

## Introduction

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- Overview
  - Classification of Different Network “Types”
  - Layered Network Architecture
  - Definitions
- > “Big Picture Now” - Details Later  
– > Read Chapter 1 in Textbook

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## What is a Computer Network?

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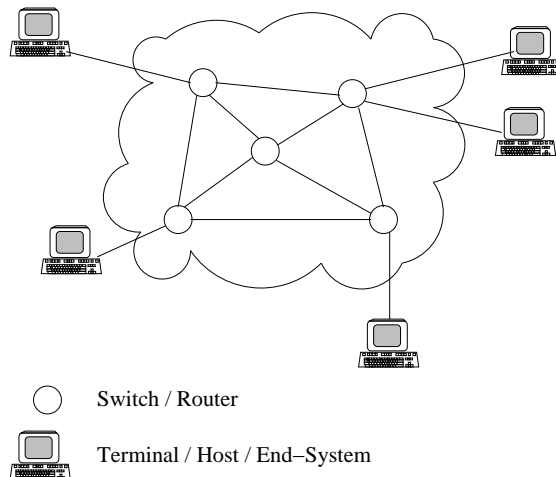
- **Goal:** Provides service(s) that allow to send information from one host to another host.
- **Information:** Data, Video, Voice, Sound, Graphics,...
- **Service:**
  - Network Infrastructure (Hardware)
  - Protocols (Software)

### Useful Analogy: Postal Service

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## Overview

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## Overview

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- **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**” can be **Connection-Oriented** or **Connectionless**.

**There are many different network architectures (“hardware”) and protocols (“software”)**

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## SMTP (Simple Mail Protocol)

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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

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## Classification

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- **Scope of the Networks**
  - Personal Area Networks (PAN)
  - Local Area Networks (LAN)
  - Metropolitan Area Networks (MAN)
  - Wide Area Networks (WAN)
- **Transmission Technology**
  - Shared-Media-Broadcast Networks
  - Switched Point-to-Point Networks

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- **Switched Point-to-Point Networks**
  - Circuit-Switched Networks
  - Packet-Switched Networks
- **Packet-Switched Networks**
  - Connection-Oriented (Virtual-Circuit Routing)
  - Connectionless (Datagram Routing, Dynamic Routing)

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## Shared-Media-Broadcast Networks

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End-Systems share a common channel

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- Examples:

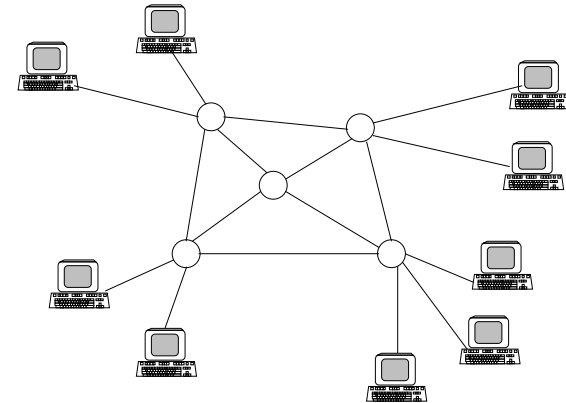
- Advantages:

- Disadvantages:

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### Point-to-Point Networks

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



- Examples:

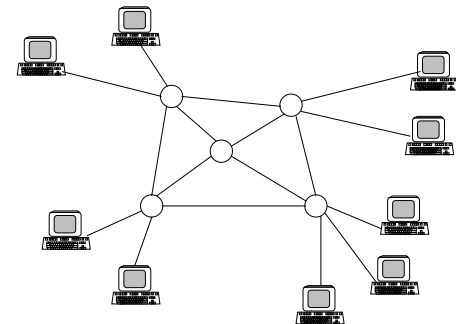
- Advantages:

- Disadvantages:

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### Circuit-Switched Networks

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



- Examples:

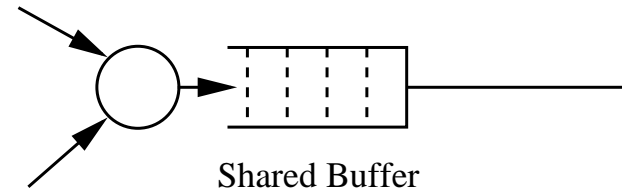
- Advantages:

- Disadvantages:

## Packet-Switched Networks

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Sessions share network resources.



- Examples:

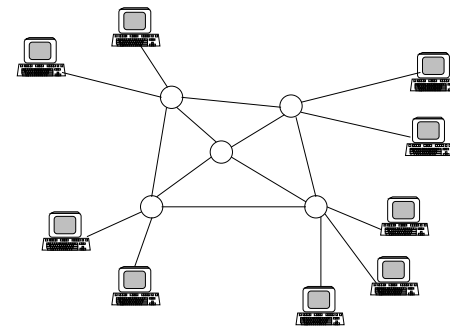
- Advantages:

- Disadvantages:

## Connection-Oriented Packet-Switched Networks

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All packets generated by a session follow the same path.



- Examples:

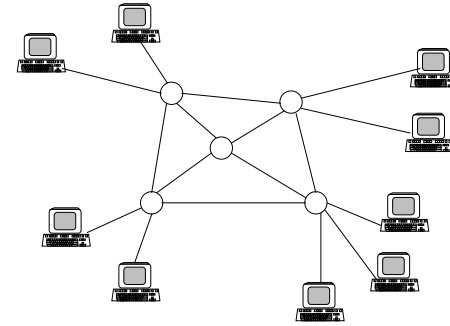
- Advantages:

- Disadvantages:

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### Connectionless Packet Switched Networks

Packets of a session can follow different paths.



- Examples:

- Advantages:

- Disadvantages:

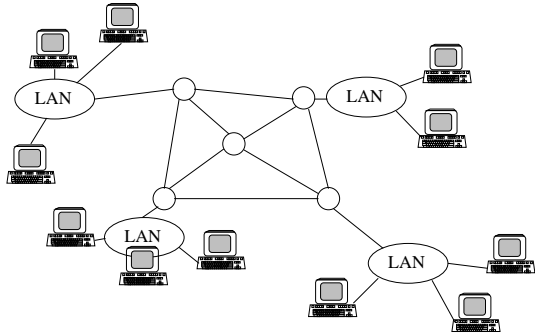
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### Question

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

## Typical Network

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## Sessions

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- **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.