NETWORK TOPOLOGY

Fundamental layout of a network

- Describes the path or paths between any two points in the network
- Affects availability, speed and traffic congestion of the network
- Logical topology
- Operational relationship between the various network components
- Physical topology

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- Actual layout of the network wiring



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BUS TOPOLOGY

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- Each node is tapped into the bus
- Each node "broadcasts" a message that travels along the bus
- Every node on the bus receives the message Message is ignored by all nodes except the one whose node matches the delivery address in the message
- Transmissions travel entire medium (both directions)
- Termination required at ends of bus to prevent signal from echoing
- Traffic congestion is a major issue
- Hubs work at Layer 1 of the OSI Model

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Mesh Topology **NETWORK DEVICES** THINK BIG 🚱 WE DO THINK BIG 🎑 WE DO Multiple paths between end nodes Repeater (Physical Layer) - Amplifies and repeats signal - Failure of an individual intermediate node Switch will slow but not stop the network as long Hub (Physical Layer) as an alternative path is available Router - Passive central bus connection Large networks that use switches and Bridge (Data Link Layer) routers are typically partial mesh - Routes packets based on MAC addresses Router networks Switch (Network Layer) Full mesh network Switch - Routes packets based on IP addresses Direct point-to-point channel connecting Router Router (Network Layer) every pair of nodes - Routes packets between networks É. - Impractical due to the large number of Gateway (Various Layers) connections needed - Converts between protocols and networks 04:06 04:57

LOCAL AREA NETWORKS (LAN)

- **Connects computers and other** networked devices over small localized area
- Ranges in size from
- Single room to

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- Multiple buildings in close range of each other
- Creating separate LANs for different departments or for different business functions minimizes extraneous traffic on the network
- Routers and perhaps gateways are used to connect the LAN to other networks



UNIVERSITY WIDE AREA NETWORKS (WAN)

- Communication between users and applications over large geographical distances
- Intranet
- WAN that services a single company or organization
- Campus Area Network (CAN)
- Can have dedicated high speed connections between geographic locations



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Internet Backbones

Internet Service Providers (ISPs)

- Local ISPs receive their service from regional ISPs who, in turn, receive their service from national ISPs
- No official central backbone and no official guidance for its development

Internet backbone

- High speed fiber optic networks carry traffic between major cities throughout world
- Speed ranges from 45 to 625 Gbps with 1.6 Tbps backbones available
- Network access points (NAP)
- Interchanges between the backbor



Created for the personal use of an individual

- Generally have ranges of 30 feet or less which is sufficient to permit an individual to interconnect personal computing devices
- Connections between different cooperating users are possible
- Bluetooth is the primary medium
- Common Example:
- Interconnection between a cell phone, hands-free speaker and car radio

PERSONAL AREA NETWORKS (PAN) THINK BIG 馢 WE DO

