

INTRODUCTION to COMPUTER AND ICT

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For BS Computer Science, BS (IT),
BS Geology, BS Mathematics,
BS Commerce, BS Statistics



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MANAGEMENT Information System
1st Edition
Dr. Rahman Ali



MANAGEMENT Information System

1st Edition

In accordance with approved curriculum
for BS Commerce, Master of Commerce,
BBA and MBA program of the HEC
and University of Peshawar.



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Chapter 5:

Telecommunication

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Outlines

- ✓ Introduction
- ✓ Components of Data Communication
 - Sender, Receiver, Medium
 - Telecommunication media
- ✓ Transmission Modes
 - Simplex Mode
 - Half Duplex Mode
 - Full Duplex Mode
- ✓ Computer Network
- ✓ Types of Telecommunication Networks
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- ✓ Wireless Telephone Technology
 - 1G, 2G, 3G, 4G, 5G
- ✓ Network Topologies
 - Bus Topology
 - Star Topology
 - Ring Topology

Introduction

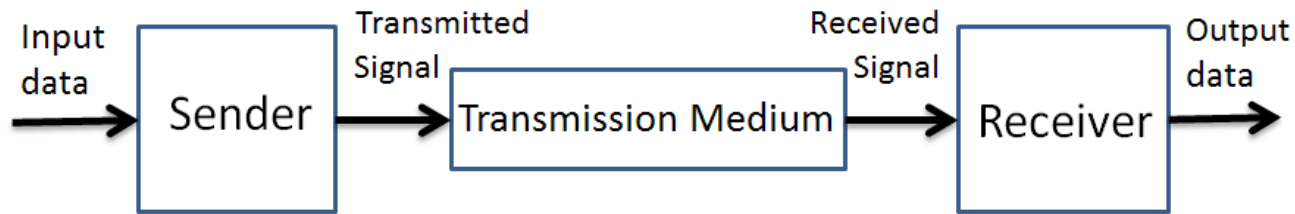
➤ Data Communication

- The process of using computing and communication resources to transfer data among devices located at different places.
- Techniques and Technologies to enable electronic communication.
- Communicating two or more devices regardless of location, media and content.



Components of Data Communication

- Sender, receiver, media and protocol.



➤ Sender

- A device transmitting data to be sent to the target device.
- The data is encrypted so that only the specified receiver is able to understand it.

➤ Receiver

- The device which receives data sent to it.
- Must know how to decrypt the data encrypted by the sender.

Importance of Telecommunication

- Fast information transmission
- Customer relationship and services
- Team collaboration
- Flexibility
- Marketing and advertisement
- Increased productivity
- Global business empire
- Cost saving
- Time saving and declining temporal barriers
- B2B, B2C, C2C and B2G Applications

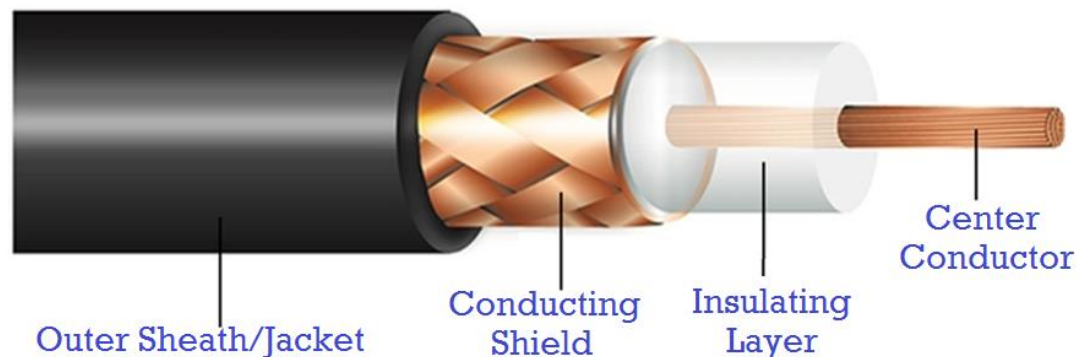
Telecommunication Media

➤ Transmission Media

- The media through which the data transfer takes place.
 - Wired Media: coaxial, twisted pair-wire, fiber optics
 - Wireless Media: Terrestrial Microwave, communication satellite, wireless LAN

• Coaxial Cable

- A shielded and insulated copper wire.
- Used in computer networks and cable TV.
- Components:
 - An outer plastic layer.
 - Aluminum sheath for protection against electro-magnetic interference.
 - A plastic insulator
 - Copper wire

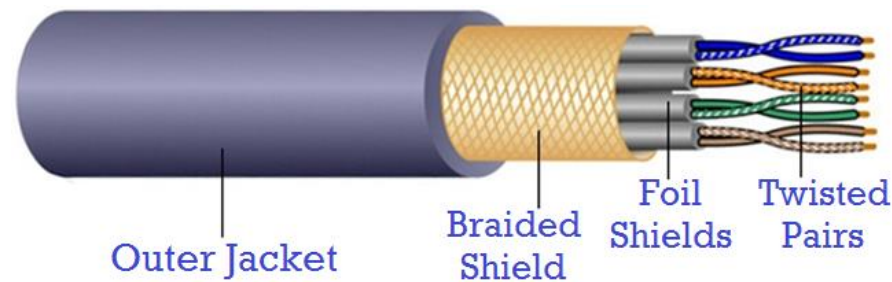


Components of Data Communication

➤ Transmission Media (continued....)

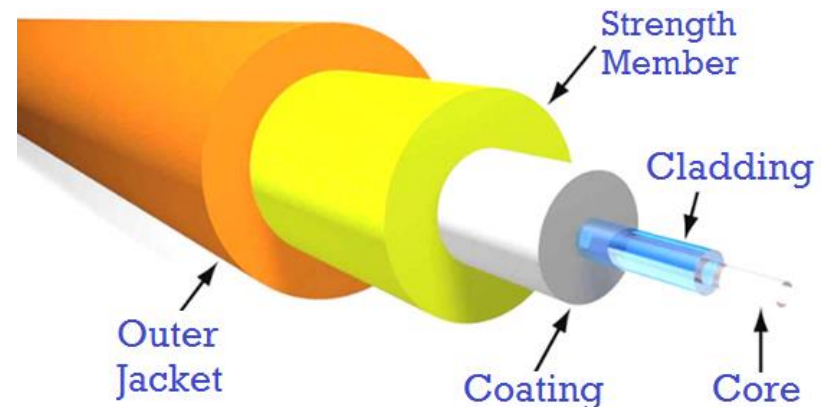
• Twisted Pair Cable

- Pairs of twisted insulated wires run in parallel to each other.
- Both of the wires in the pair belong to a single circuit.
- Reduces external interference.



• Fiber Optics

- Transmits data by pulses of light.
- Several optical fibers bundled together.
- Work on the principles of “Total Internal Reflection”.
- Higher bandwidth than any other cable.

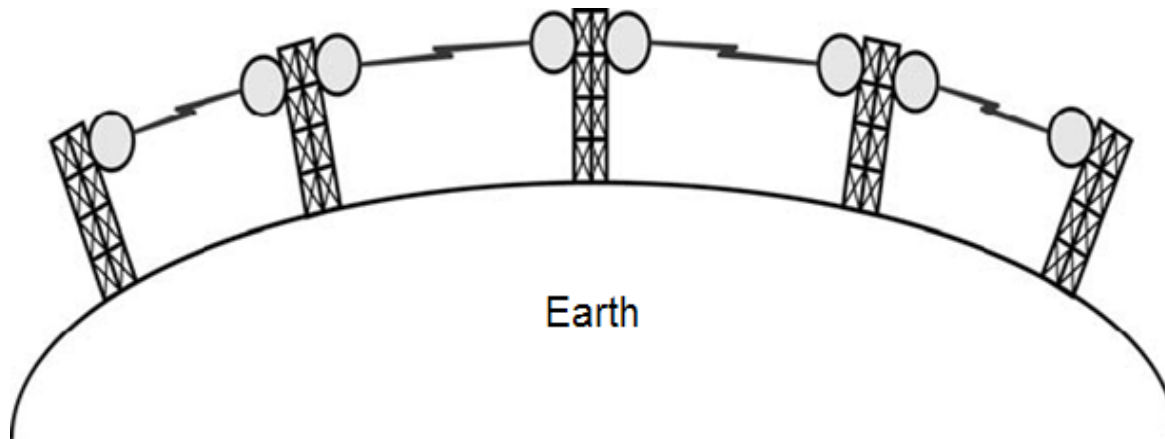


Components of Data Communication

➤ Transmission Media (continued....)

• Terrestrial Microwave

- Earth based transmitters and receivers.
- Wireless communication.
- “Line of sight” communication.
- Highly directional signals sent and received with the help of antennas.
- Example: Mobile Communication.

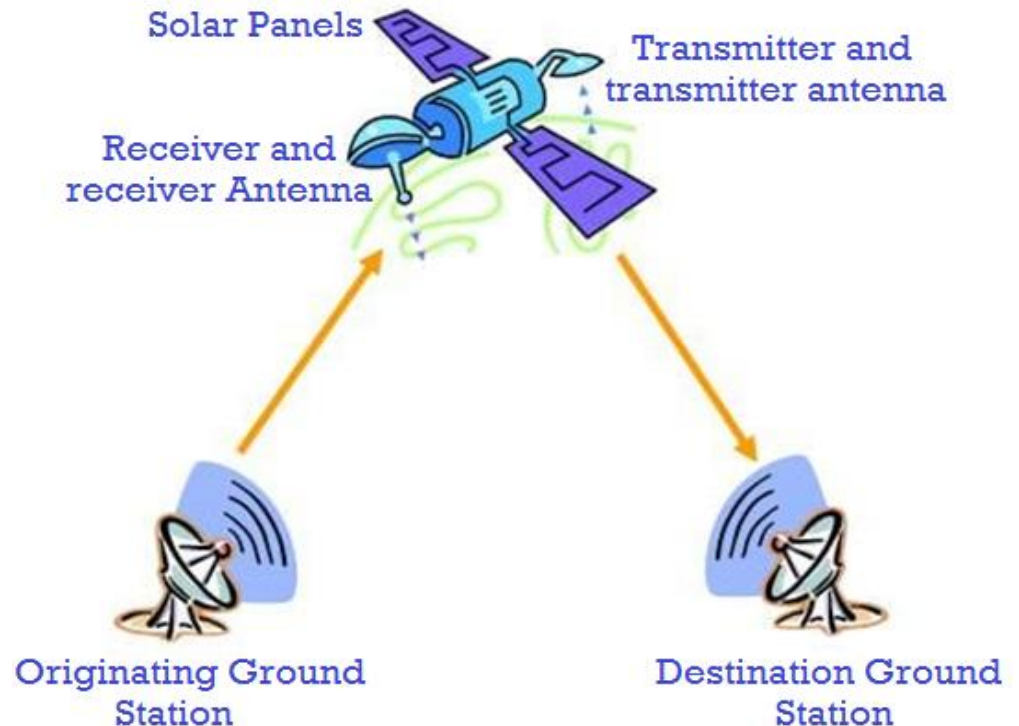


Components of Data Communication

➤ Transmission Media (continued....)

• Communication Satellite

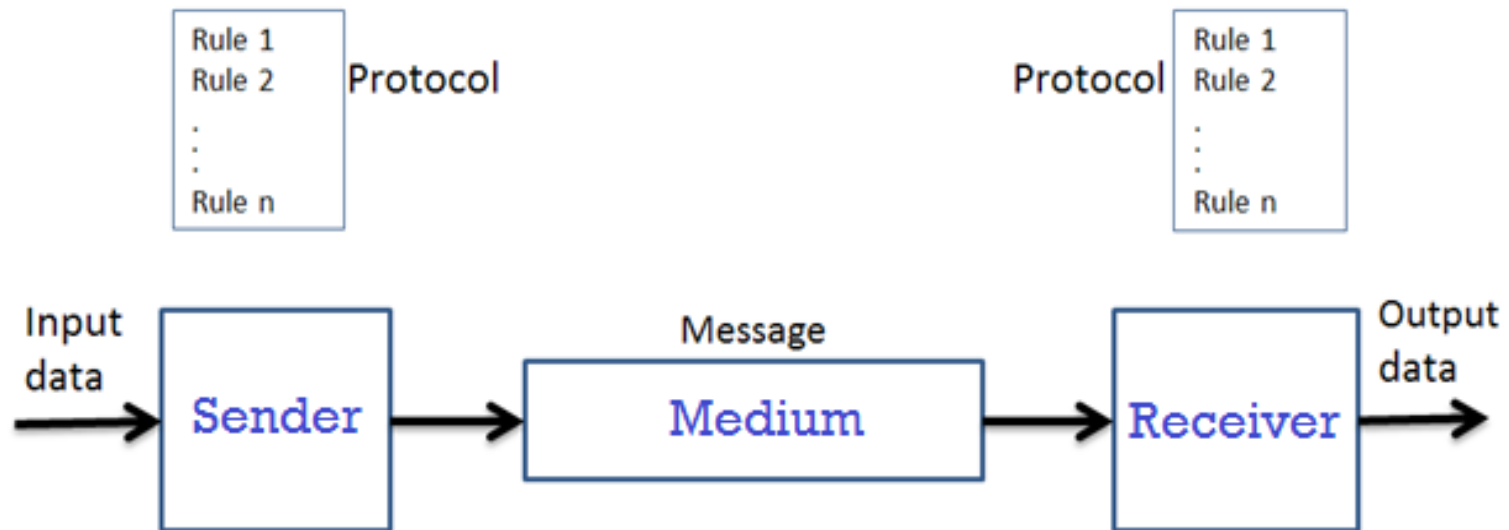
- Artificial Satellite placed in earth's orbit that sends and receive data.
- Uses transponder for receiving and transmitting signal.
- Uses:
 - Military purposes
 - TV services
 - Radio
 - Weather
 - Internet and more.



Components of Data Communication

➤ Protocol

- A set of rules that govern communication between devices.
- Both of the source and destination follow the same protocols to communicate.
- Functions:
 - Sequencing data, routing data, flow control, error control, connection management and more.

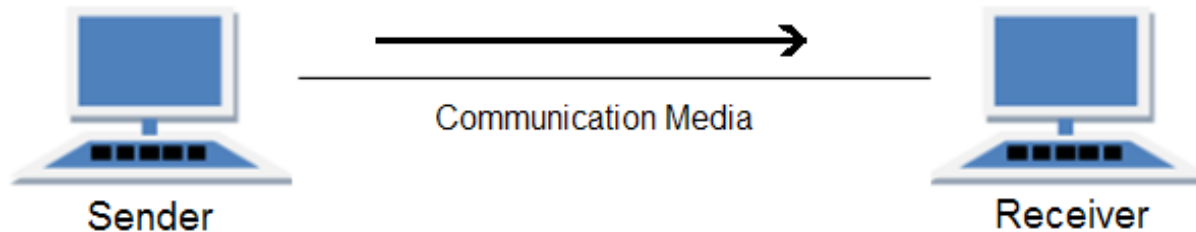


Transmission Modes

- The mechanism of transferring data between two devices over a network.
- The way in which data is transferred.
 - Simplex mode
 - Half duplex mode
 - Full duplex mode

➤ Simplex Mode

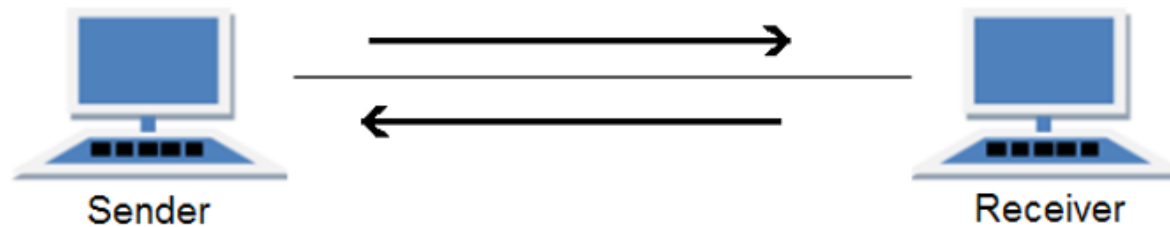
- Data is sent only in one direction.
- A device can either send or receive data but can't do both.
- Examples: TV broadcasting, TV remote, Loud Speaker etc.



Transmission Modes

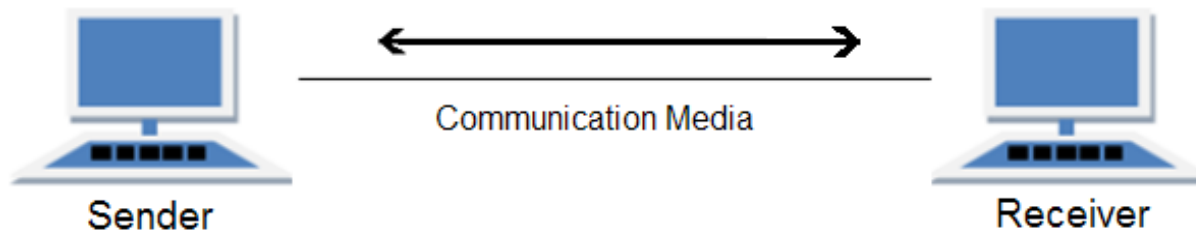
➤ Half Duplex Mode

- Data can be transferred in both the directions but not simultaneously.
- A device can both send and receive data.
- Example: Walkie-Talkie



➤ Full Duplex Mode

- Both the devices can send and receive data simultaneously.
- Example: Talking over telephone.



Types of Telecommunication Networks

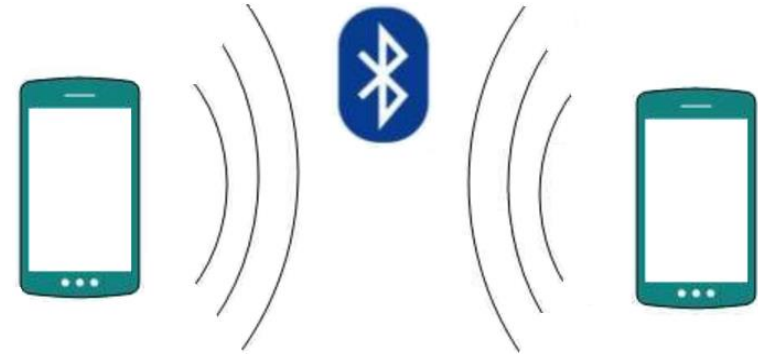
- A group of computers and other devices linked together through communication media to facilitate communication and sharing of resources.
- On the basis of range, networks are classified to several categories:
 - PAN
 - LAN
 - WAN
 - MAN
 - GAN
 - Intranet
 - Extranet and more.



Computer Networks

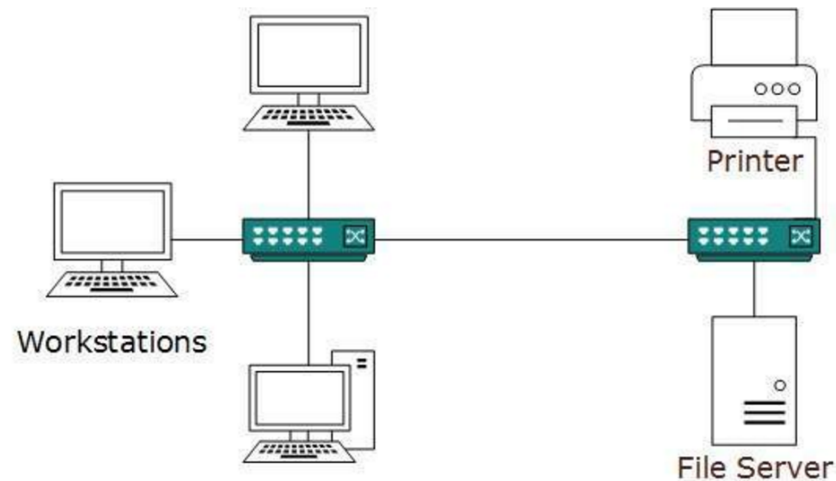
➤ PAN

- Personal Area Network
- A small network within a limited area.
- **Examples:**
 - Smartphones connected via Bluetooth
 - Wireless keyboard and Mouse



➤ LAN

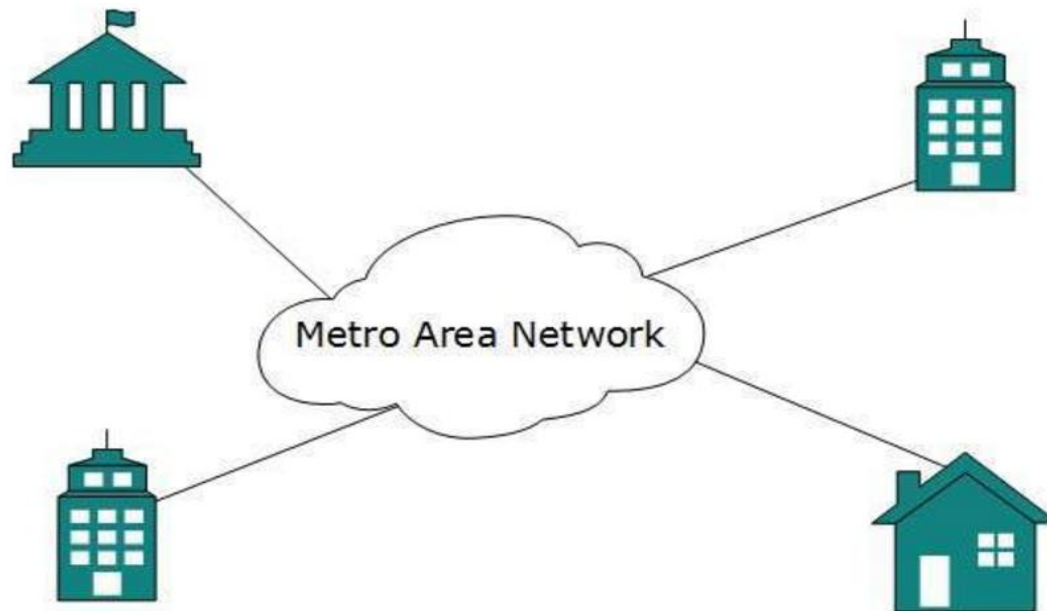
- Local Area Network
- Covers a small area such as a building or an organization.
- Operated under a single administrative system.
- Used to share resources and internet.



Computer Networks

➤ MAN

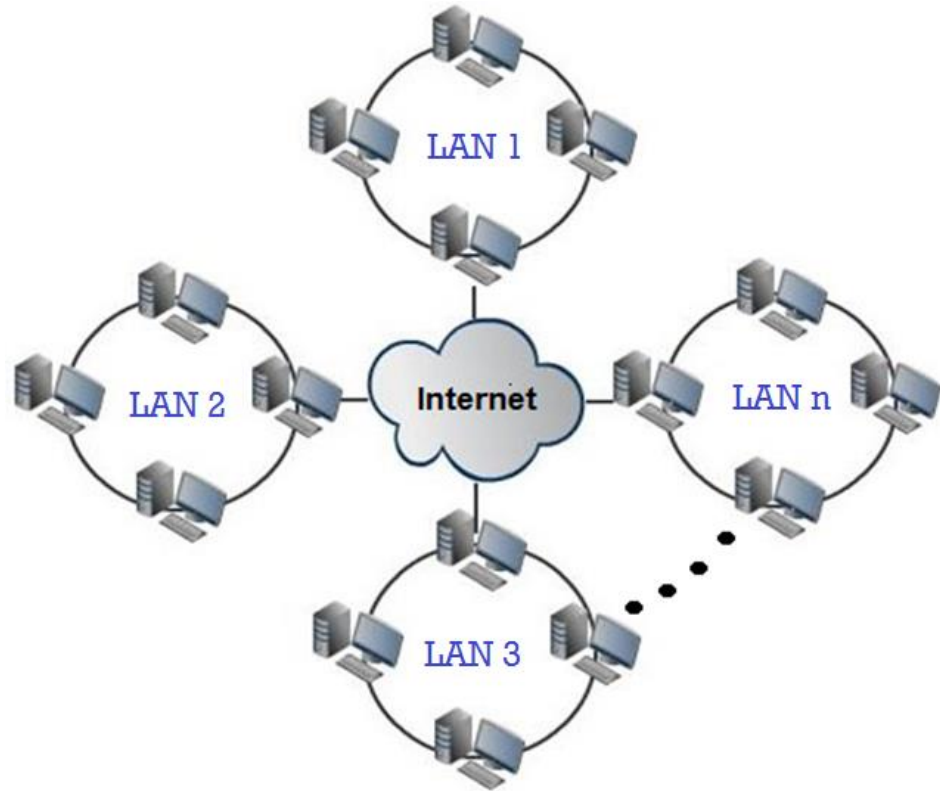
- Metropolitan Area Network.
- Spread throughout a large area such as a city.
- **Examples:**
 - Cable TV
 - A network interconnecting offices of an organization.



Computer Networks

➤ WAN

- Wide Area Network.
- Covers a wide area ranging from a few to several cities.
- Interconnects multiple local area networks.
- Wired or wireless media.
- **Example:** Internet.



Computer Networks

➤ GAN

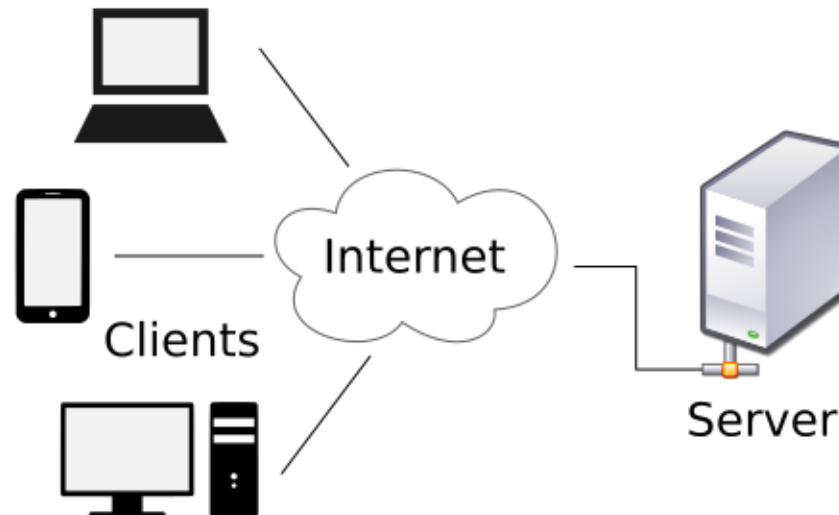
- Global Area Network
- A network of interconnected networks covering unlimited geographical area.
- Regroups several devices, LANs and WANs forming a bigger network.



Computer Networks

➤ Client Server Networking

- Providers of resources and services: **Server**
- One or more requesters of resources and services: **Clients**
- Distributes workload among servers and clients.
- Clients request but don't share their own resources and services.
- **Example:** The Internet



Client Server Networking in Business Environment

- **Database servers**
 - are the computers existing in a LAN that are devoted to storing and retrieving data.
- **File and print server**
 - companies use a centralized file and print server to store individual user documents.
 - The printer drivers reside on the server as well, and users connect to the network printers through that server.
- **Application server**
 - organizations use a centralized repository for their programs and applications.

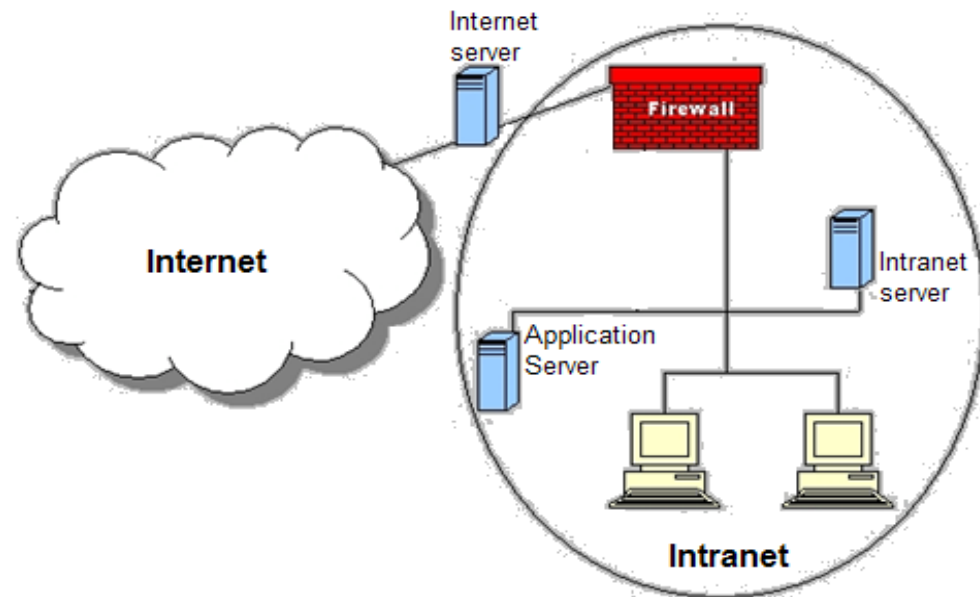
Computer Networks

➤ Intranet

- A **private** network limited to an organization.
- Connected to the outside internet via one or more gateways.
- Used to share information and resources among the workers.
- **NOT** available to the public.

➤ Business Applications of Intranet

- Information and resources sharing
- Network folder
- Offline websites
- Digital reference databases
- Internal email system
- Instant messaging software
- Improved internal communication



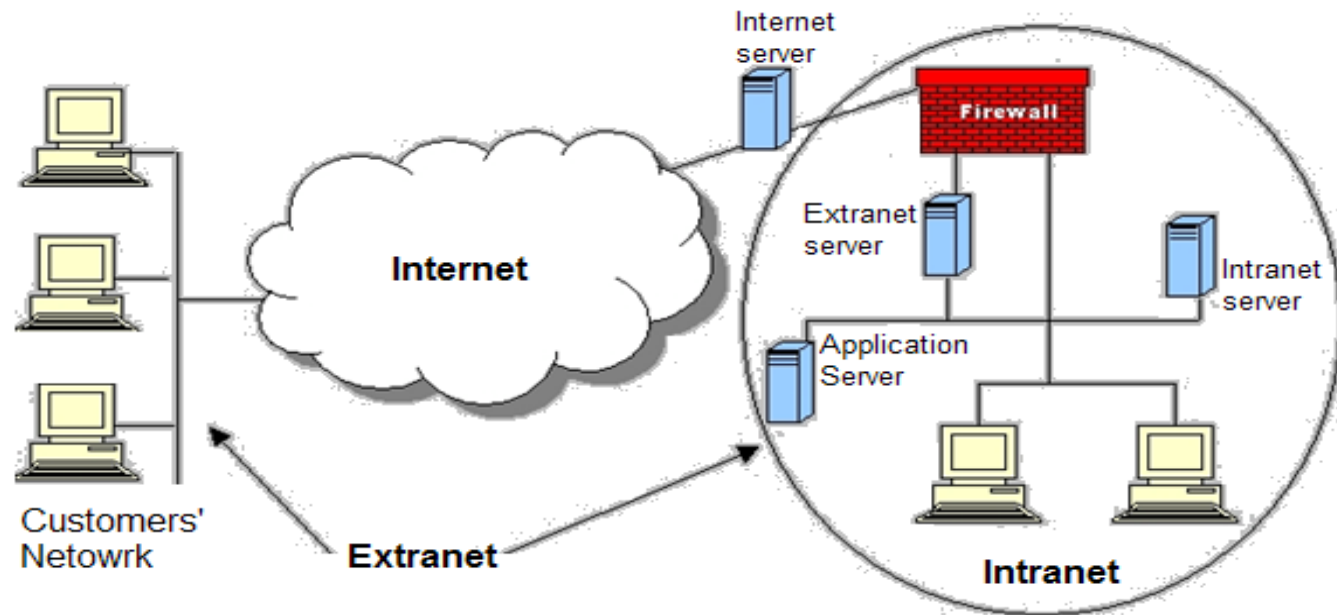
Computer Networks

➤ Extranet

- The extended Intranet to give access to outside users like suppliers, customers etc.
- Allows controlled access to outside users to access a **subset** of information via the internet.

➤ Business Applications of Extranet

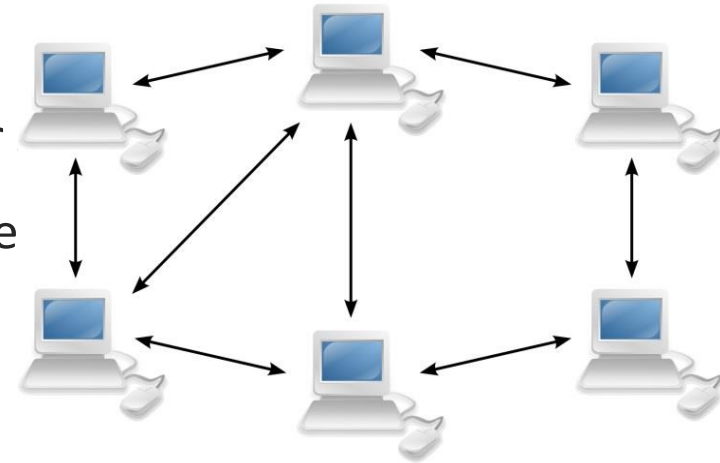
- Facilitation of cooperation
- Controlled communication
- Access to services on other network



Computer Networks

➤ Peer to Peer Networking

- A group of computers, each acting as a node for
- Each computer acts as a server for the files store
- No **centralized server**.



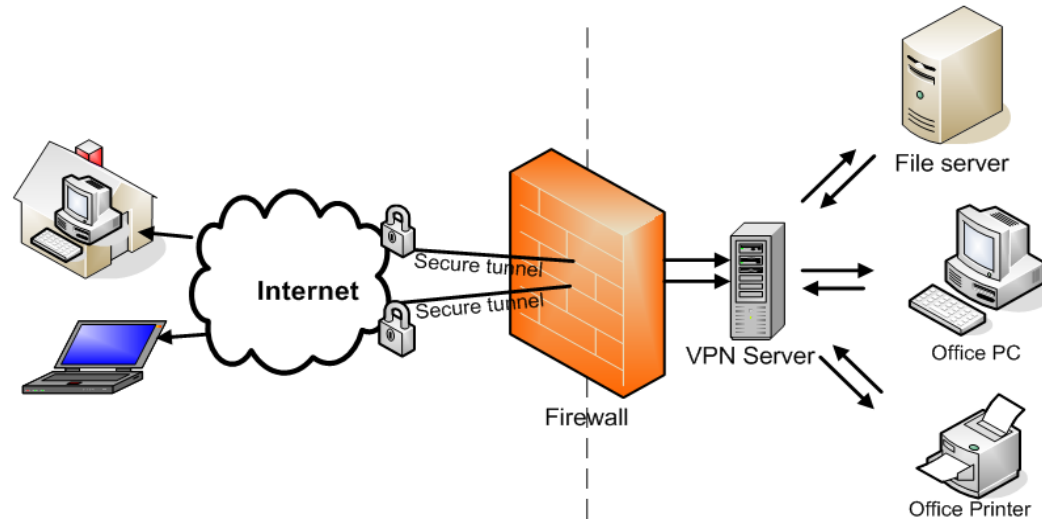
➤ Emerging Applications of P2P Technologies

- For Business Collaboration
 - [Colonos Workplace](#) is a cross-platform P2P system for collaborative teams to work on projects and transmit their work amongst their work group
- For file sharing
 - BitTorrent
- For communication
 - Skype is one of the popular VoIP application
- Content Distribution
 - BBC iPlayer (a P2P client) is a content distribution service provided by BBC on their website.

Computer Networks

➤ Virtual Private Network (VPN)

- It is a private network that is built over a public infrastructure in which security techniques like encryption allow the users to use it across unsecured networks like the internet.



➤ VPN Benefits to Businesses

- Security
- Mobility
- Cost
- Increased productivity

Computer Networks

➤ Wi-Fi

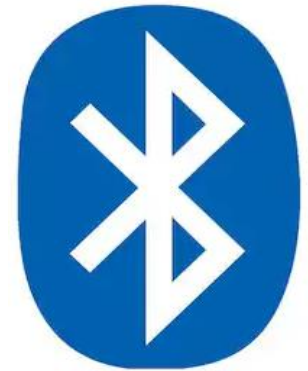
- Wireless networking technology based on radio waves.
- RF (Radio Frequency) technology rather than physical medium.
- Wi-Fi is a trademark that refers to the networking standard IEEE 802.11x.
- Used in a wide range of devices like laptops, smartphones, smart cameras and more.



Computer Networks

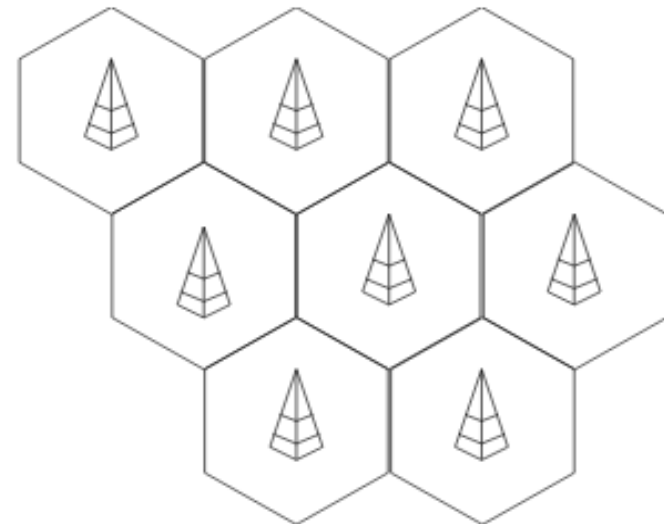
➤ Bluetooth

- Wireless Communication Technology.
- Used to transmit data over short distance.
- Slower, limited in range and support for fewer devices.
- High level of security.



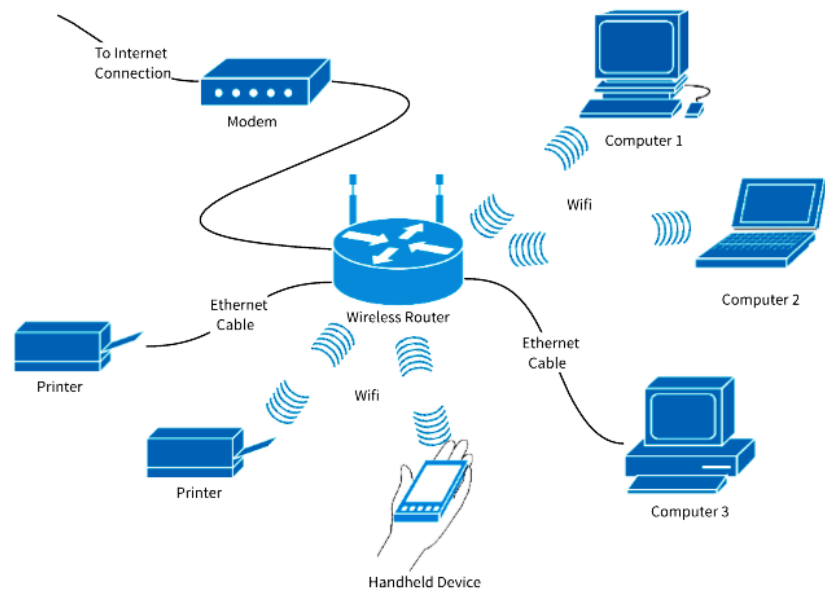
➤ Cellular Network

- Mobile Network, distributed over regions of areas called “Cells”.
- Each cell is served by at least one fixed location “Cell Tower”.
- The transceivers are interconnected to transmit data, e.g. voice calls, text messages etc.



Wireless Networks

- The networks that are not connected by any kind of cables are called wireless networks.
- Types
 - Wireless Personal Area Networks
 - Wireless Local Area Networks
 - Wireless Metropolitan Area Network which interconnects several wireless LANs.
 - Wireless Wide Area Network
 - Ad hoc Network,
 - Cellular Network,
 - Space Network: NASA.



Wireless Telephone Technology

- Wireless communication through mobile devices was introduced in the 1980's and evolved from first generation (1G) to the future generation 5G.



➤ 1G

- Introduced in the 1980's and implemented in the 1990's.
- Its speed is up to 2.4 kbps.
- Allowed phone calls.



Wireless Telephone Technology

➤ 2G

- Introduced in 1991.
- Based on GSM and digital signal, having a speed of up to 64 kbps.
- Allows sending text, picture and MMS.
- Added GPRS, Email and Web browsing facilities.



➤ 3G

- Introduced in 2000.
- Much faster speed of 144 kbps to 21.6 Mbps.
- Enabled the devices to run web based applications.
- More security.



Wireless Telephone Technology

➤ 4G

- Introduced in the late 2000's.
- 100 Mbps to 1 Gbps.
- Used for web browsing, mobile multimedia and video conferencing.



➤ 5G

- The proposed next generation technology, with a data rate beyond 1 Gbps.
- Improved coverage, efficiency and reduced power consumption.

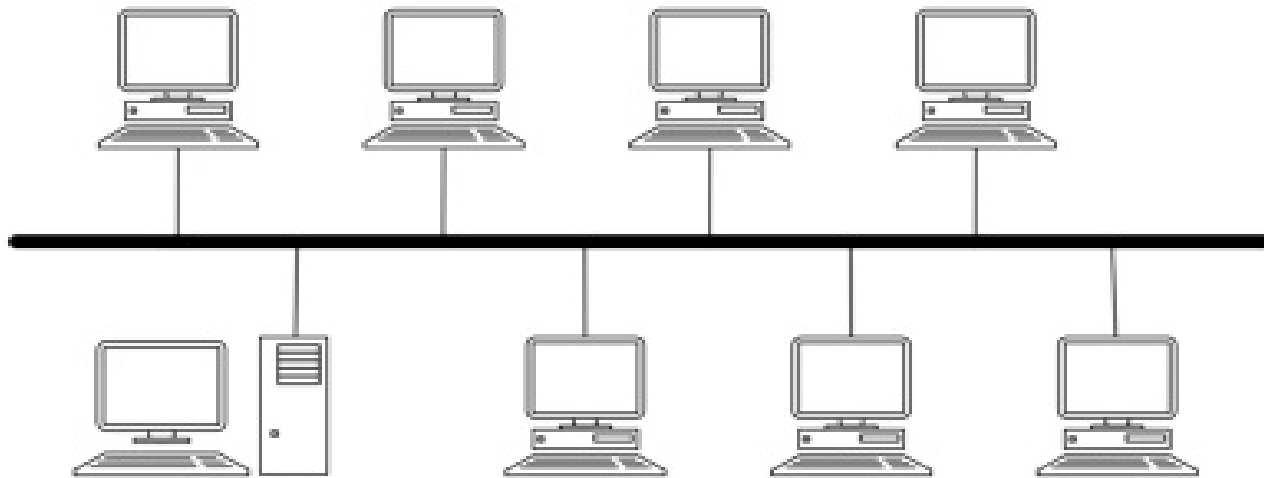


Network Topologies

- The physical or logical layout of a network.
- Refers to the arrangement of the nodes and their connecting line in a network.

➤ Bus Topology

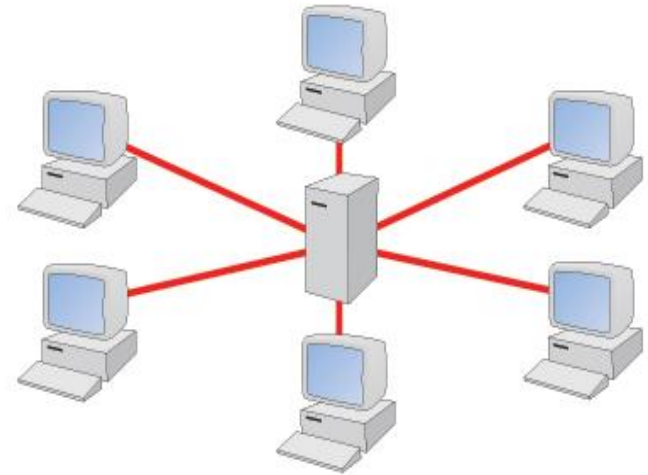
- A low cost topology with a single transmission line (Bus) to which all the nodes are connected.
- The network is not affected if one of the devices fails.



Network Topologies

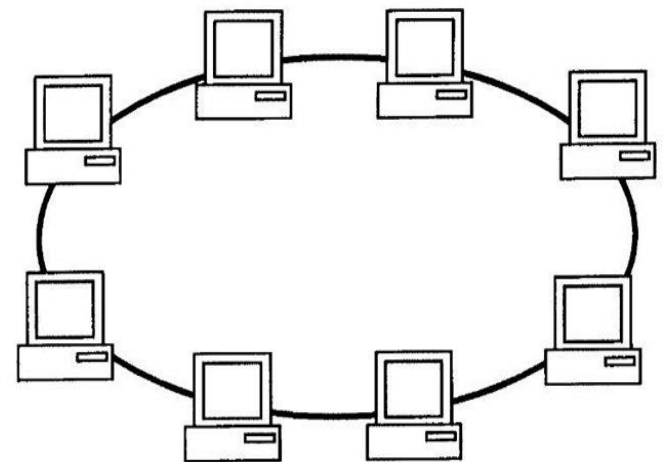
➤ Star Topology

- A single server to which all the devices are connected.
- The nodes are interconnected through the central server.
- The network fails if the central server fails.



➤ Ring Topology

- A loop like structure.
- Each device is directly connected to the adjacent device.
- The whole network fails if any of the devices fails.



Business on the Internet

➤ Business on the internet, also called online business or e-business.

- Benefits

- There are various benefits of online business that include:
- Cost saving in rent and staffing.
- It is not expensive to start an online business.
- Products and services are delivered faster in an efficient manner.
- 24/7 accessibility to customers globally.
- More opportunities to attract customers.
- It's easy to keep in touch with customers.
- Comparatively better marketing in less or no price.
- It is much easy to analyze and understand the market.
- Opportunity to manage business from anywhere in the world.
- Easier and faster financial transactions.

- Disadvantages

- Software and hardware expenses.
- Knowledge and technical skills of web development may be needed.
- Risk of online scams and fraud.

E-Commerce

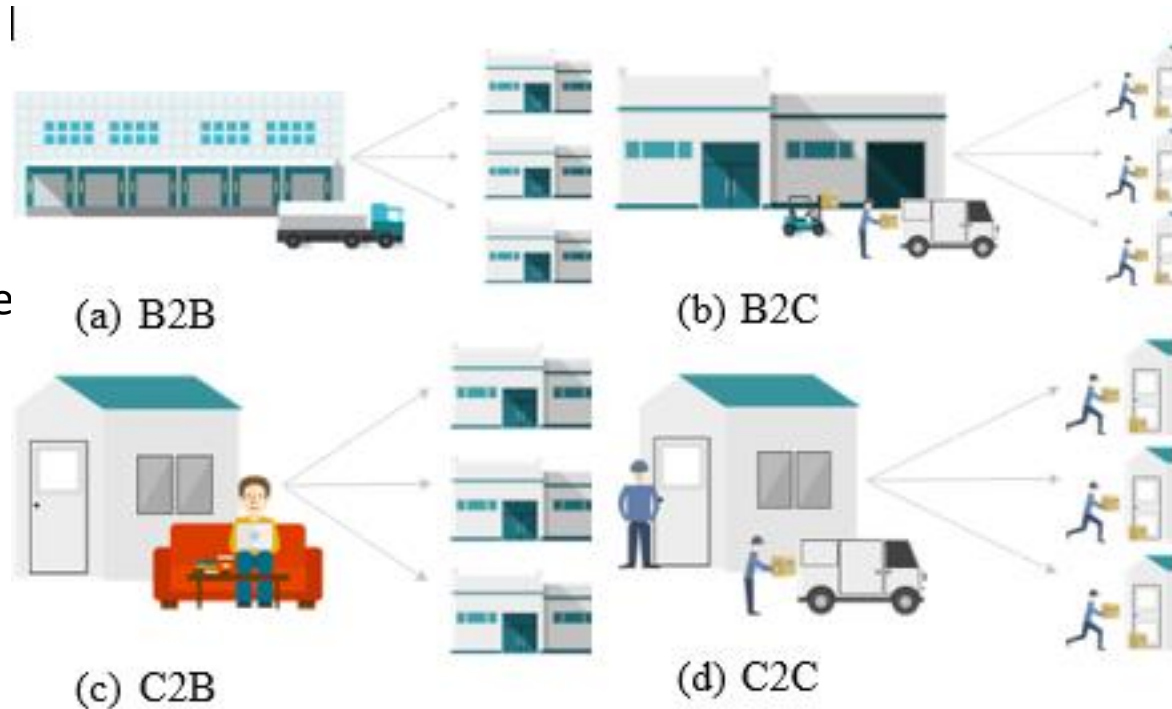
➤ E-Commerce is the transaction of buying or selling online

➤ Forms of e-commerce

- Online Shopping
- Electronic Payment
- Online Auctions
- Internet Banking
- Online Ticket selling & more

➤ Models of e-commerce

- B2B
- B2C
- C2C
- C2B



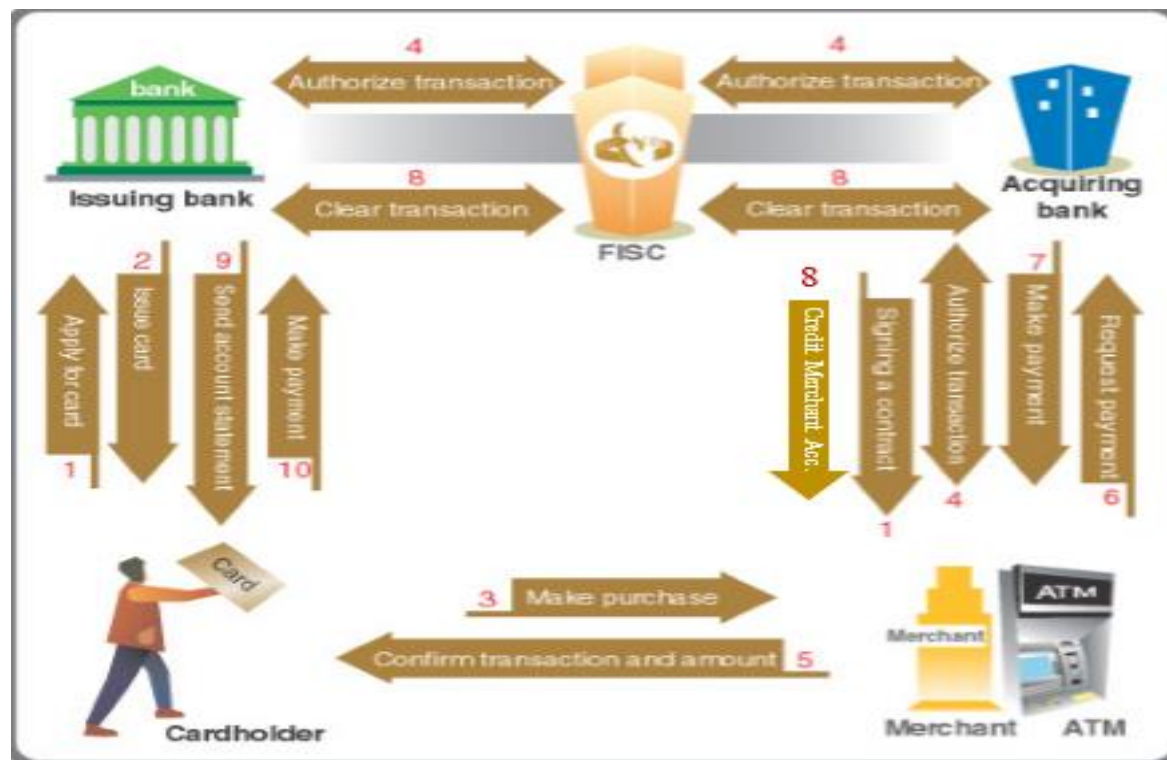
Credit/Debit Card Payments

➤ Credit card

- is a card made of plastic with a magnetic stripe (smart cards also have an integrated chip and circuit) that allows the cardholder to borrow money from a bank to make purchases.

➤ Debit card

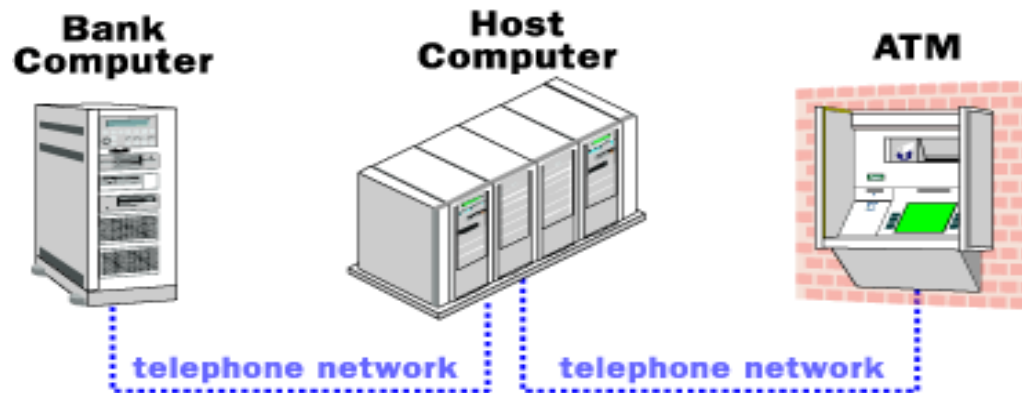
- is a card that provides the convenience of a credit card but works in a different way.
- The amount paid with a debit card is drawn directly from the bank account the card is associated with rather than borrowing from the bank.



Working of Debit card

ATM

- ATM (Automated Teller Machine) is a specialized computer that makes it easy to manage the money in your bank account.
- How ATM Work



References

- Ali, R. & Ali, A. (2018). Chapter 5: Telecommunication. *Management Information System – 1st Edition* (pp. 83-114). Muhalla Jangi, Qissa Khawani, Peshawar, Pakistan: Al-ilum Publications.

Thanks!
Any Questions
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