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Batch - H2
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Date: __/__/____

CN Lab-2

Aim: Design and configure a VLAN using Packet Tracer.

Objectives:
To understand the concept of VLAN and implement it using packet tracer.

Theory:

1. What is a VLAN?
VLAN stands for Virtual Local Area Network
VLAN is a custom network which is created using one or more Local Area Network.
It enables a group of devices available in multiple networks to be combined into one logical network. The result becomes a virtual LAN that is administrated like a physical LAN

a. Collision Domain.
Collision Domain is a scenario in which when a device sends out a message to the Network, all other devices which are included in its collision domain have to

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pay attention to it; irrespective of that message was destined for it or not.

b. Broadcast Domain.
A Broadcast Domain is a scenario in which when a device sends out a broadcast message, all the devices in that network. From this, we can realise that the more the number of collisions domains and the more the number of brodcast domains, the more efficient is the network providing better bandwidth to all its users.

c. Collision Domain and Broadcast Domain in networking devices - Hub, Switch, Router
a) Hub → A hub neither breaks a collision domain nor a broadcast domain, i.e. neither a collision domain separator nor a broadcast domain separator. All devices connected in a hub are in a single collision domain and a single broadcast domain Hubs donot segment a network, they just connect network segments.

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b) Switch → Every port on a switch is in its own collision domain, i.e., a switch is a collisions domain separator. So, messages that come from different devices connected to different ports never face collisions. But they are not broadcast domain separators; because all the ports in a switch are in the same broadcast domain. So, if a device sends a broadcast messages it will still cause congestion.

c) Router → A router is a collision domain separator as well as broadcast domain separator. A router creates a connection between two networks. A broadcast message will never reach from one network to other; because the router will not let it pass.

d. Access Port and Trunk Port

a) Access Port → These switch port belong to carry the traffic of only one VLAN. By default, it will carry the traffic of native VLAN (VLAN 1). If the switch

ports are assigned as access ports then they can be considered as the switch ports belongs to a single broadcast domain. Any traffic arriving on these switch ports is considered as it belongs to the VLAN assigned to the port.

b) Trunk Port → These switches belong to carry traffic of more than one VLAN. This is an advantage as to carry the traffic of a group of VLANs, a single switch port can be used. These are handy if the user wants to exchange traffic between switches having more than one VLANs configured. To carry traffic between VLANs, then Inter VLAN routing is required; in which the link between router and switch is configured as trunk.

FAQ's:

1. What is the need of VLAN's?

Ans (i) VLAN allows different computers and devices to be connected virtually

to each other, as if they were in a LAN sharing a single broadcast domain.
(2) A VLAN is helpful for organizational use, mainly because it can be used to segment a larger network into smaller segments.
(3) VLANs can limit user access to a certain VLAN, which then allows only authorised users to have access to networks with highly sensitive information.
(4) VLAN can be used for different groups of users, departments, functions etc, without needing to be in the same geographical area.
(5) VLANs can help reduce IT cost, improve network security and performance, provide easier management as well as ensure network flexibility.

2. What is the difference between VLAN access and trunk mode?

Ans (1) The trunk port only sends tagged frames; whereas, access port sends and receives untagged frames.
(2) The trunk port allows us to switch

multiple VLANs, but all frames are in the same VLAN in access port.

(3) Trunk port is used to connect between switches, whereas, access port is used to connect computers, laptops, printers etc.

(4) A trunk port has more than one VLAN set up on the interface, whereas, access-port is capable of having only one VLAN set up on the interface.

(5) Trunk port offers higher bandwidth and lower latency than access port.

3. Enlist different Network simulator tools like Cisco Packet Tracer.

Ans (1) Cisco Packet Tracer
(2) Boson Netsim
(3) GNS3
(4) VIRL
(5) EVE-NG
(6) Putty
(7) Secure CRT
(8) Microsoft Visio
(9) PRTG Network Monitor
(10) Wireshark
(11) Network Simulator -NS3
(12) SNMP Agent Simulator.