

Computer Networking Basics

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1. Introduction to Computer Networking

- Computer networking is the practice of connecting computers and other devices to share resources and information.
- Networks can be categorized based on their geographical scope: LAN (Local Area Network), WAN (Wide Area Network), MAN (Metropolitan Area Network), etc.

2. Types of Networks

- LAN (Local Area Network): Connects devices within a limited area such as a home, office, or campus.
- WAN (Wide Area Network): Spans a large geographical area, connecting LANs and other networks across long distances.
- WLAN (Wireless Local Area Network): Uses wireless technology to connect devices within a limited area.

3. Networking Devices

- Router: Connects multiple networks together and routes data packets between them.
- Switch: Connects devices within a network to facilitate communication.
- Modem: Converts digital data from a computer into signals that can be transmitted over a communication channel.

4. Networking Protocols

- TCP/IP (Transmission Control Protocol/Internet Protocol): A set of rules governing how data is transmitted over the internet.
- HTTP (Hypertext Transfer Protocol): Used for transmitting and displaying web pages on the internet.
- FTP (File Transfer Protocol): Allows for the transfer of files between computers on a network.

5. Networking Topologies

- Bus Topology: All devices are connected to a single cable.
- Star Topology: Each device is connected to a central hub or switch.

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- Mesh Topology: Devices are interconnected with each other for redundancy and fault tolerance.

6. IP Addressing

- An IP address is a unique numerical label assigned to each device on a network.
- IPv4 (Internet Protocol version 4) uses a 32-bit address in the format xxx.xxx.xxx.xxx.
- IPv6 (Internet Protocol version 6) uses a 128-bit address to accommodate the growing number of devices connected to the internet.

7. Network Security

- Firewalls: Security devices that monitor and control incoming and outgoing network traffic.
- VPN (Virtual Private Network): Encrypts data transmitted over a public network to ensure privacy and security.
- Antivirus Software: Protects devices from malware and other cyber threats.

8. Conclusion

- Understanding computer networking basics is essential for anyone working with computers or connected devices.
- Networking knowledge helps in troubleshooting network issues, optimizing network performance, and ensuring data security.