

CNT4703C – LAB 5

Multiple VLANs | Router Sub-Interfaces

Objective:

In this lab we will continue learning about how to configure VLANs in a CISCO environment by building on the previous assignments. This lab will include the addition of another VLAN and require a unique address space for each VLAN. The addition of a router will allow a unique addressing space for each VLAN. Review the included links and videos to assist in the configuration of the CISCO equipment needed to complete this complex assignment. This assignment will demonstrate how VLANs are used to create multiple unique networks on a single piece of networking hardware. This lab will utilize the Institute of Electrical and Electronics Engineers (IEEE) standard ethernet frame and the IEEE 802.1Q standard for VLAN tagging.

While building the Packet Tracer model be sure to save the command input/outputs to a .txt file and create incremental saves of your work. These will help to identify errors, if you have any trouble with your configuration.

The TA will be available to assist you with this lab.

Supporting Concepts for Lab 5:

- *Lab 1 – CISCO Packet Tracer Training
- *Lab 2 – Build Cat5e Patch-Cable / T568B Pinout
- *Lab 3 – Connecting to Equipment utilizing Console Interface (Putty/xTerm)
- *Lab 4 –Static VLAN Configuration | Trunk Interfaces

Credit for this assignment will require:

- 1) Packet Tracer file: CNT4703C-Lab5-[*full-name-of-student*]
- 2) Screenshots of Packet Tracer Model
 - a. Network Topology (Logical)
 - b. Successful Ping from PC to PC
 - c. Unsuccessful Ping from PC to PC (between VLANs)
 - d. Command Output: [hostname]#show vlan
- 3) Photos of Switch/Router/Workstations
 - a. Configuration of Interfaces (IPv4)
 - i. 1 Workstation from each VLAN
 - b. Command Output:
 - i. Router: #show ip int brief
 - ii. Switch: #show vlan
 - iii. Ping from Router to Workstation
 - iv. Ping from Workstation to Workstation

LAB 5 Questions:

- 1) On the CISCO Router/Switch:
 - a. How many sub-interfaces were used?
 - b. What is the command to check how the interfaces are configured?
 - c. What is the command to check what VLANs are set?
 - d. Which port(s) were trunked?
- 2) How many Mask Bits are there in a 192.168.100.0/28 subnet?
 - a. What is the subnet mask? Convert this mask to binary.
 - b. How many addresses are available in this subnet?
- 3) What is the maximum length you can run CAT5e?
- 4) What is a MAC Address?
- 5) What is a gateway and what purpose does it serve on a network?

FIGURE 1.0 – Multiple VLAN Diagram / CISCO Packet Tracer

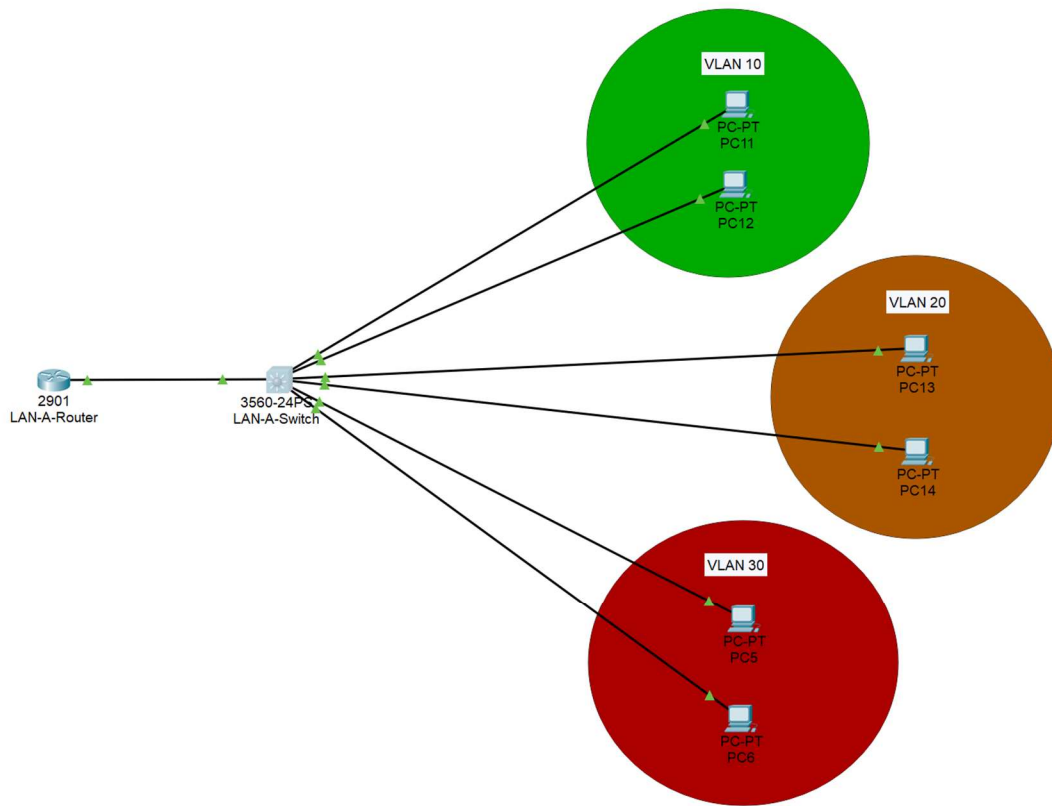


FIGURE 1.1 – LAN IP Addresses and VLANs

Equipment	IPv4 – Address	Subnet Mask	Switch Interface	VLAN
CISCO 2901-Router	172.168.1.1	255.255.255.0	fa0/24	N/A
	192.168.100.1	255.255.255.0	fa0/24	vlan 1
	192.168.10.1	255.255.255.240	fa0/24	vlan 10
	192.168.20.1	255.255.255.240	fa0/24	vlan 20
	192.168.30.1	255.255.255.240	fa0/24	vlan 30
PC1	192.168.10.2	255.255.255.240	fa0/1	vlan 10
PC2	192.168.10.3	255.255.255.240	fa0/2	vlan 10
PC3	192.168.20.3	255.255.255.240	fa0/3	vlan 20
PC4	192.168.20.4	255.255.255.240	fa0/4	vlan 20
PC5	192.168.30.5	255.255.255.240	fa0/5	vlan 30
PC6	192.168.30.6	255.255.255.240	fa0/6	vlan 30

FIGURE 1.2 – Router Sub-Interface Assignments

CISCO – Router / Interface	IPv4 – Address / Subnet	VLAN	VLAN - Name	Encapsulation Mode
gi0/1	172.168.1.1/24	N/A	N/A	N/A
gi0/1.1	192.168.100.1/24	1 (native)	default	IEEE 802.1Q
gi0/1.10	192.168.10.1/28	10	Zone10	IEEE 802.1Q
gi0/1.20	192.168.20.1/28	20	Zone20	IEEE 802.1Q
gi0/1.30	192.168.30.1/28	30	Zone30	IEEE 802.1Q

FIGURE 1.3 – CISCO Router | Command List

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Router>
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int gi0/1
Router(config-if)#ip address 172.168.1.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to
up

Router(config-if)#exit
Router(config)#int gi0/1.1
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.1, changed state
to up

Router(config-subif)#encapsulation dot1q 1 native
Router(config-subif)#ip address 192.168.1.1 255.255.255.0
Router(config-subif)#exit
LAN-A-Router(config)#exit
Router#
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)#vlan 10 name zone10
VLAN 10 added:
Name: zone10
Router(vlan)#vlan 20 name zone20
VLAN 20 added:
Name: zone20
Router(vlan)#vlan 30 name zone30
VLAN 30 added:
Name: zone30

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Router(vlan)#exit
APPLY completed.
Exiting....
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int gi0/1.10
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.10, changed state
to up

Router(config-subif)#encapsulation dot1q 10
Router(config-subif)#ip address 192.168.10.1 255.255.255.240
Router(config-subif)#exit
Router(config)#int gi0/1.20
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.20, changed
state to up

Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip address 192.168.20.1 255.255.255.240
Router(config-subif)#exit
Router(config)#int gi0/1.30
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.30, changed
state to up

Router(config-subif)#encapsulation dot1q 30
Router(config-subif)#ip address 192.168.30.1 255.255.255.240
Router(config-subif)#exit
Router(config)#hostname LAN-A-Router
LAN-A-Router(config)#
LAN-A-Router(config)#exit
LAN-A-Router#write memory
Building configuration...
[OK]
LAN-A-Router#exit

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