



Prepare 50% Faster

Study Notes

Networking Devices

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Networking Devices

Networking Devices & Network Components

Modem

Function: Modem (Modulator-Demodulator) connects computers for communication via telephone lines.

Hub

Function: Operates at the Physical layer, connects multiple devices but broadcasts all data packets to all connected devices without filtering.



Modem



NIC



Repeater



Hub



Switch



Router



Bridge



Gateway

Switch

Function: Operates at the Data Link layer, connects devices like a hub but sends data packets only to the intended recipient, improving network efficiency by avoiding bandwidth sharing.

Repeater

Function: Operates at the Physical layer, amplifies weak signals to extend network reach but does not filter noise, potentially increasing network traffic.

Router

Function: Operates at the Network layer, connects networks with different architectures and protocols, and directs data packets to their destinations efficiently using routing tables to minimize network congestion.

Gateway

Function: Operates across all layers of the network architecture, connects networks with different communication protocols or data formats, converting data packets for compatibility.

Bridge

Function: Operates at the Data Link layer, connects two LANs with the same standard but using different types of cables, selectively forwards messages based on physical addresses to enhance network performance.

Router

Function: Operates at both the Network and Data Link layers, functions as both a bridge and a router, capable of forwarding data between networks and routing data to individual systems within a network.

Feature	Bridge	Router
Function	Connects two LAN segments using MAC addresses	Sends data between LANs or LAN to WAN using IP addresses
Segments Connected	Connects two different LAN segments	Connects LAN and WAN
Data Format	Transfers data in frames	Transfers data in packets
Table Usage	Does not use a table for data forwarding	Uses a routing table for data forwarding

NIC (Network Interface Card)

NIC (Network Interface Card): A hardware component that connects a computer to a network. It contains a unique MAC (Media Access Control) address assigned by IEEE, stored in PROM (Programmable Read-Only Memory).



Function: Enables computers to communicate over a network by transmitting and receiving data packets.

Types: Wired NIC (connects via cables) and Wireless NIC (connects wirelessly).

Computer Network Architecture

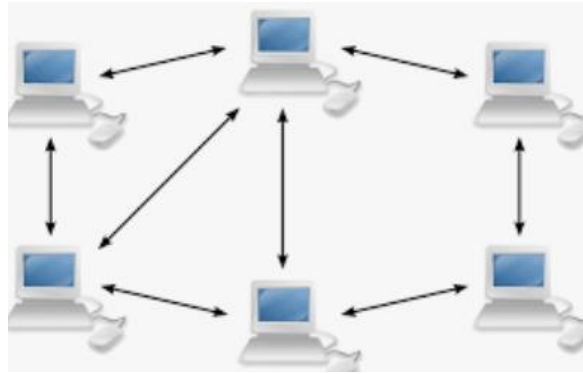
Computer Network Architecture: The physical and logical design encompassing software, hardware, protocols, and media used for data transmission

Peer-To-Peer Network:

Description: All computers are linked equally without a central server. Each computer shares resources like files or printers.

Suitability: Ideal for small environments with fewer than 10 computers.

Challenges: Dependency on individual computers for resources, which can cause issues if a resource-hosting computer is offline.

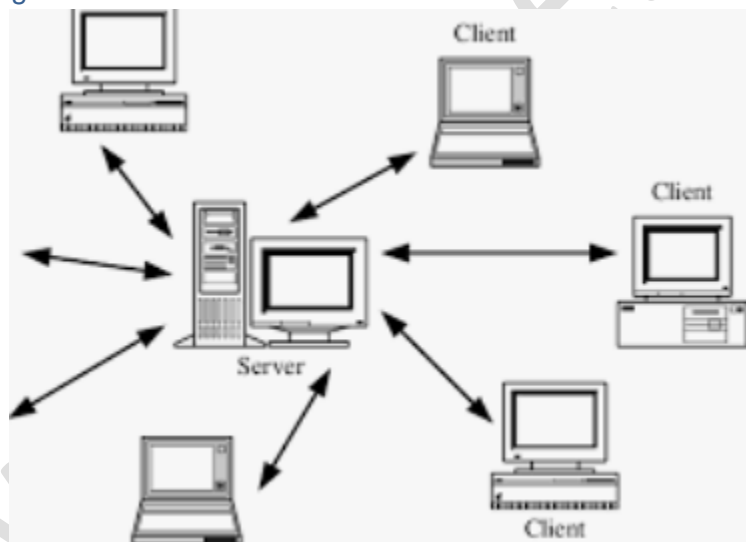


Client/Server Network:

Description: Clients (end users) access resources (files, media) from a central server.

Role of Server: Manages security, network operations, and resource allocation.

Advantages: Centralized management enhances security and facilitates efficient resource sharing.



Summary

NICs enable computers to connect to networks, distinguishing between wired and wireless connections. Network architectures include peer-to-peer for decentralized resource sharing and client/server for centralized management and resource allocation. Each architecture suits different network sizes and operational needs.