

Computer Networks: Interconnected devices sharing resources and information, enabling efficient data exchange for applications like email and internet browsing.

Network Functionality: Networks facilitate communication, resource sharing, and access to information, evolving from simple connections to complex, adaptable systems.

Network Components: Networks consist of nodes (devices like computers and routers) connected by links (cables or wireless connections), communicating via protocols and IP addresses.

Network Evolution: Initially used for military purposes, computer networks are now essential for businesses, offering flexibility, automation, and enhanced security.

Key Network Capabilities: Modern networks support virtual networks, large-scale connectivity, rapid adaptation through software control, and built-in security features.

Basic Network Terms: Understanding terms like network, nodes, protocols, topology, IP address, DNS, and firewall is crucial for comprehending networking concepts.

Enterprise Network Types: Common network types include LANs (local area networks), WANs (wide area networks), and cloud networks, each serving different geographical scales and purposes.

Open and Closed Systems: An open system is connected to the network and ready for communication, while a closed system is not.

Network Architectures: Network architectures define how devices are organized, including client-server (centralized server) and peer-to-peer (decentralized) models.

Network Devices: Devices like routers, switches, hubs, and bridges facilitate communication between connected devices in a network.

Network Topologies: Network topology describes the physical or logical arrangement of devices, including bus, star, ring, mesh, tree, and hybrid topologies.

OSI Model: The OSI model is a seven-layer framework that standardizes communication protocols and functionalities at each layer.

Network Protocols: Protocols are sets of rules governing data transmission, including TCP/IP, HTTP/HTTPS, SMTP, FTP, DHCP, and DNS.

Network Identifiers: Devices are uniquely identified by hostnames, IP addresses (logical), MAC addresses (physical), and port numbers, which combine to form sockets.

DNS (Domain Name System): DNS translates human-readable domain names into IP addresses, enabling easy access to websites.

ARP (Address Resolution Protocol): ARP maps IP addresses to MAC addresses, crucial for local network communication.

RARP (Reverse Address Resolution Protocol): RARP (now obsolete) mapped MAC addresses to IP addresses.

Network Security: Network security is essential for protecting data and resources, employing firewalls, encryption, intrusion detection, access control, and regular updates.

Benefits of Computer Networks: Networks enable fast communication, expanded storage options, simplified information sharing, and enhanced security measures.