**Superior University Faculty of CS & IT**

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Task 11

Computer Network Lab

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**Program:** SE

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**Department of Software Engineering**

**Task 1:**

**What is “DHCP, VLAN & DNS”, explain with Example.**

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

***Definition:***

DHCP is a network protocol that automatically assigns IP addresses and other network configuration details (such as default gateway and DNS servers) to devices on a network. This allows devices to communicate on the network without requiring manual configuration of network settings.

**How it works:**

When a device (such as a computer or smartphone) connects to a network, it sends a request (DHCP Discover) to the DHCP server. The server then assigns an IP address and sends back other network details (DHCP Offer). The device acknowledges this offer (DHCP Request) and is assigned the network configuration (DHCP Acknowledgment).

**Example:**

* Imagine you are at a coffee shop with free Wi-Fi. When you connect your phone or laptop to the coffee shop's Wi-Fi network, it automatically receives an IP address like **192.168.1.15** from the router, along with DNS and gateway information. The router uses DHCP to assign this IP address, so you don’t have to manually enter it.

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

***Definition:***

A VLAN is a logical partition of a physical network. It allows network administrators to group devices together into a single broadcast domain, regardless of their physical location on the network. VLANs improve network performance, security, and management by isolating traffic between groups of devices.

**How it works:**

VLANs work by tagging network frames (data packets) with a VLAN identifier (ID). Devices in the same VLAN can communicate directly with each other, but devices in different VLANs need a router to communicate. This segmentation helps reduce network congestion, improve security, and manage traffic more efficiently.

**Example:**

Imagine an office with two departments: **Sales** and **Engineering**.

* + VLAN 10: Sales Department
  + VLAN 20: Engineering Department Both departments can use the same physical network hardware (routers, switches), but their traffic will be separated logically. This way, the sales team’s data doesn’t interfere with engineering’s, and vice versa, improving both performance and security.

***DNS (Domain Name System)***

***Definition:***

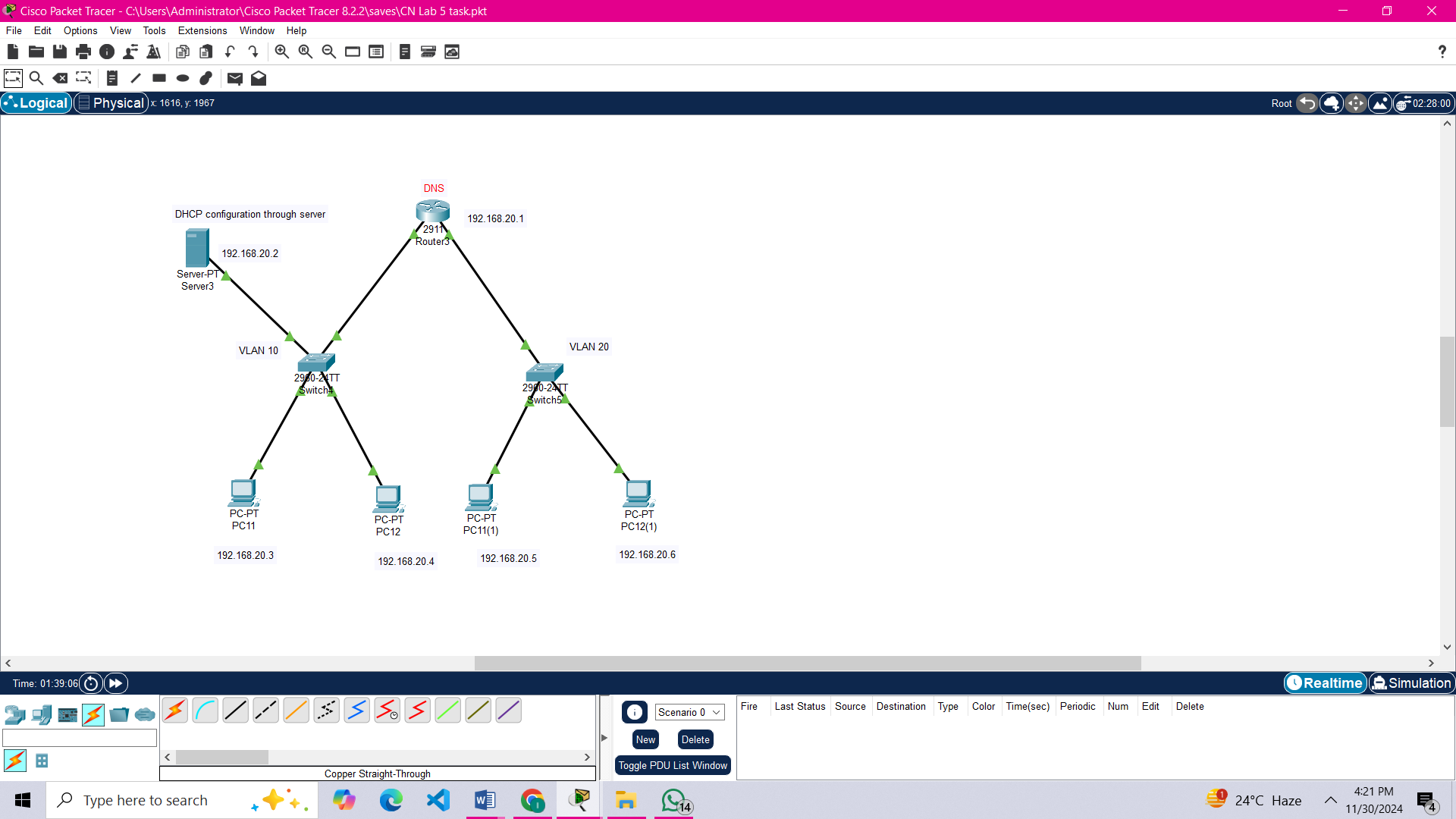
DNS is a system that translates human-readable domain names (like **www.example.com**) into machine-readable IP addresses (like **192.168.1.1**). It works like an address book for the internet, allowing users to access websites using names instead of numerical IP addresses.

**How it works:**

When you enter a website’s domain name in your browser, your computer sends a request to a DNS server to resolve the domain name to its corresponding IP address. The DNS server then returns the correct IP address so your computer can establish a connection with the website’s server.

**Example:**

* When you type **www.google.com** into your browser, your computer sends a request to a DNS server to resolve that domain name. The DNS server responds with the IP address **172.217.6.196** (which corresponds to Google's server). Your computer can then connect to Google's server using this IP address.

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