NPS LAB EXPERIMENT-5

Objective: Configure Encapsulation Dot1Q (802.1Q) on a Cisco switch using Cisco Packet Tracer. Dot1Q is a VLAN tagging protocol that allows multiple VLANs to be carried across a single physical network link by encapsulating VLAN information into the Ethernet frame.

Steps:

Step 1: Open **Cisco Packet Tracer** and create the following network topology:

- **1 Server**

- **2 PCs**

- **1 Switch** Connect them through automatic cables on **FastEthernet 1/0** interfaces (or any other FastEthernet ports).

Step 2: Open the **CLI** (Command Line Interface) for the switch and perform the following configuration steps:

- **en**: Short for **enable**, this command allows you to enter privileged EXEC mode, where you can make changes to the device's configuration.

- **config**: This enters **global configuration mode**, where you can configure system-wide settings.

- **int f0/2**: This selects interface **FastEthernet 0/2** for configuration. You can replace f0/2 with the actual interface number based on your topology. This command is used to access the specific interface to apply changes.

- **switchport access vlan 1**: This sets the selected interface (FastEthernet 0/2) to be in **VLAN 1**. VLAN 1 is typically the default VLAN for Cisco switches. This command places the port in access mode, meaning it belongs to a single VLAN.

- **ip address 10.0.0.1**: This assigns the IP address 10.0.0.1 to the selected interface. The IP address will allow the server (or PC) connected to this interface to communicate over the network.

- **switchport mode trunk**: This command configures the interface as a **trunk port**, allowing it to carry traffic for multiple VLANs. Trunk ports are essential for inter-VLAN communication.

- **switchport trunk encapsulation dot1q**: This command specifies the use of **802.1Q encapsulation** for the trunk port. Dot1Q is the industry standard protocol used to tag VLANs on trunk links, allowing VLAN traffic to be forwarded between switches.

- **exit**: This exits the current configuration mode for the interface.

After configuring the first port (f0/2), repeat the process for other interfaces (e.g., f0/3 and f0/4), assigning different VLANs and IP addresses for each. For example, configure a second port in **VLAN 2** and assign an IP address like 10.0.0.2.

Example for additional VLAN setup:

int f0/3

switchport access vlan 2

ip address 10.0.0.2

switchport mode trunk

switchport trunk encapsulation dot1q

exit

Example for third VLAN setup:

int f0/4

switchport access vlan 3

ip address 10.0.0.3

switchport mode trunk

switchport trunk encapsulation dot1q

exit

Step 3: After configuring VLANs and trunking on the switch, open the **command prompt** on **PC1**. To verify the network configuration, use the ping command to test connectivity with the server or other devices by their IP addresses.

Copy code

ping 10.0.0.1

This command sends ICMP echo requests to the IP address 10.0.0.1 (the server's IP). If the network is properly configured, you should see replies from the server, indicating successful communication over the network.

Step 4: Observe the results of the ping command in the command prompt. If the configuration is correct, you will receive replies from the server. Once confirmed, save the project file for future reference by clicking **File** > **Save As** in Cisco Packet Tracer.
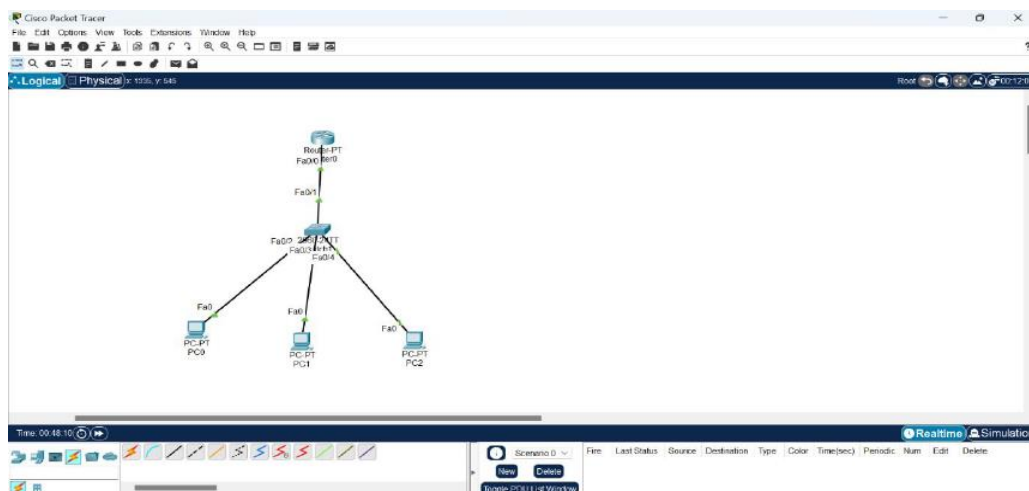
Physical   Config   CLI   Attributes

IOS Command Line Interface

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#
Router(config-if)#int f0/0.1
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)#en
% Ambiguous command: "en"
Router(config)#
Router(config)#int f0/0.1
Router(config-subif)#encapsulation dot1Q 2
Router(config-subif)#net
                     ^
% Invalid input detected at '^' marker.

Router(config-subif)#netu
                        ^
% Invalid input detected at '^' marker.

Router(config-subif)#ip address 10.0.0.1 255.0.0.0
Router(config-subif)#int f0/0.2
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.2, changed state to up

Router(config-subif)#encapsulation dot1
Router(config-subif)#encapsulation dot1Q 3
Router(config-subif)#ip address 20.0.0.1 255.0.0.0
Router(config-subif)#int f0/0.3
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.3, changed state to up

Router(config-subif)#encapsulation dot1Q 4
Router(config-subif)#ip address 30.0.0.1 255.0.0.0
Router(config-subif)#
Router(config-subif)#exit
```

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