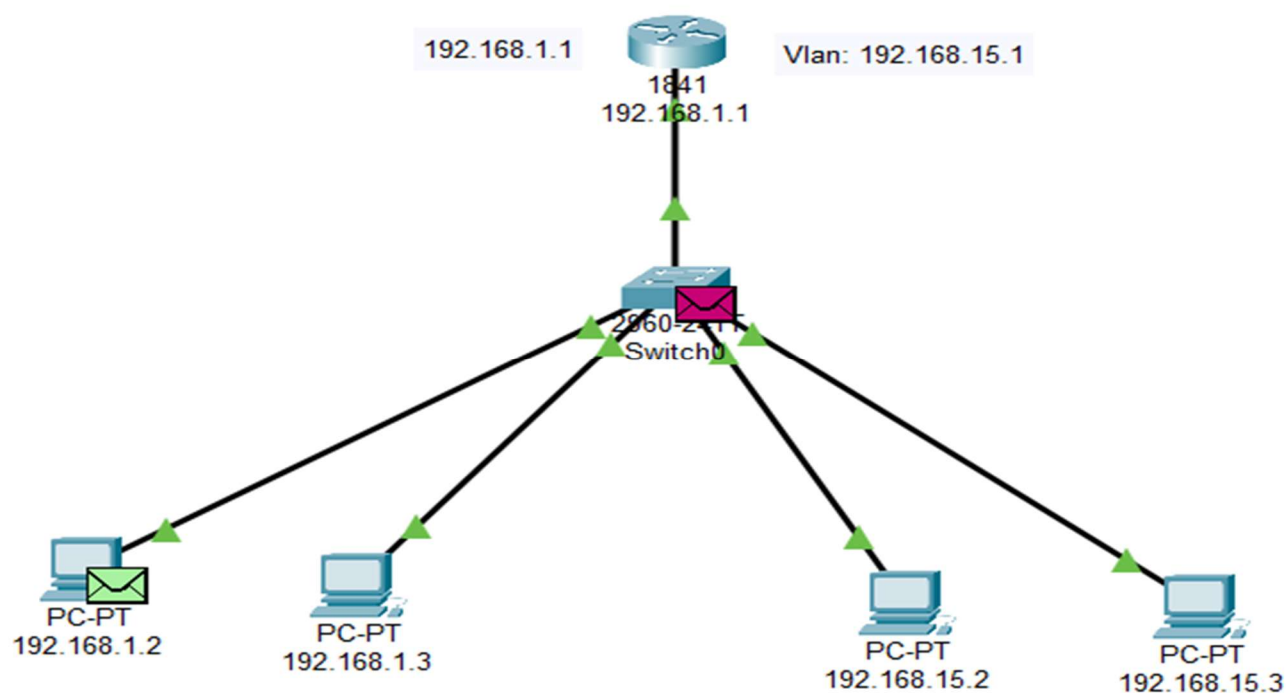
C:\>
```

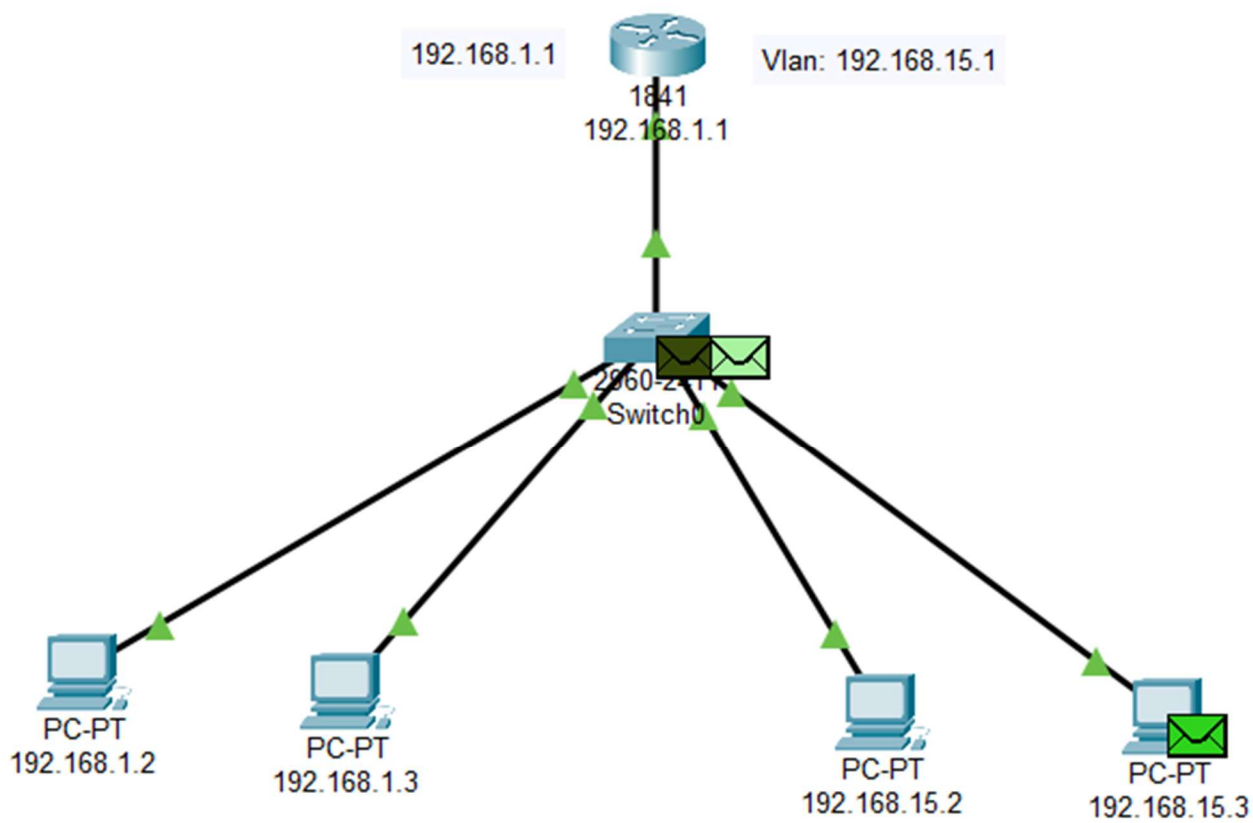
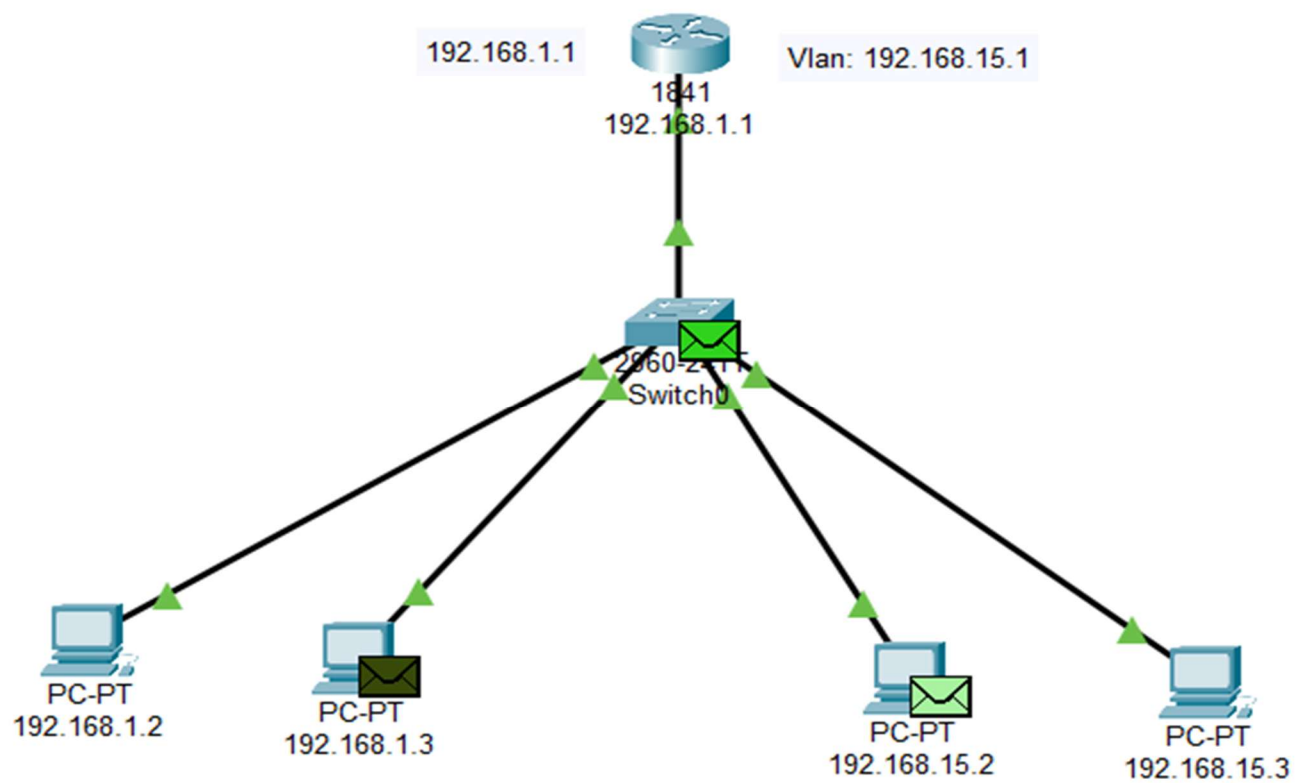
☐ Top

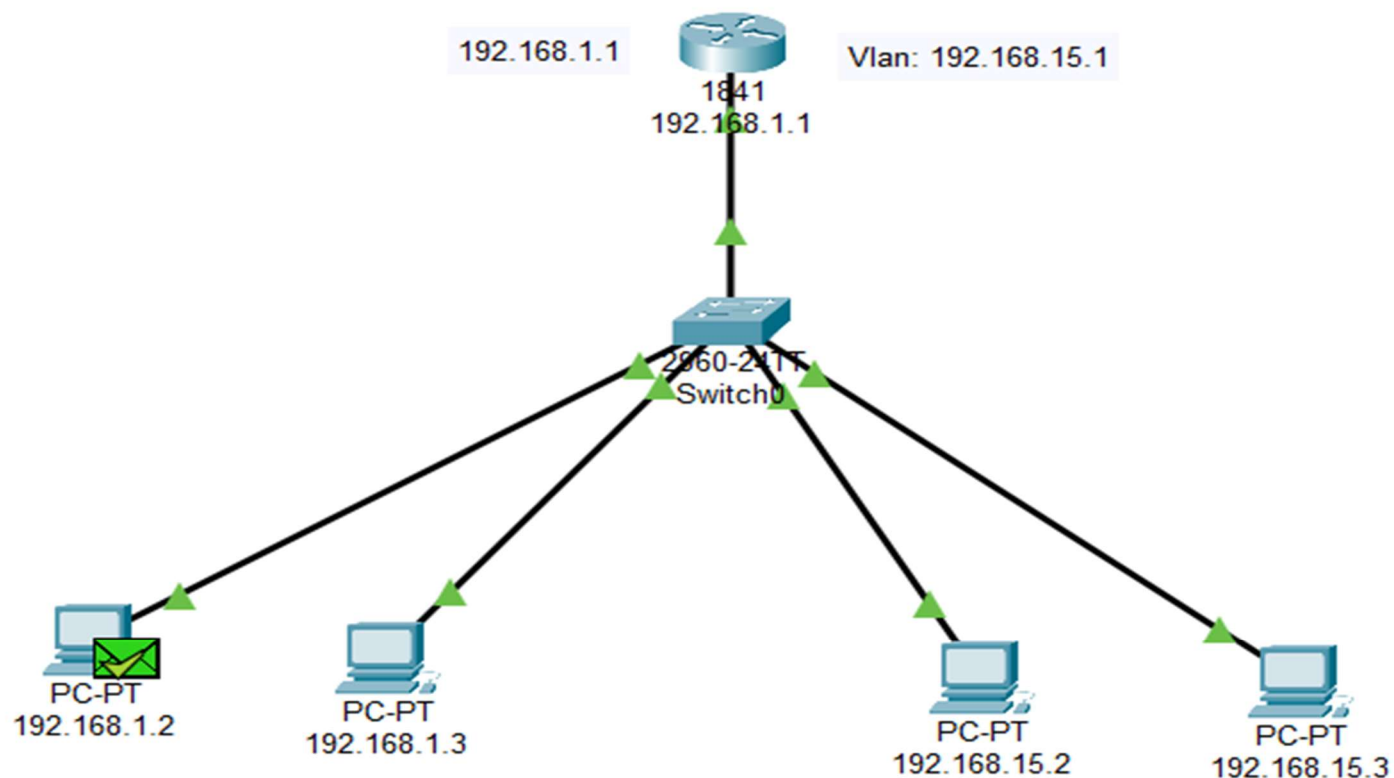


6. Real Mode Simulation and Event Simulation:

- At the bottom-right, click Simulation Mode.
- Now click the “Add Simple PDU” (envelope icon) from the bottom-left toolbar.
- Click on Device 1 (192.168.1.2), then click on Device 2 (192.168.1.3).
- This drops a simulated ping (ICMP packet) between the two devices.
- After a few steps, the simulation should complete and show packet delivery. Message changes to: Last Status: Successful | Source: Device 1 | Destination: Device 2 | Type: ICMP
- At the bottom-right, click the Simulation tab.
- Click the Add Simple PDU tool (envelope icon in the bottom-left toolset).
- First, click on Device 1 (192.168.1.2), then click on Device 2 (192.168.1.3) to create a simulated ping.
- Press the Capture/Forward button to step through the packet's path.
- Green dots/arrows will appear showing the packet flow from source to destination.
- We will see events updating live in the Event List Panel (right side).







Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	192.168.1.2	192.168.1.3	ICMP		0.000	N	0	(edit)	(delete)
	Successful	192.168.1.2	192.168.15.2	ICMP		0.000	N	1	(edit)	(delete)
	Successful	192.168.1.2	192.168.15.3	ICMP		0.000	N	2	(edit)	(delete)