

Here is a summarized version of your PDF content on Network Topology:

Network Topology Summary

What is Network Topology?

A computer network is a collection of two or more computers connected to share information and resources.

Types of Network Topology

Based on Geographical Area

- **LAN:** Local Area Network
- **MAN:** Metropolitan Area Network
- **WAN:** Wide Area Network

Based on Architecture

1. **Bus Topology:** Single cable connecting all nodes.
2. **Star Topology:** All nodes connected to a central hub.
3. **Advantages:** Easy to manage, expandable.
4. **Disadvantages:** Hub is a single point of failure, higher installation cost.
5. **Ring Topology:** Nodes connected in a loop.
6. **Advantages:** Easier fault location, good for long-distance LAN.
7. **Disadvantages:** Expensive, limited expansion.
8. **Tree Topology:** Hierarchical structure with a root node.
9. **Advantages:** Easy to expand, managed easily.
10. **Disadvantages:** Heavily cabled, expensive.
11. **Mesh Topology:** Point-to-point connections between nodes.
12. **Advantages:** High security, easy fault diagnosis.
13. **Disadvantages:** Complex installation, costly.
14. **Hybrid Topology:** Combination of two or more topologies.
15. **Advantages:** Reliable, scalable.
16. **Disadvantages:** Complex and expensive.

Client-Server vs P2P

- **Client-Server:** Centralized management, better for large networks.
- **P2P:** Decentralized, simple, suitable for small networks.

Modern Internetworks

- **Intranet:** Private network for internal use.

- **Extranet:** Private network extended to specific external users.
- **Internet:** Global network of networks using TCP/IP.

Basic Networking Hardware

- **NICs:** Network Interface Cards
- **Bridges, Hubs, Switches, Routers**
- **Cabling:** Cat 5, Cat 6 or wireless connections

Key Devices

- **Modems:** Convert digital signals to analog and vice versa.
- **Repeaters:** Extend signal range.
- **Hubs:** Physical layer device, broadcasts packets.
- **Switches:** Forward frames based on MAC addresses.
- **Routers:** Forward packets using IP addresses, select best path.

Scenarios

University Campus Network

- Recommended topology: Star/Hybrid Star
- Supports scalability and reliability
- Compared to Bus topology: better performance, maintenance, reliability
- Challenges: High cost, single point of failure; solutions: phased deployment, backup switches

Hospital Network Design

- Needs high reliability, data security, scalability, minimal downtime
- Connects computers, servers, medical devices, and Wi-Fi

This summary condenses the main points and key details from your PDF.