**Computer Network Lab**

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**Section 4B**

**Department of Software Engineering**

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**Task no 12:**

**VLAN (Virtual Local Area Network)**

1. **Definition**: A VLAN is a logical grouping of devices on the same physical network, which are segmented into different broadcast domains. VLANs allow network administrators to create distinct networks within the same physical infrastructure.
2. **Purpose**: The primary purpose of VLANs is to improve network efficiency and security. By separating devices into different VLANs, you minimize broadcast traffic, enhance security by restricting access to sensitive devices, and increase overall network performance.
3. **Configuration**: VLANs are typically configured on network switches. Each VLAN is assigned an identifier (VLAN ID), which can range from 1 to 4095. Devices within the same VLAN can communicate directly with each other, but devices in different VLANs cannot communicate without additional configuration (like routing).
4. **Common Use Cases**:
   * Isolating departments in an organization (e.g., HR, Finance, IT).
   * Creating separate networks for different services (e.g., guest Wi-Fi vs. internal network).
   * Enhancing security by separating sensitive data from general traffic.

**Inter-VLAN Routing**

1. **Definition**: Inter-VLAN routing is the process of enabling communication between different VLANs. Since devices in different VLANs cannot communicate directly, a routing mechanism is needed to allow traffic to pass between them.
2. **Purpose**: The primary purpose of Inter-VLAN routing is to facilitate communication between devices on different VLANs. For example, if a computer in VLAN 10 needs to communicate with a printer in VLAN 20, Inter-VLAN routing is required.
3. **Implementation**:
   * **Router-on-a-stick**: This is a common method where a single router interface is configured as a trunk link to the switch, allowing it to route traffic between multiple VLANs.
   * **Layer 3 Switch**: Some switches have Layer 3 capabilities that allow them to perform routing functions. In this case, the switch can route traffic between VLANs without needing a separate router.
4. **Common Use Cases**:
   * Allowing different departments to communicate while still maintaining VLAN separation.
   * Enabling internet access for devices in multiple VLANs.
   * Supporting services that require cross-VLAN communication, such as printing or file sharing.

Structure of vlan or inter vlan :-

