Department of Computer Science and Engineering
Islamic University of Technology (IUT)
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Lab Report 04

CSE 4412: Data Communication and Networking Lab

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Section: B
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Title: Understanding the basics of Inter-VLAN communication using Router, L3 Switch along with basics of Static Routing

Objectives:

1. Implement Inter-VLAN Routing via Router-on-a-Stick.
2. Implement Inter-VLAN Communication with Layer 3 Switch.
3. Demonstrate Static Routing.
4. Ensure Proper Segmentation and Security.
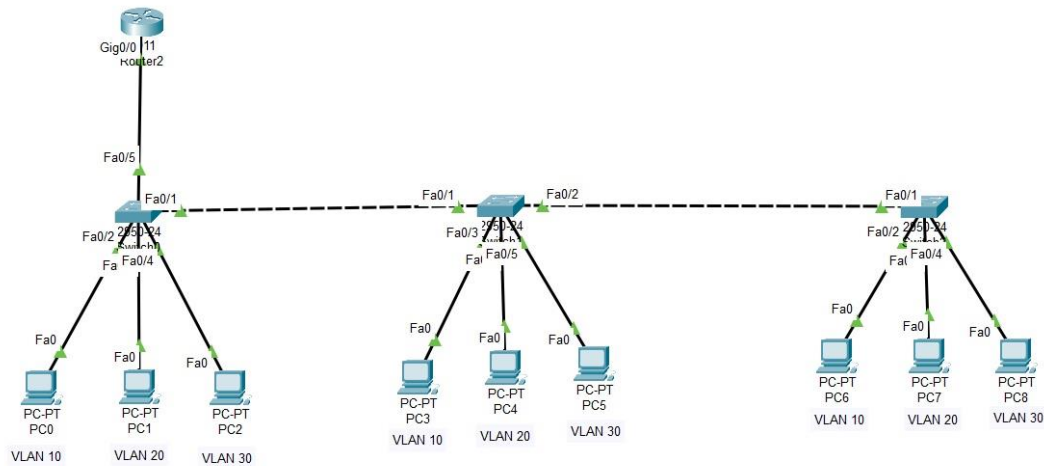5. Document and Provide Clear Explanations.

Diagram of the experiment:

(Provide screenshot of the final network topology. Make sure to label the network components.)
TASK 1:
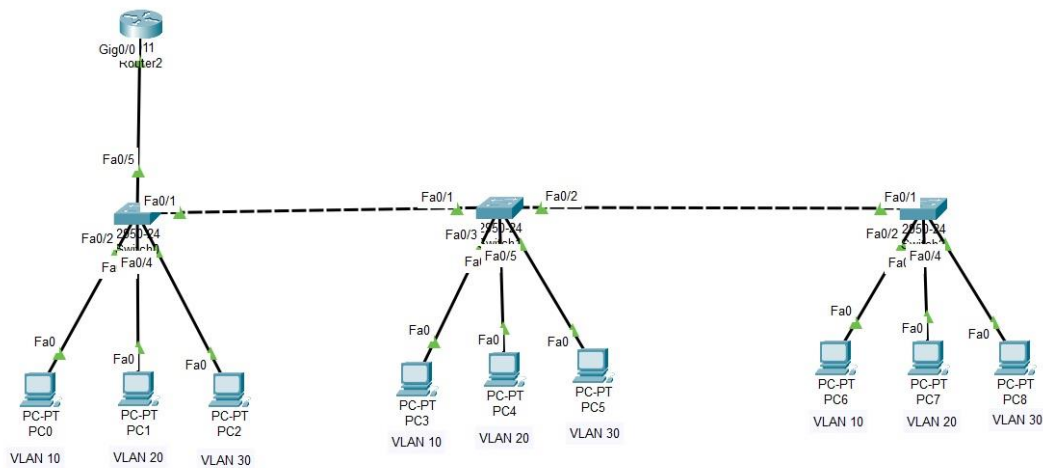
TASK 2:

TASK 3:

Working Procedure:

(Explain in brief how you completed the tasks. Provide necessary screenshots of used commands for each task.)
TASK 1:
TASK 2:
TASK 3:

Questions (Answer to the point):

1. Why do we need L3 Switches?
   Ans: L3 switches are indispensable for inter-VLAN communication because they can efficiently route traffic between different VLANs at wire speed, simplifying network design and management while ensuring high performance. By integrating routing functionality into the switch itself, L3 switches reduce network complexity, enhance security through features like access control lists, and offer scalability to accommodate the growth of the network over time, making them essential components for modern LAN environments.

2. What is the use router in Inter-Vlan Routing?
   Ans: Routers play a crucial role in inter-VLAN routing by facilitating communication between different VLANs at the network layer (Layer 3) of the OSI model. Unlike switches, which operate primarily at the data link layer (Layer 2) and forward traffic within the same VLAN, routers can interpret layer 3 information such as IP addresses and make forwarding

decisions based on this information. In the context of inter-VLAN routing, routers serve as gateways between VLANs, allowing traffic to flow between them by routing packets from one VLAN to another. Routers enforce security policies, perform packet filtering, and apply quality of service (QoS) mechanisms to prioritize traffic, thereby ensuring efficient and secure communication between VLANs within a network.

3. What changes are needed while configuring VLANs using L3 switches instead of Router-on-a-stick approach?

   Ans:

   When configuring VLANs using L3 switches instead of the Router-on-a-stick approach, we need,

   - Create Switched Virtual Interfaces (SVIs) for each VLAN.
   - Configure routing for inter-VLAN communication.
   - Set up trunk links to carry traffic for multiple VLANs.
   - Assign VLANs to specific switch interfaces.
   - Configure security features like access control lists (ACLs).
   - Optionally, configure Quality of Service (QoS) for traffic prioritization.

4. What is next-hop floating address?

   Ans:

5. What is the disadvantage of static routing?

   Ans: One disadvantage of static routing is its lack of adaptability to network changes. In static routing, routes are manually configured and do not dynamically adjust to changes in the network topology or link failures. This means that if there is a change in the network, such as the addition of new subnets or the failure of a router or link, the static routes may become outdated or invalid, leading to suboptimal routing or loss of connectivity. Additionally, managing static routes can be cumbersome and error-prone, especially in large or complex networks, as every change must be manually updated on each router. Compared to dynamic routing protocols, which automatically learn and adapt to network changes, static routing is less scalable and less resilient in dynamic environments.

Challenges (if any):