IT 307- Exploring the Networks
Handout on Virtual LANs
Lab 6

Introduction to Virtual LAN (VLAN)

Virtual LANs (VLANs) are a network protocol and standard used to create logically segmented networks within a physical network. They offer a method to partition a local network into several distinctive segments, thus minimizing the number of broadcast domains. VLANs can group network nodes together even if they are not located on the same network switch, making it easier to create a secure and efficient network topology.

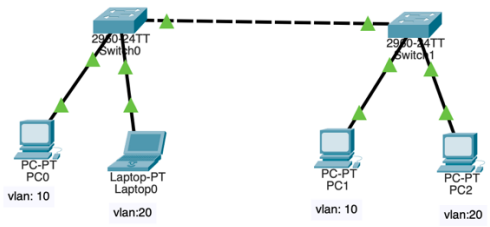
Benefits

1. Improved Network Security: Isolates traffic that should not be broadcasted to all nodes in a network.
2. Optimized Network Performance: Limits the extent of broadcast domains, reducing unnecessary traffic.
3. Simplicity and Scalability: Easier to configure and maintain; can readily adapt to network changes.

Basic Concepts

VLAN ID: A unique identifier assigned to each VLAN.
Tagging: The process of associating data packets with a specific VLAN ID.
Untagging: The process of removing the VLAN ID information from data packets.
Switch Port Modes: Access (belongs to a single VLAN) or Trunk (can carry multiple VLAN traffic).

Topology



Assign gateway 192.168.1.1 to all PCs.
Assign IP address in the same range

Commands (Switch 1)

A. VLAN naming

vlan 10
name Students
exit
vlan 20
name Faculty
exit

B. Assign VLAN to Ports on Switch 1

interface FastEthernet <*num*>

switchport mode access
switchport access vlan 10
exit
interface FastEthernet <*num*>
switchport mode access
switchport access vlan 20
exit

Commands (Switch 2)

A. VLAN Naming

vlan 10
name Students
exit
vlan 20
name Faculty
exit

B. Assign VLAN to Ports on Switch 2

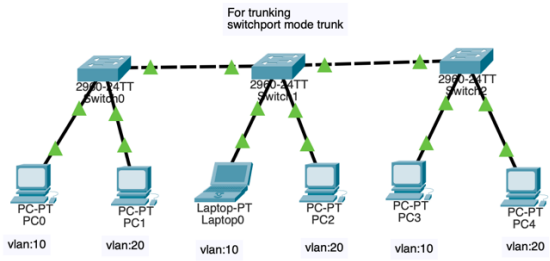
interface FastEthernet <*num*>
switchport mode access
switchport access vlan 10
exit
interface FastEthernet <*num*>
switchport mode access
switchport access vlan 20
exit

Introduction to Trunking

Trunking is the technology used on a switch-to-switch link to carry the traffic of multiple VLANs over a single physical connection. It uses tagging protocols like IEEE 802.1Q to identify which packets belong to which VLANs.

Why Trunking?
Efficient Use of Bandwidth: Allows multiple VLANs to share a single physical connection.
Simplified Network Design: Reduces the number of required links between switches.

Topology



Assign gateway 192.168.1.1 to all PCs.
Assign IP address in the same range

Step 1: Create VLANs on Switch 1, 2, and 3

vlan 10
name Students
exit
vlan 20
name Faculty
exit

Step 2: Assign VLAN to ports on Switch 1, 2, and 3

interface FastEthernet *<num>*
switchport mode access
switchport access vlan 10
exit
interface FastEthernet *<num>*
switchport mode access
switchport access vlan 20
exit

At each Switch connection port

interface FastEthernet *<num>*
Switchport mode trunk