



Indian Institute of Information Technology, Sri City, Chittoor
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Computer Communication Networks

Introduction, Communication link, Multiplexing

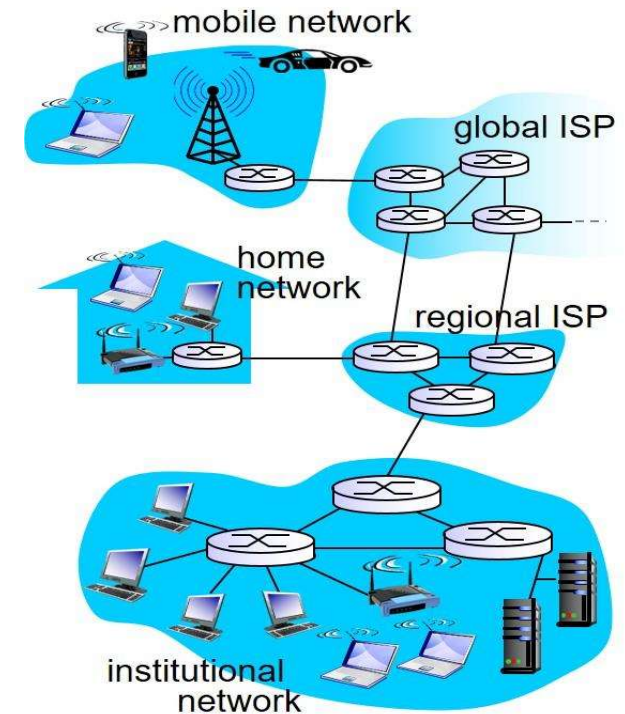
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Content

- Introduction
- Communication Link
 - Guided
 - Unguided
- Multiplexing
 - Frequency division multiplexing (FDM)
 - Time division multiplexing (TDM)

What is a Network?

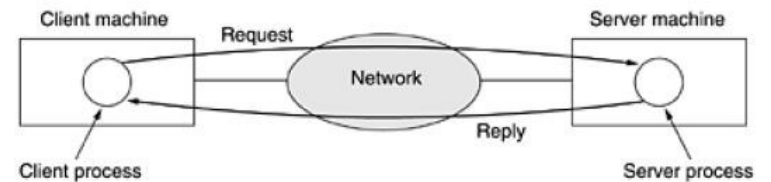
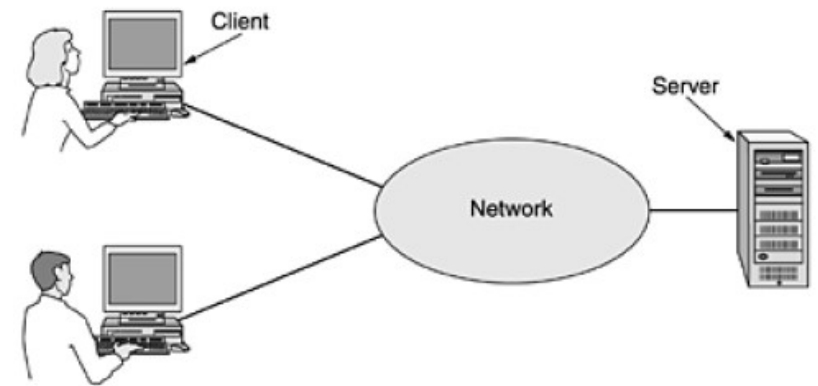
- A network is an interconnection of devices.
- The computers/laptops connected to the network are known as end systems or hosts.
- The digital data is fragmented into packets.



Uses of Computer network

- Business applications

- Resource sharing
- powerful medium of communication (email and online document preparation)
- Video conferencing
- Doing business electronically with other companies (ex: Isuzu).
- Doing business with consumer (online market).



Uses of Computer network

- Home applications

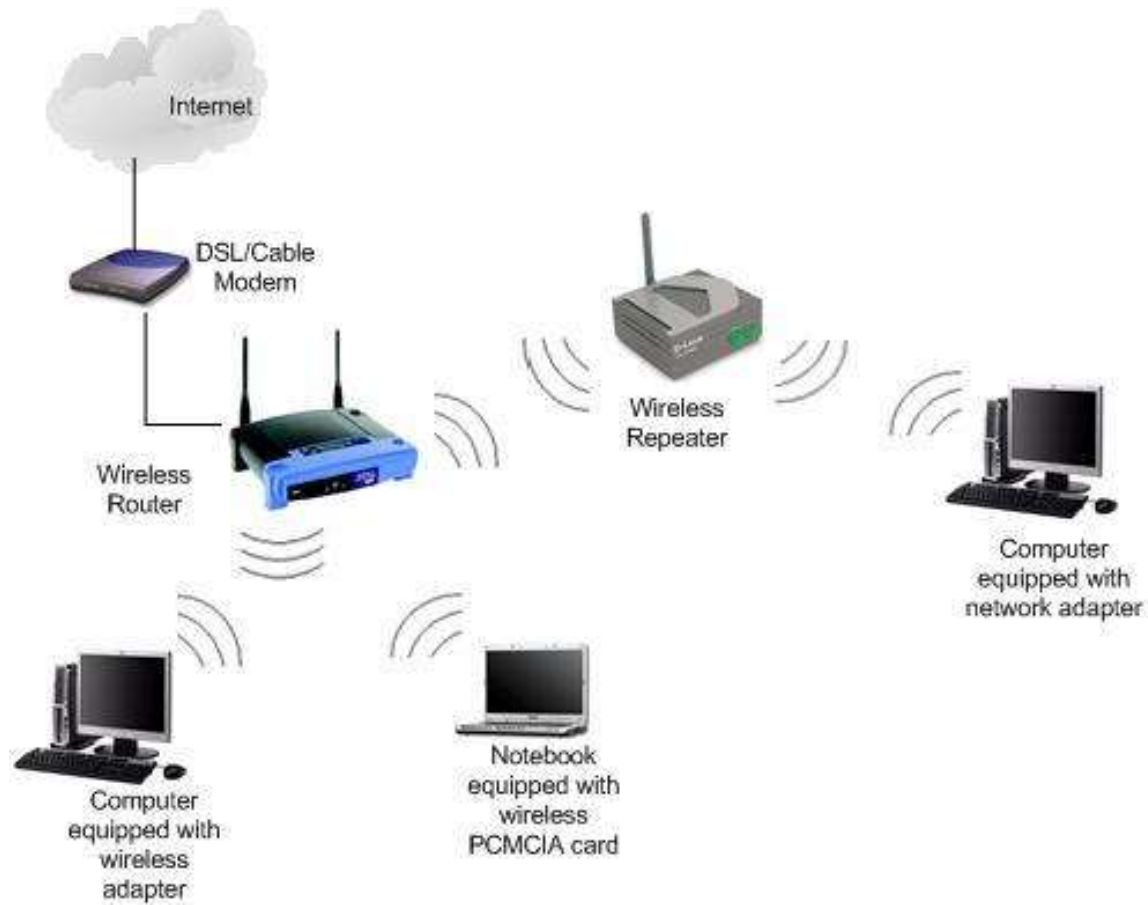
- Why do people buy computer for home use?
 - Earlier days it is for word processing and gaming , now for “Internet access”
 - Internet provides access to remote information, person- to-person communication, entertainment, e-commerce.

Tag	Full name	Example
B2C	Business-to-consumer	Ordering books on-line
B2B	Business-to-business	Car manufacturer ordering tires from supplier
G2C	Government-to-consumer	Government distributing tax forms electronically
C2C	Consumer-to-consumer	Auctioning second-hand products on line
P2P	Peer-to-peer	File sharing

Network Essentials

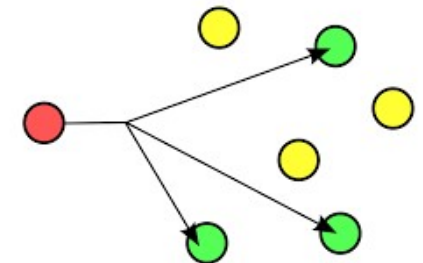
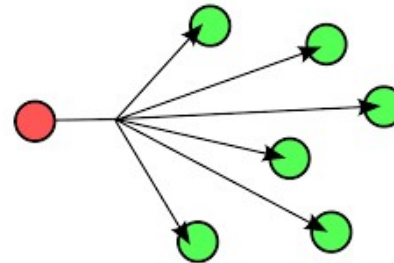
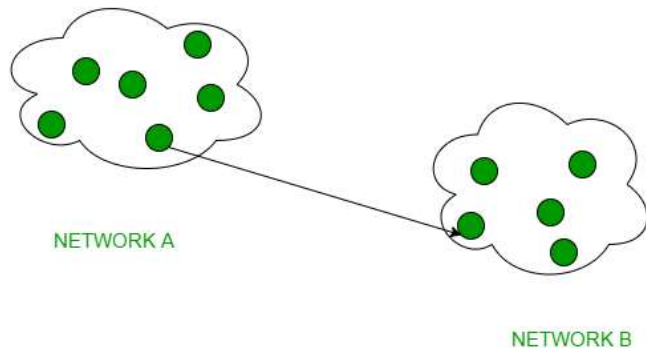
- **Modem**
- “**Modulator and demodulator**”, is a hardware device that converts data into a format suitable for a transmission medium so that it can be transmitted from one computer to another.
- **Ethernet**
- System for connecting the number of computers to form a LAN.
- **Router**
- A router is a device that forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISP's network.
- **Repeater**
- A **network** device used to regenerate or replicate a signal. **Repeaters** are used in transmission systems to regenerate analog or digital signals distorted by transmission loss. Analog **repeaters** frequently can only amplify the signal while digital **repeaters** can reconstruct a signal to near its original quality.

Wireless Network



Classification of Networks

- Transmission technology:
 - Unicasting : transmission with exactly one sender and exactly one receiver
 - Broadcasting : information is intended to all hosts
 - Multicasting : information is intended for a subset of hosts in the network



Network Hardware: Classification

Interprocessor Distance	Processors located in same	
1 m	Square meter	Personal area network
10 m	Room	Local area network
100 m	Building	
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 of Networks:

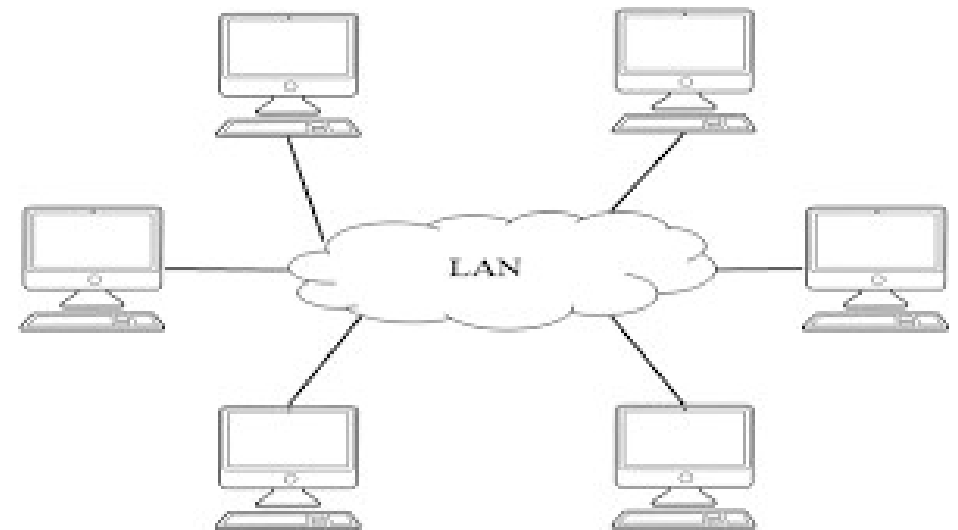
- Personal area networks (PANs)
 - Organized around an individual person, with in a small office or residence.
 - With in the range of few meters
 - Notable example is Bluetooth
 - Watching movies on online streaming service to TV
 - With multiple uses with in a same residence then, referred as Home Area Network (HAN).



Connecting peripherals to computer via Bluetooth

Classification of Networks:

- Local area networks (LANs)
 - Typically an individual office building: suitable for sharing resources (data storage and printers).
 - Range: It can reach few hundred meters, can be increased further using wireless repeaters.
 - Wireless LAN: WLAN



Privately owned network: wireless/wired connections.

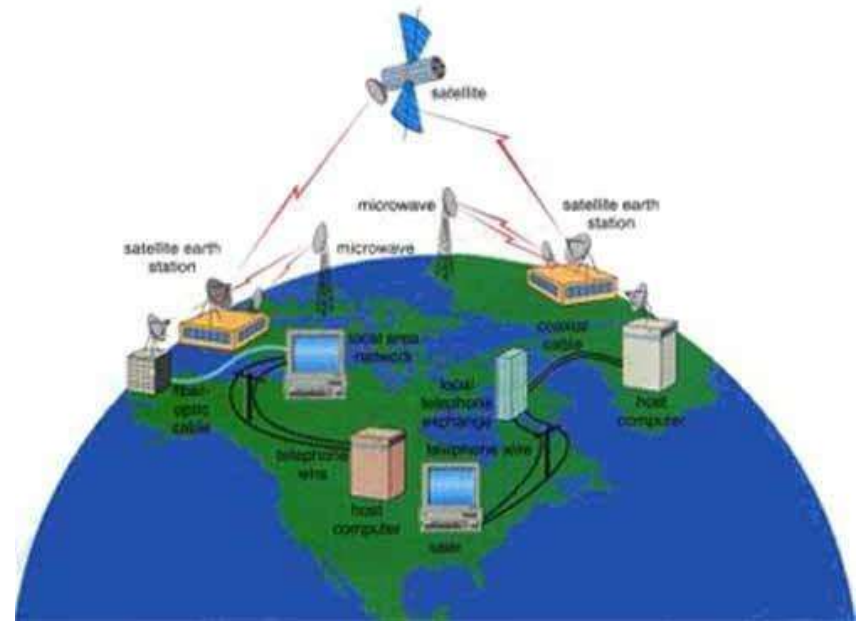
Classification of Networks:

- Metropolitan area networks (MANs)
 - Computer network across entire city, college campus or small region.
 - Referred as Campus Area Network (CAN).
 - Range: from several miles to tens of miles.
 - Connect several LANs together to form a bigger network.



Classification of Networks:

- Wide area networks (WANs)
 - Occupies a very large area, such as an entire country or the entire world
 - can contain multiple smaller networks, such as LANs or MANs
 - The most well-known WAN is the **“Internet”**

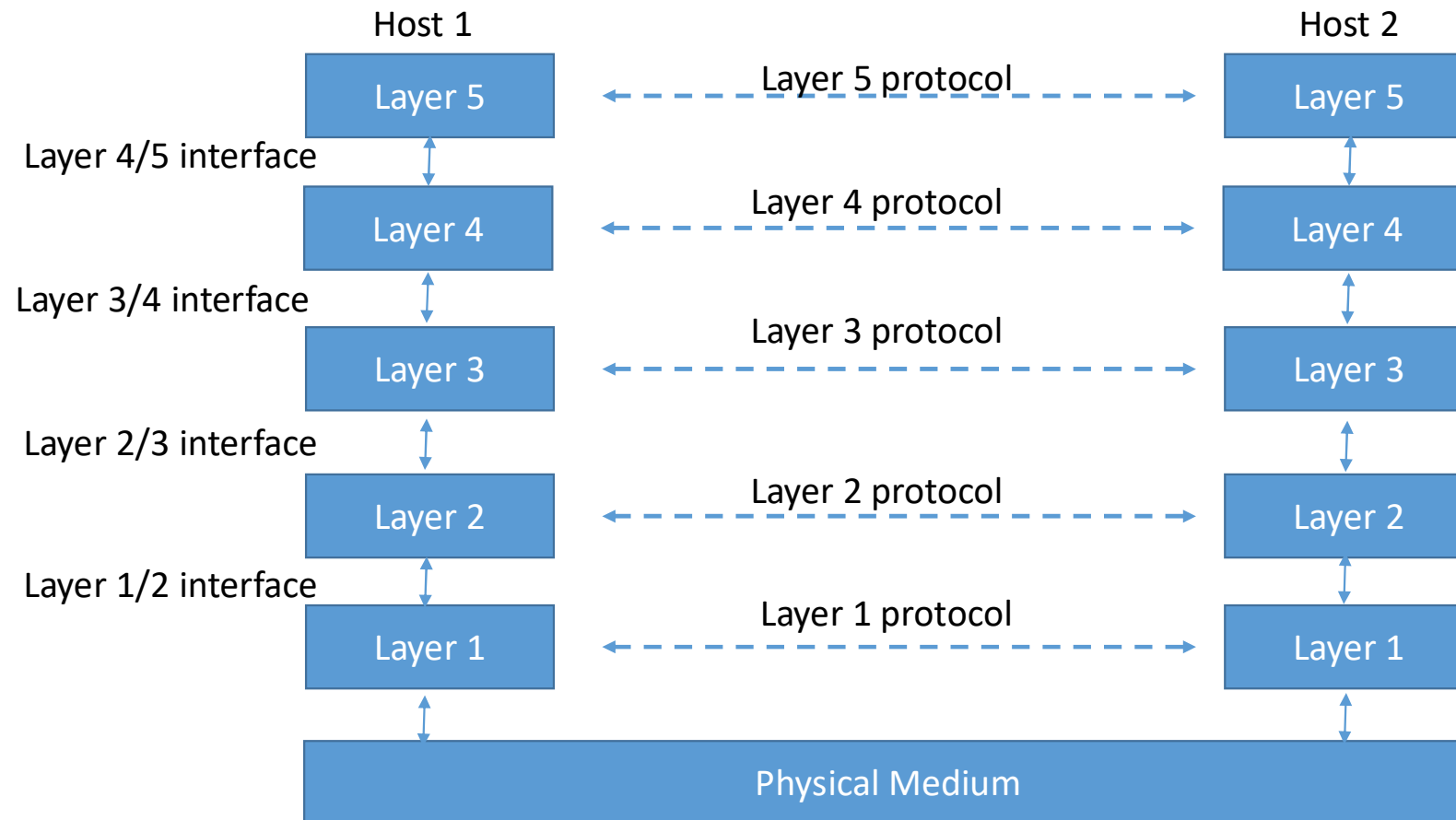


Network Software

- Protocol

- Is an agreement between the communicating parties on how communication is to proceed.
- Violation of protocol will make communication more difficult, if not completely impossible.

Layers, protocols, and interfaces



The Physical Layer

- Lowest of our protocol model
- Defines the electrical, timing and other interfaces by which bits are sent as signals over channels.
- The properties of different kinds of physical channels determine the performance.
- Kinds of transmission media: Guided and Unguided.