SUPERIOR UNIVERSITY

Name: Zohaib Karamat

Roll No: SU92-BSSEM-F22-207

Subject: Computer Networks Lab

Lab 12

Date: 04-12-2024

Submitted To: Sir Rasikh

Section: 5D

Task 1:

What is difference between “VLAN & Inter-VLAN Routing”, explain with Example (draw structure in cisco)

Sol:

Difference Between VLAN and Inter-VLAN Routing

Aspect	VLAN	Inter-VLAN Routing
Definition	VLAN (Virtual Local Area Network) is used to segment a network logically into isolated parts.	Inter-VLAN Routing enables communication between different VLANs.
Purpose	Isolates devices to improve security, reduce congestion, and organize a network.	Allows devices in separate VLANs to communicate through a router or Layer-3 switch.
Communication	Devices in one VLAN cannot communicate with devices in another VLAN by default.	Facilitates communication between VLANs via routing.
Configuration Device	Configured on switches by assigning ports to VLANs.	Configured on a router or Layer-3 switch.

Example

VLAN Setup

- VLAN 10: **HR Department** (IP Range: 192.168.10.0/24)
- VLAN 20: **IT Department** (IP Range: 192.168.20.0/24)
- Devices in VLAN 10 can only communicate with other devices in VLAN 10.
- Devices in VLAN 20 can only communicate with other devices in VLAN 20.

Inter-VLAN Routing

- A router or Layer-3 switch is configured to enable communication between VLAN 10 and VLAN 20.

- Example: PC in VLAN 10 (IP: 192.168.10.2) can communicate with a PC in VLAN 20 (IP: 192.168.20.2) via the router.

Steps to Configure in Cisco Packet Tracer

1. **VLAN Configuration on the Switch**

```
vlan 10
 name HR
vlan 20
 name IT

interface FastEthernet 0/1
 switchport mode access
 switchport access vlan 10

interface FastEthernet 0/2
 switchport mode access
 switchport access vlan 20
```

2. Inter-VLAN Routing on the Router

- Use a **Router on a Stick** setup with sub-interfaces for each VLAN.
- Configure the router for each VLAN:

```
interface GigabitEthernet 0/0.10
 encapsulation dot1Q 10
 ip address 192.168.10.1 255.255.255.0
```

```
interface GigabitEthernet 0/0.20
 encapsulation dot1Q 20
 ip address 192.168.20.1 255.255.255.0

interface GigabitEthernet 0/0
 no shutdown
```