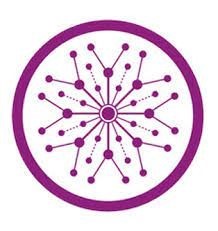
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**Superior University Gold Campus**

**CN LAB 12 TASK**

Difference between VLAN & Inter VLAN

**Program:**

BS DATA SCIENCE

**Course Name:**

(Computer Network LAB)

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**Difference between VLAN and Inter-VLAN Routing**

**VLAN (Virtual Local Area Network)** and **Inter-VLAN Routing** are concepts used in computer networks to segment network traffic and allow communication between those segments. Here's a detailed explanation of both, along with their differences and an example to clarify:

**1. VLAN (Virtual Local Area Network)**

**Definition**:  
A **VLAN** is a logical partition of a physical network into multiple broadcast domains. It is used to divide a larger network into smaller, isolated networks, even if they are physically connected. Each VLAN has its own unique identifier (VLAN ID), and devices in the same VLAN can communicate directly with each other without needing a router.

**Purpose**:

* To segment networks for improved management and security.
* To reduce broadcast traffic, as devices in different VLANs do not receive each other’s broadcasts.
* To manage and optimize traffic by grouping devices based on logical requirements rather than physical layout.

**Example**: Consider a company with departments like Sales, HR, and IT. They can each have their own VLAN:

* **VLAN 10**: Sales
* **VLAN 20**: HR
* **VLAN 30**: IT

Even if all departments are physically connected to the same switch, they are logically separated into different VLANs, and the devices in **Sales (VLAN 10)** can only communicate with each other unless they go through a router or another Layer 3 device.

**2. Inter-VLAN Routing**

**Definition**:  
**Inter-VLAN Routing** refers to the process of forwarding traffic between different VLANs. Since VLANs are separate broadcast domains, devices in different VLANs cannot communicate directly with each other unless routed. **Inter-VLAN Routing** is typically done by a **router** or a **Layer 3 switch** (which is a switch that can perform routing).

**Purpose**:

* To allow communication between devices in different VLANs.
* A router or Layer 3 switch is required to forward data packets between the VLANs.

**Example**:

* **VLAN 10 (Sales)** has IP addresses 192.168.1.0/24.
* **VLAN 20 (HR)** has IP addresses 192.168.2.0/24.
* **VLAN 30 (IT)** has IP addresses 192.168.3.0/24.

In this setup, devices in **VLAN 10 (Sales)** want to communicate with devices in **VLAN 20 (HR)**. Since they are in different VLANs, their communication must go through a router or Layer 3 switch.

**Key Differences between VLAN and Inter-VLAN Routing**

| **Aspect** | **VLAN** | **Inter-VLAN Routing** |
| --- | --- | --- |
| **Definition** | Logical segmentation of a physical network. | Routing traffic between different VLANs. |
| **Function** | Divides a network into smaller, isolated networks. | Allows communication between devices in different VLANs. |
| **Layer** | Operates at Layer 2 (Data Link Layer) of the OSI model. | Operates at Layer 3 (Network Layer) of the OSI model. |
| **Communication** | Devices within the same VLAN can communicate directly. | Requires a router or Layer 3 switch for communication. |
| **Purpose** | To reduce broadcast traffic, improve security, and segment networks. | To allow communication between VLANs. |
| **Example of Use** | A company may create separate VLANs for different departments. | A router allows communication between the Sales and HR VLANs. |

**Structure ON other File**