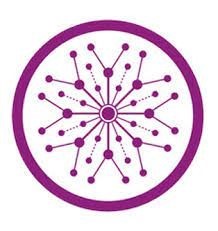
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**Superior University Gold Campus**

**CN LAB 11 TASK**

Difference between DHCP,VLAN,DNS

**Program:**

BS DATA SCIENCE

**Course Name:**

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**Difference between DHCP, VLAN and DNS**

**1. DHCP (Dynamic Host Configuration Protocol)**

DHCP is a network management protocol that automatically assigns **IP addresses**, subnet masks, default gateways, and DNS settings to devices (like PCs, printers, etc.) on a network. It eliminates the need to manually configure network settings for each device.

**Example:**

* Imagine you are running a hotel with 100 rooms, each equipped with a smart TV and a Wi-Fi-enabled thermostat. Instead of manually assigning an IP address to each device, a DHCP server automatically assigns the required IP addresses when devices connect to the network.

**How it works**:

1. When a device connects to the network, it sends a **DHCP Discovery Request** to find a DHCP server.
2. The DHCP server responds with an available IP address and other network configurations.
3. The device uses this information to join the network.

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

A VLAN is a logical grouping of devices on a network that behave as if they are in the same physical LAN, even if they are located in different physical locations. VLANs enhance **network segmentation**, security, and efficiency.

**Example:**

* In your hotel, you can use VLANs to separate different departments:
  + **VLAN 10**: For **Reception** PCs and printers.
  + **VLAN 20**: For **HR and Finance**.
  + **VLAN 30**: For **Guest Wi-Fi**.

This segmentation ensures that guest traffic (e.g., from smartphones and laptops) cannot access the internal business network of the hotel (e.g., HR records or financial systems).

**How it works**:

* VLANs are configured on network switches by assigning specific ports to specific VLANs. Devices connected to those ports belong to that VLAN and can communicate with devices within the same VLAN only.

**3. DNS (Domain Name System)**

DNS is like the phonebook of the internet. It translates **domain names** (human-readable web addresses like www.hotel.com) into **IP addresses** (machine-readable, e.g., 192.168.1.1) so that computers can locate and connect to websites and services.

**Example:**

* When a guest types www.hotelwifi.com into their web browser to log in to the hotel Wi-Fi, the DNS server translates this domain name into the IP address of the hotel's Wi-Fi login portal server.
* Without DNS, guests would have to remember the server’s numerical IP address (e.g., 192.168.0.101) to access the portal, which is inconvenient.

**How it works**:

1. A device sends a DNS query to the DNS server, asking for the IP address of a domain name.
2. The DNS server looks up the address and returns the correct IP address.
3. The device uses the IP address to establish a connection.

**Summary Table**

| **Protocol** | **Purpose** | **Example** |
| --- | --- | --- |
| **DHCP** | Assigns IP addresses automatically. | Automatically configures devices on a hotel network. |
| **VLAN** | Segments network traffic logically. | Separates guest Wi-Fi traffic from internal office systems. |
| **DNS** | Translates domain names to IP addresses. | Converts www.hotelwifi.com to the server's IP. |