A **computer network** is a fundamental aspect of modern technology that enables computers to communicate and share resources with each other. It is a system of interconnected devices, often referred to as nodes, which can include computers, servers, printers, switches, routers, and other hardware. These devices are connected through various communication channels such as wired connections (e.g., Ethernet cables) or wireless connections (e.g., Wi-Fi). The primary purpose of a computer network is to facilitate the sharing of data, resources, and applications, enabling individuals and organizations to work more efficiently and collaboratively.

The concept of computer networks dates back to the mid-20th century, when researchers began exploring ways to connect computers for data exchange. The advent of the **ARPANET** in the late 1960s, a project funded by the U.S. Department of Defense, marked a significant milestone in networking history. ARPANET introduced packet-switching technology, a method of breaking data into smaller packets for transmission, which remains the foundation of modern networking. Over time, the development of protocols like the **Transmission Control Protocol/Internet Protocol (TCP/IP)** further revolutionized networking, enabling the creation of the **Internet**—the largest and most significant global network.

Computer networks are typically classified based on their scale, architecture, and purpose. One common classification is based on geographic scope, resulting in categories such as **Local Area Networks (LANs)**, **Wide Area Networks (WANs)**, and **Metropolitan Area Networks (MANs)**. LANs are confined to a small area, such as a home, office, or school, and are often used for sharing resources like files, printers, and internet access among a limited number of devices. WANs, on the other hand, span large geographic areas, connecting devices across cities, countries, or even continents. The Internet is a prime example of a WAN. MANs bridge the gap between LANs and WANs, covering a larger area than LANs but remaining smaller than WANs, often encompassing a city or a campus.

Another way to classify networks is by their architecture, specifically whether they are **peer-to-peer (P2P)** or **client-server**. In a peer-to-peer network, all devices are equal and can act as both clients and servers, sharing resources directly without relying on a centralized authority. This type of network is common in small-scale setups and file-sharing applications. In contrast, client-server networks involve a central server that provides services, resources, or data to client devices. These networks are prevalent in business environments and are designed to handle large numbers of users and resources.

The functionality of a computer network depends heavily on protocols, which are predefined rules and conventions that govern how data is transmitted and received. Protocols ensure that devices with different hardware and software configurations can communicate effectively. One of the most crucial protocol suites is **TCP/IP**, which forms the backbone of the Internet. TCP handles data transmission reliability by ensuring that packets arrive intact and in the correct order, while IP is responsible for addressing and routing packets to their destination. Other essential protocols include **HTTP/HTTPS** for web browsing, **FTP** for file transfers, and **SMTP** and **IMAP** for email communication.

The physical components of a computer network are just as important as its protocols. These components include hardware devices like routers, switches, modems, and access points. Routers direct data traffic between different networks, making them essential for Internet connectivity. Switches connect devices within a single network, enabling efficient data transfer.