

Introduction

- Overview
- Classification of Different Network “Types”
- Layered Network Architecture
- Definitions

- Objective
 - “Big Picture” - Details Later
 - Read Chapter 1 in Textbook

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What is a Computer Network?

- **Goal:** Provides service(s) that allow to send information from one host to another host.
- **Information:** Data, Video, Voice, Sound, Graphics,...
- **Service:**
 - Network Infrastructure (Hardware)
 - Protocols (Software)
- **Useful Analogy:** Postal Service

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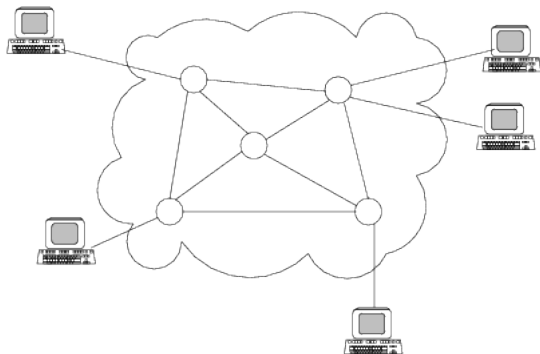
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Overview



Switch / Router



Terminal / Host / End-System

- **Hosts/End-Systems** run **Network Applications**
- **Switches/Routers/Nodes** and **Links** connect End-Systems
- End-Systems and Routers use **Protocols** to communicate
 - FTP,TCP,IP
- “**Services**” (**Protocols**) can be **Connection-Oriented** or **Connectionless**.
- There are many different network architectures (“hardware”) and protocols (“software”)

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SMTP (Simple Mail Transfer Protocol)

S: 220 sf.com

C: HELO toronto.edu

S: 250 Hello toronto.edu, pleased to meet you

C: MAIL FROM: <alice@toronto.edu>

S: 250 alice@toronto.edu... Sender ok

C: RCPT TO: <bob@sf.com>

S: 250 bob@sf.com ... Recipient ok

C: DATA

S: 354 Enter mail, end with "." on a line by itself

C: How are you?

C: See you soon.

C: .

S: 250 Message accepted for delivery

C: QUIT

S: 221 sf.com closing connection

- **Scope of the Networks**

- Personal Area Networks (PAN)
- Local Area Networks (LAN)
- Metropolitan Area Networks (MAN)
- Wide Area Networks (WAN)

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- **Transmission Technology**
 - Shard-Media-Broadcast Networks
 - Switched Point-to-Point Networks

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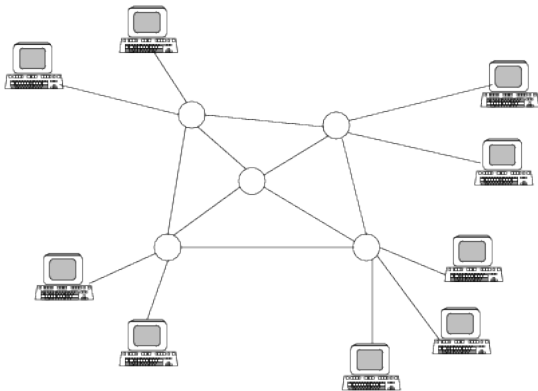
End-Systems share a common channel

Shared-Media-Broadcast Networks

- Examples:
- Advantages:
- Disadvantages:

Point-to-Point Networks

Information (Packet) travels over several nodes from one host to another host.



Point-to-Point Networks

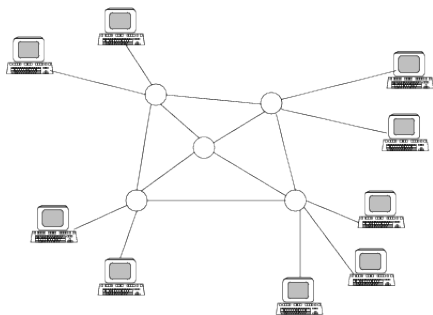
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- **Switched Point-to-Point Networks**
 - Circuit-Switched Networks
 - Packet-Switched Networks

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Circuit-Switched Networks

A (dedicated) share of the network capacity is allocated to each session (connection).

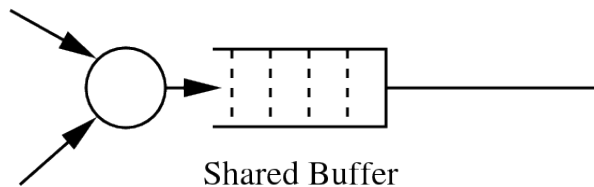


Circuit-Switched Networks

- Examples:
- Advantages:
- Disadvantages:

Packet-Switched Networks

Sessions share network resources.



Packet-Switched Networks

- Examples:
- Advantages:
- Disadvantages:

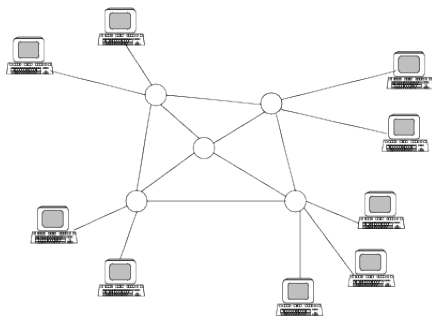
- **Packet-Switched Networks**

- Connection-Oriented Packet-Switched Networks
- Connectionless Packet-Switched Networks

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Connection-Oriented Packet-Switched Networks

All packets generated by a session follow the same path.

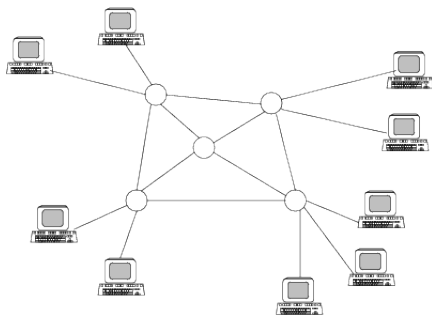


Connection-Oriented Packet-Switched Networks

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- Advantages:
- Disadvantages:

Connectionless Packet-Switched Networks

Packets of a session can follow different paths.

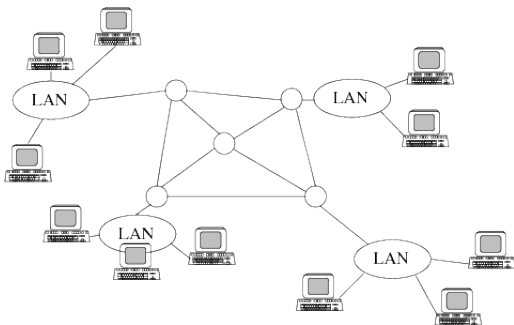


Connectionless Packet Switched Networks

- Examples:
- Advantages:
- Disadvantages:

What is the difference between a circuit-switched network and a connection-oriented packet-switched network?

Typical Network



Sessions

- **Interactive:** Short messages, small delay, high reliability
- **File transfer:** Long messages, moderate delay, high reliability
- **Digitized Voice:** Short messages, fixed small delay, moderate reliability
- **Web Traffic:** Long messages, small delay, high reliability
- **Video:** Long messages, fixed small delay. Requires broadcast and multicast capabilities.

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