

Computer Networks (CSE 3205 & CSE 3206)

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Overview

Computer
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Classification
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- Gain a general understanding of the principles and concepts governing the operations of computer networks
- Gain a general understanding of Network Security
- Includes both theory and practice
- Theory: Networks Layers, Network Protocol, Cryptography, Hashes, Digital Signature
- Sessional (tools and programming) (individual work)
- Class tests (2)
- Assignment (group work)

Reminder

Zero tolerance for cheating

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- Overview of network layers and protocols
- Physical Layer
- Data Link Layer: (i) Framing (ii) Error detecting and correcting codes (iii) sliding window protocols
- The Medium Access Control Layer
- Network Layer: (i) Routing algorithms (ii) congestion control (iii) IP Addressing
- Transport Layer
- Basic of Network Security: (i) Cryptography (ii) Hashes (iii) Digital Signature

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- 1 Computer Networks by Andrew S. Tanenbaum
- 2 Data Communications and Networking by Behrouz A. Forouzan
- 3 Research papers and other documents will be supplied when necessary

What is Computer Network?

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Computer Network

A computer network is a group of computer systems and other computing hardware devices that are linked together through communication channels to facilitate communication and resource-sharing among a wide range of users.¹

¹<https://www.techopedia.com/definition/25597/computer-network>

What is Computer Network?

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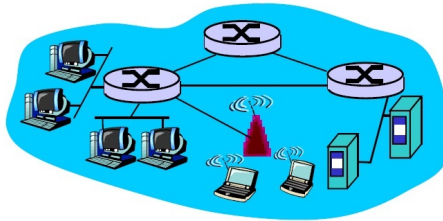
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We use **Computer network** to mean,

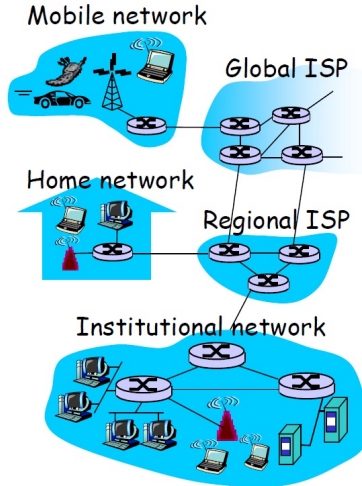
A collection of autonomous computers *interconnected* by a single technology with networking device(s). Two computers are said to be interconnected if they are able to exchange information.



Wire and/or wireless medium.

What is Internet?

A network of networks.



Computer Network vs Distributed System

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Distributed System

In a distributed system, a collection of independent computers appears to its users as a single **coherent system**. Usually, it has a **single model** or paradigm that it presents to the users. Often a layer of **software** on top of the operating system, called *middleware*, is responsible for implementing this model.

Example: World Wide Web (WWW)

Computer Network

In a computer network, this coherence, model, and software are absent.

Uses of Computer Network

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- 1 Resource Sharing
- 2 Email service
- 3 E-commerce
- 4 VoIP (Voice over IP)
- 5 IPTV
- 6 Social networking
- 7 Wearable Computers and many more

Fundamental of communication

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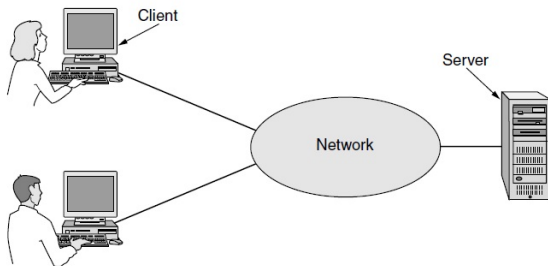
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A network with two clients and one server.

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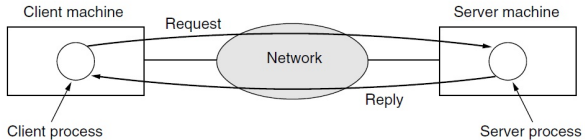
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The client-server model involves requests and replies.

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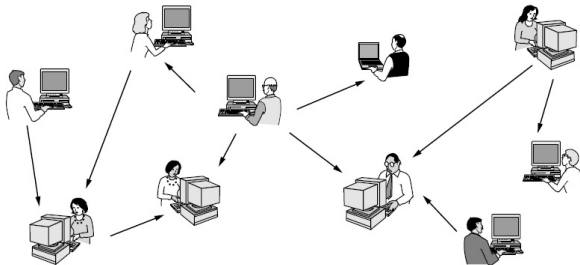
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In a peer-to-peer system there are no fixed clients and servers.

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Broadly speaking, there are two types of transmission technology that are in widespread use.

- 1 broadcast links (Broadcast System)
- 2 point-to-point links (Unicast System)

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Interprocessor distance	Processors located in same	Example
1 m	Square meter	Personal area network
10 m	Room	
100 m	Building	Local area network
1 km	Campus	
10 km	City	Metropolitan area network
100 km	Country	Wide area network
1000 km	Continent	
10,000 km	Planet	The Internet

Classification by scale.

Classification of Network

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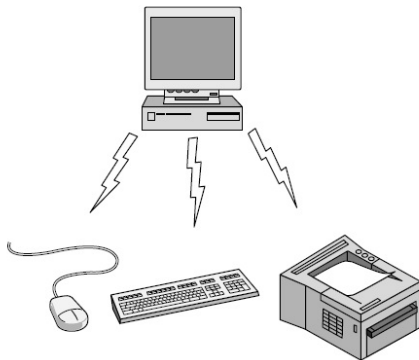
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Bluetooth PAN configuration.

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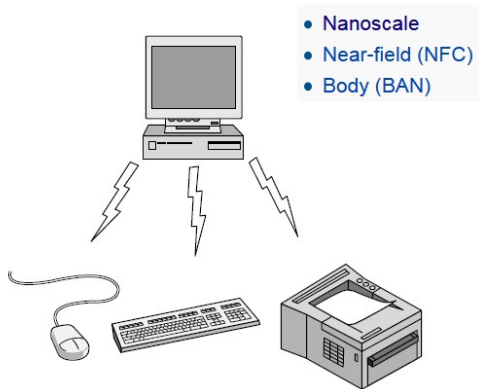
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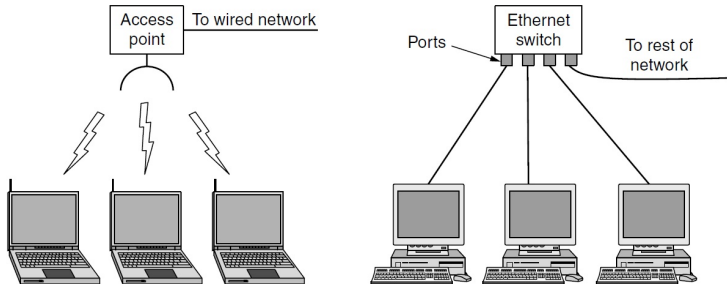
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Wireless and wired LANs. (a) 802.11. (b) Switched Ethernet.

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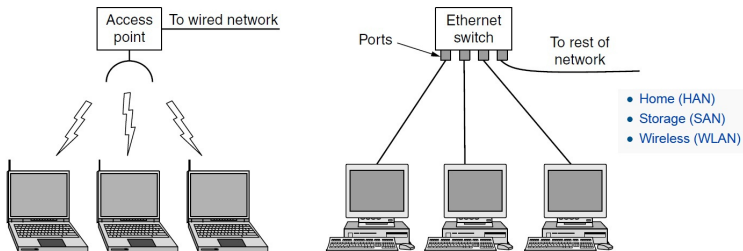
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CAN(Campus Area Network)

A campus network, campus area network, corporate area network or CAN is a computer network made up of an interconnection of local area networks (LANs) within a limited geographical area.²

²https://en.wikipedia.org/wiki/Campus_network 

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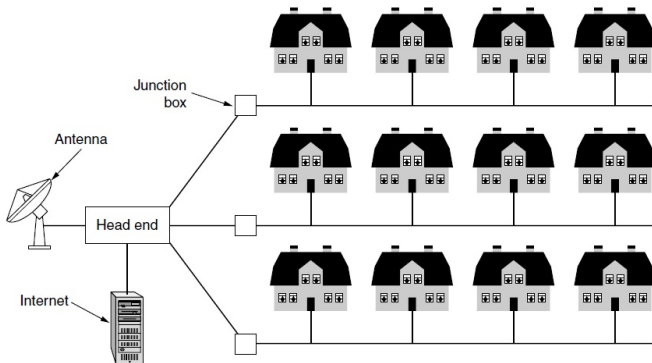
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A metropolitan area network based on cable TV.

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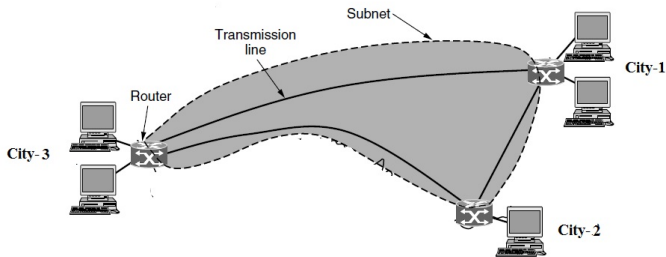
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WAN that connects three branch offices in Australia.

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- Slides supplied with Computer Networks by Andrew S. Tanenbaum
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