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Lab Report - 08

Course Title : Computer Networks Lab
Course Code : CSE 320
Report Name : VLAN Configuration and Multi-Network Routing Simulation.

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Date of Submission: 05/12/2024

1. Objectives

The primary objective of this lab is to design and configure a VLAN-based network architecture with inter-network communication. This includes integrating services like DNS, HTTP, and wireless connectivity across multiple VLANs using routers.

2. Necessary Tools

2.1 Software:

- Cisco Packet Tracer

2.2 Hardware:

- Four routers
- Four switches
- Several PCs, laptops, and servers
- Wireless Access Point, smartphone, and tablet

2.3 Cables:

- Straight-through cables for wired connections

3. Theory/Background

This lab focuses on implementing Virtual Local Area Networks (VLANs) and routing between them. Core topics include:

- **VLAN Segmentation**:
  Devices are grouped into VLANs to isolate traffic and improve security.
  - **Default VLAN 01**: 192.168.1.3 to 192.168.1.5 (Green network)
  - **CSE VLAN 02**: 192.168.1.6 to 192.168.1.8 (Pink network)
  - **EEE VLAN 03**: 192.168.1.9 to 192.168.1.11 (Blue network)
- **Routing Between VLANs**:
  Configured using **routers-on-a-stick** with trunk ports.
- **Inter-Network Communication**:
  Utilized **RIP** for dynamic routing between subnets.

4. Figures

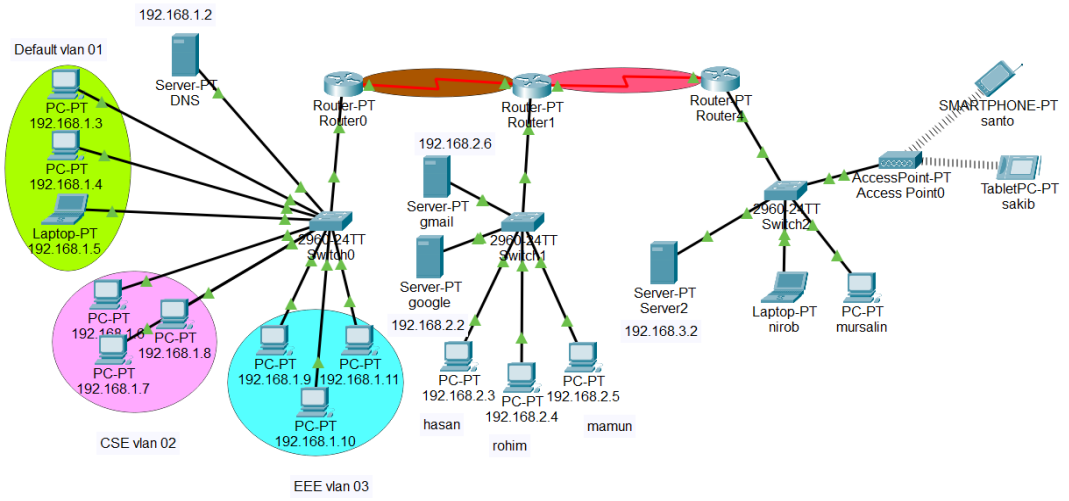

Figure 4.1: Network Topology

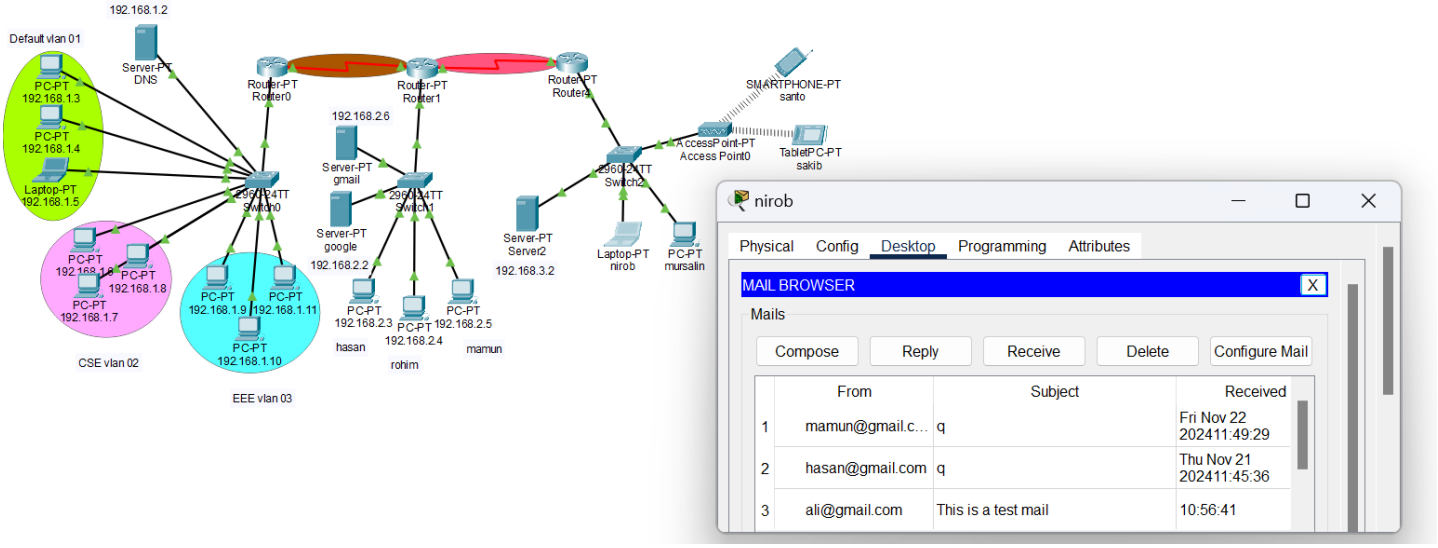

Figure 4.2: Laptop (nirob) to Gmail Server.

5. Programs or Procedure

5.1 Add Devices: Place routers, switches, servers, PCs, laptops, and wireless devices in the workspace according to the diagram.

5.2 VLAN Configuration:

Assign specific VLAN IDs:

VLAN 1 (Default): DNS server and PCs (192.168.1.3 to 192.168.1.5)

VLAN 2 (CSE): PCs in the pink network (192.168.1.6 to 192.168.1.8)

VLAN 3 (EEE): PCs in the blue network (192.168.1.9 to 192.168.1.11)

5.3 Router Configuration:

Enable **RIP** on all routers (Router0, Router1, Router4) to route traffic between VLANs.

5.4 Server Configuration:

DNS Server: Assign 192.168.1.2 for domain resolution.

Web Servers: Configure Gmail (192.168.2.6), Google (192.168.2.2), and another server (192.168.3.2) to provide HTTP services.

5.5 Wireless Access:

Connect wireless devices (smartphone and tablet) to **AccessPoint0**, ensuring access to network resources.

6. Inputs and Outputs

Inputs:

- VLAN segmentation with static IPs and RIP configuration.
- Server setups for DNS and HTTP.

Outputs:

- **Ping Test**: Successful communication between VLANs.
- **HTTP Access**: Clients can load web pages hosted on the servers.
- **DNS Test**: Correct name resolution using the DNS server.

7. Remarks/Comments

The network effectively achieved segmentation using VLANs while enabling seamless communication through routing protocols. The integration of wired, wireless, and VLAN-based devices demonstrated practical real-world networking scenarios.