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Lab Task 11

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

**What is DHCP?**

* **DHCP** is a protocol used to dynamically assign IP addresses to devices on a network. This eliminates the need for network administrators to manually assign IPs to every device.
* DHCP also provides other network configuration information, such as the default gateway and DNS server IP.

**Example of DHCP:**

Imagine a **classroom network** where PCs are connected to a **switch**. Instead of manually assigning each PC an IP, the DHCP server will automatically assign IPs within a certain range.

* **DHCP Server:** 192.168.1.1
* **PC1:** 192.168.1.2
* **PC2:** 192.168.1.3

The DHCP server assigns these addresses to the PCs when they boot up, simplifying network management.

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

**What is VLAN?**

* **VLAN** is a network segmentation technique that logically divides a physical network into multiple isolated networks.
* Each VLAN operates as if it is its own network, even though devices may be physically connected to the same switch.

**Example of VLANs:**

In a **university network**, the network might be divided into several VLANs for different departments:

* **VLAN 10 (Faculty):** IP range 192.168.10.0/24
* **VLAN 20 (Students):** IP range 192.168.20.0/24
* **VLAN 30 (Admin):** IP range 192.168.30.0/24

Devices in **VLAN 10** can only communicate with other devices in the same VLAN unless routing is configured (using a **router-on-a-stick**). VLANs improve security by isolating traffic between departments.

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

**What is DNS?**

* **DNS** is a system that translates human-readable domain names (like www.example.com) into IP addresses (like 192.168.1.10).
* This allows users to access websites and services using easy-to-remember names instead of IP addresses.

**Example of DNS:**

* **DNS Server IP:** 192.168.1.5
* **DNS Entries:**
  + faculty.university.com -> 192.168.10.10
  + students.university.com -> 192.168.20.10

When a user types faculty.university.com in a browser, the DNS server resolves it to 192.168.10.10.