# **N+ Assingnment Module 1 Vijay Vachhani**

# What is a Network?

# A network is a collection of computers, servers, mainframes, peripherals, or other devices interconnected to facilitate communication and data sharing. Essentially, it allows two or more devices to exchange information, resources, and services. Think of it like a spider web where transmission lines (similar to webbing) connect hardware devices (often called nodes). [Networks can range from just two devices to the vast Internet connecting billions of people worldwide1](https://www.computerhope.com/jargon/n/network.htm).

# 2) Types of Networks:

# Local Area Network (LAN):

# Frequently used network within a limited area (e.g., home, office, school).

# Connects computers over a server.

# Range: Up to 2 km.

# Technologies: Ethernet, Wi-Fi.

# [Examples: Home networks, school labs, offices](https://www.computerhope.com/jargon/n/network.htm)[2](https://www.geeksforgeeks.org/types-of-computer-networks/).

# Metropolitan Area Network (MAN):

# Connects computers over a city or town.

# Range: 5 to 50 km.

# Technologies: FDDI, CDDI, ATM.

# [Examples: Town networks, city-wide connections](https://www.computerhope.com/jargon/n/network.htm)[2](https://www.geeksforgeeks.org/types-of-computer-networks/).

# Wide Area Network (WAN):

# Spans large geographical distances (e.g., across countries).

# Technologies: Leased lines, satellites, fiber optics.

# What is internet?

# The Internet is a globally connected network system that facilitates communication and data services through a vast collection of private, public, business, academic, and government networks. [It serves as a virtual infrastructure linking millions of computers and electronic devices worldwide, allowing seamless information exchange](https://www.techopedia.com/definition/2419/internet).

# Network Topologies:

# [Mesh, ring, star, tree, bus, hybrid](https://www.computerhope.com/jargon/n/network.htm)[1](https://www.computerhope.com/jargon/n/network.htm)

# Cables Used in Networks:

# Twisted Pair: Common for LANs, uses twisted copper wires.

# Fiber Optics: High-speed data transmission using light signals.

# Straight Cable Standard Sequences 568 A and 568 B:

# Not done in class yet

# What is fiber optics moduel and fiber connector?

# Not done in class yet

# Network Devices:

# Switch: Manages data traffic within a LAN.

# Router: Connects different networks and directs data between them.

# Modem: Converts digital data to analog for transmission over phone lines.

# DHCP (Dynamic Host Configuration Protocol): DHCP is a network protocol that automatically assigns IP addresses and other network configuration information to devices on a network, allowing them to communicate with other devices and access network resources without manual configuration.

# DNS (Domain Naming Services): DNS is a system that translates human-readable domain names (like example.com) into IP addresses (like 192.0.2.1), allowing users to access websites and other resources using easy-to-remember names.

# Protocol: A protocol is a set of rules and conventions that govern how data is transmitted and received over a network.

# **Unicast, Multicast, and Broadcast**:

# Unicast: Data is sent from one sender to one receiver.

# Multicast: Data is sent from one sender to multiple specifically designated receivers.

# Broadcast: Data is sent from one sender to all devices on the network.

# OSI Model (Open Systems Interconnection Model): The OSI model is a conceptual framework used to understand and standardize the functions of a telecommunication or computing system into seven layers, each responsible for different aspects of network communication.

# Port Number: A port number is a 16-bit integer used to uniquely identify a specific process or service running on a computer in a network. Ports are used in conjunction with IP addresses in the transport layer protocols like TCP and UDP.

# TCP vs UDP Communications: TCP (Transmission Control Protocol) provides reliable, connection-oriented communication with error checking and data retransmission, while UDP (User Datagram Protocol) provides faster, connectionless communication without guaranteed delivery or error checking.

# Session Development: Session development refers to the process of establishing, maintaining, and terminating communication sessions between networked devices.

# Flow Control: Flow control is a mechanism used to regulate the flow of data between sender and receiver in a network to prevent congestion and ensure efficient transmission.

# Difference between TCP/IP Model and OSI Model: The TCP/IP model is a simpler, four-layer conceptual model that combines the OSI model's physical and data link layers into one layer. It's widely used in practice, while the OSI model is more of a theoretical framework.

# ARP (Address Resolution Protocol) Broadcast: ARP broadcast is a mechanism used by devices on a network to discover the MAC addresses associated with specific IP addresses.

# MAC Address: A MAC (Media Access Control) address is a unique identifier assigned to network interfaces for communication on a physical network segment.

# IP Address: An IP (Internet Protocol) address is a numerical label assigned to each device connected to a computer network that uses the IP for communication. IPv4 addresses are 32 bits long, while IPv6 addresses are 128 bits long.

# Multiple IPv4 Addresses on a Single Network Adapter: Assigning multiple IPv4 addresses to a single network adapter allows a device to communicate over multiple networks simultaneously.

# Network Vulnerabilities: Network vulnerabilities are weaknesses in a network's security that could be exploited by attackers to gain unauthorized access, disrupt services, or steal data.

# Firewall: A firewall is a network security device or software that monitors and controls incoming and outgoing network traffic based on predetermined security rules.

# Wireless Access Point: A wireless access point (AP) is a device that allows wireless devices to connect to a wired network using Wi-Fi.

# Wireless Extender: A wireless extender, also known as a range extender or repeater, is a device that amplifies and retransmits a wireless signal to extend the coverage area of a wireless network.