Certificate in Computer Applications (CCA)
Study Material

CCA - 102 : Data Communications
(Unit 1 to Unit 10)

Supported by
Institute of Management Studies (IMS),
Ghaziabad-UP

About CCA Program

The certificate program focuses on computer fundamentals. This program provides a comprehensive introduction to Fundamentals of Information Technology; Computer Applications; Internet & Communication Technologies; Web Programming; and Soft Skills.

The program is designed and conducted by CSC Academy along with one of the leading Management Institute, Institute of Management Studies, Ghaziabad (UP). Some of the core subject faculty are associated in delivering this program.

After the completion of this course, student will be able to:

- Get a basic understanding of personal computers and their operations.
- Use of MS Office Tools - Like MS word, MS excel and Power point presentations
- Understand basics of Programming.
- Recognize and describe the working of Computer Networks.
- Get familiar with the basics of communication skills
- Develop good skills at writing business letters, emails, minutes of meeting and other business correspondence.
- Design and Implement interactive, responsive web site using HTM5L, CSS5 and JavaScript.
- Build Dynamic web site using server-side PHP Programming and Database connectivity.

The CCA program covers five course modules:

Unit 101: Fundamentals of IT & Programming

Unit 102: Data Communications

Unit 103: Soft Skills & Communications

Unit 104: Web Technologies

Unit 105: Cyber Security

The objective of this study material is to provide the students to enable them to obtain knowledge and skills in the related subject. This material is not in itself to be read alone, and student should use this in addition to the CCA online e-learning content study. In case students need any further clarifications or have any suggestions to make for further improvement of the material contained herein, they may give the same at CSC Academy Centre.

All care has been taken to provide content in a manner useful to the students.

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The CSC Academy is committed to teaching, delivering of specialized courses/ training programs, leadership, communication skills and promotion of entrepreneurship among the rural masses in India. Presently, the CSC Academy is delivering various Government of India sponsored skill and education programs, in addition to courses from private sector.

About Institute of Management Studies, Ghaziabad (UP)

IMS Ghaziabad is a pioneer institute for management education in Northern India. It is the first institute of IMS Society Ghaziabad with 30 glorious years of excellence. IMS Ghaziabad offers full time AICTE approved & NBA accredited PGDM Programme which has been awarded the MBA equivalent status by the Association of Indian Universities (AIU), PGDM - International Business, PGDM - Big Data Analytics and MCA Programme are approved by AICTE and affiliated to Dr APJ AKTU, Lucknow.

Since its foundation IMS Ghaziabad has gathered a lot of feathers in its cap with global accreditations and memberships such as Accreditation Services for International Colleges (U.K), AACSB Business Education Alliance, National Assessment and Accreditation Council - 'A' Grade.

IMS Ghaziabad is amongst Top 10 best B-Schools in North India as per latest MBA and B School Rankings. It has been awarded as the "Best Campus for Industry Oriented Management Education in India / Asia Pacific 2019" by ASSOCHAM and the Education Post. It has been ranked as 5th in North India and 15th in India by Times of India B School Survey, February 2019, A++ Institute in Delhi - NCR by 9th Chronicle B-School Survey 2018.

Table of Contents

Course Outline

Course Objective

The objective of the course is to help the students to get conceptual knowledge of all the networking basics along with various techniques used for communication between networks.

Course Outcomes

At the end of this course, student should be able to:

1. Recognize and Describe about the working of Computer Networks.
2. Illustrate reference models with layers, protocols and interfaces.
3. Summarize functionalities of different Layers.
4. Combine and distinguish functionalities of different Layers.
5. Model the LAN and WAN configuration using different media.
6. Examine problems of a computer networks.
7. Use emails and their working and operational features

Course Outline

Unit I Introduction to data communication

Introduction to Data Communications, Data Communication System (DCS), Effectiveness of a data DCS, Components of DCS, Message Representation of Message in DCS

UNIT II Network Connecting Devices

Network connecting devices, Layer-wise connecting devices, Hubs & Repeaters, Bridge, L2 & L3 Switches, Router, Gateways

UNIT III Basics of Computer Networks: Local Area Network (LAN), Wide Area Network (WAN)

Basics of Computer Networks, Types of links, Point-to-point Vs point-to-multi-point links, Topologies, LAN, Ethernet, Wireless Ethernet or Wi-Fi, WAN

UNIT IV Concept of Internet

Introduction to Intranet & extranet, Introduction to Internet, Client & Servers in the Internet, Operations of client & server applications, Hypertext documents, HTTP

UNIT V Basics of Internet Architecture

Introduction to Internet Architecture, Evolution of Internet Architecture, 3-Tier Internet Architecture, TCP/IP Network Model VS OSI Network Model, Addresses in TCP/IP, MAC Address, IP Address, Port Address

UNIT VI Services on Internet

Information Retrieval Services, Communication Services, World wide web, Web Services

UNIT VII World Wide Web

Facts, Operation, Architecture, Key Layers on internet, Advantages, Disadvantages, Conclusion

UNIT VIII Communication on Internet

Social Networking Apps, Smart phone messaging apps, Chat Room, Instant Messaging Services, VoIP, Video Calls and Conferencing

UNIT IX Preparing Computer for Internet Access

ISP: Introduction to ISP, Types of ISPs
Connection Types: Dial-up Connection, Integrated Service Digital Network (ISDN), Digital Subscriber Line (DSL), Cable TV Internet Connection, Satellite Internet Connection, Wireless Internet Connection

UNIT X Basics of E-mail

Electronic Mail: Use of Email, What is an Electronic Mail, Email Addressing, Features, Advantages, How to create a new account
Mailbox: Inbox, Compose, send, and Drafts Email
Advance email features: Sending an attachment
E-Mail: Receive, Reply, Delete and Forward, SPAM

Essential Readings:

1. Behnouz A. Forouzan, “Data Communication and networking”, Latest Ed. Tata McGraw Hills.

Suggested Readings:

1. James F. Kurose and Keith W. Ross, “Computer Networking: A Top down Approach” LetestEdition, Pearson Publications

2. Shirley Taylor, “Model Business Letters, Emails and Other Business Documents” 7th Edition, Kindle Edition, Pearson Publications

Unit 1 Introduction to data communication

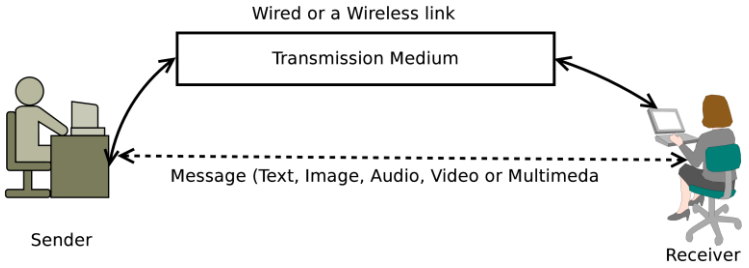
Unit 1.1: Introduction to Data Communications – Part 1

Introduction to Data Communications

- Communication means sharing of information
- Data communication is a technology which is used to transfer data from a sender machine to receiver machine.
- The shared information (message) can be in the form of text, images, audio, video or a good mix of some of them all.

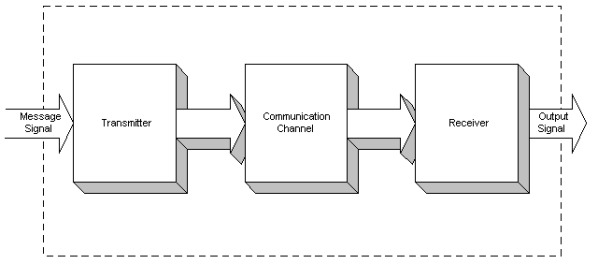
Introduction to Data Communications

- These messages are encoded in to the electromagnetic signals for transmission over a physical medium as shown in the following figure.



Data Communication System

- The purpose of a DCS is to transmit the message signal from a source to a destination.
- Following Figure is a block diagram of a communication system. This system consists three basic parts: transmitter, channel, and receiver.



Effectiveness of a data communications system

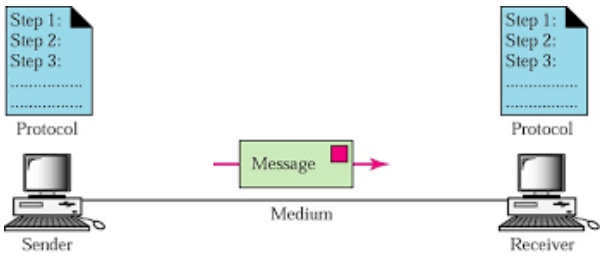
The effectiveness of a data communications system depends on following four fundamental characteristics:

- **Delivery:** to the correct and intended destination.
- **Accuracy:** unaltered in transmission system.
- **Timeliness:** in a timely manner.
- **Jitter:** variation in the packet arrival time.

Components of Data Communication System (DCS)

A DCS has 5 components which are given as and used as given in the following figure (Source: DCN By B. Fourouzan) :

1.Message
2.Sender
3.Receiver
4.Transmission Medium
5.Protocol



Representation of Message in DCS

- Message can be represented in DCS as:
  - Text representation
  - Numbers representation
  - Images representation
  - Audio representation
  - Video representation

Representation of message in text

- Text is represented as a bit pattern, a sequence of bits 0's & 1's.
- Different sets of bit patterns have been designed to represent text symbols.
- Each set is called a code, and the process of representing symbols is called coding.
- Today, the prevalent coding system is called Unicode, which uses 32 bits to represent a symbol or character used in any language in the world.
- ASCII now constitutes the first 127 characters in Unicode and, is also referred to as Basic Latin.

Representation of message in numbers

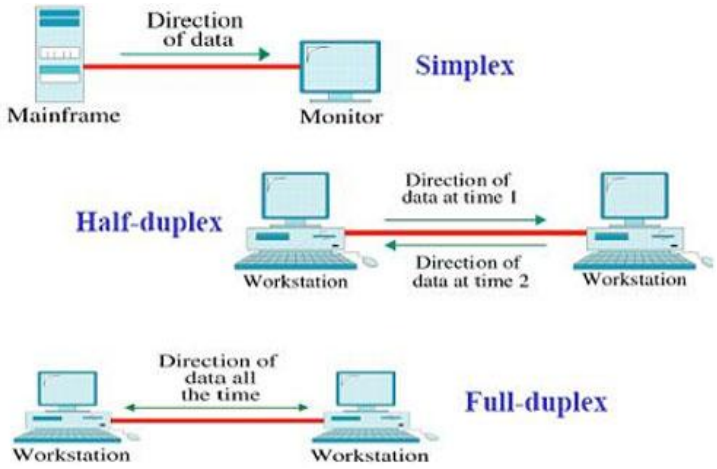
- Numbers are also represented by bit patterns.
- Apart from ASCII, BCD is also used to represent numbers.
- The number is directly converted to a BCD to simplify mathematical operations.

Representation of message using Audio & Video

- ***Audio Representation***
  - Audio refers to the recording or broadcasting of sound or music.
  - Audio is different from text, numbers, or images.
  - It is continuous, not discrete. Even when we use a microphone to change voice or music to an electric signal, we create a continuous signal.
- ***Video Representation***
  - Video refers to the recording or broadcasting of a picture or movie.
  - Video can either be produced as a continuous entity (e.g., by a TV camera), or it can be a combination of images, each a discrete entity, arranged to convey the idea of motion.

Modes of data communication used in DCS

- Communication between two devices can be one of following 3 modes:
  - Simplex , Half-duplex & Full-duplex Communication



References

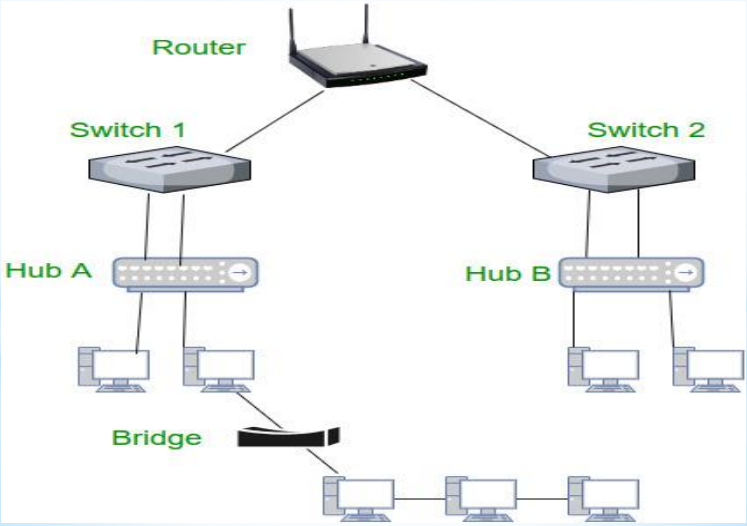
- Data Communications and Networking by Behrouz A. Forouzan, McGraw-Hill Forouzan Networking Series
- http://www-ee.eng.hawaii.edu/~sasaki/Undergrad/WaveCalc/ZeLi/elements.html

UNIT 2 Network Connecting Devices

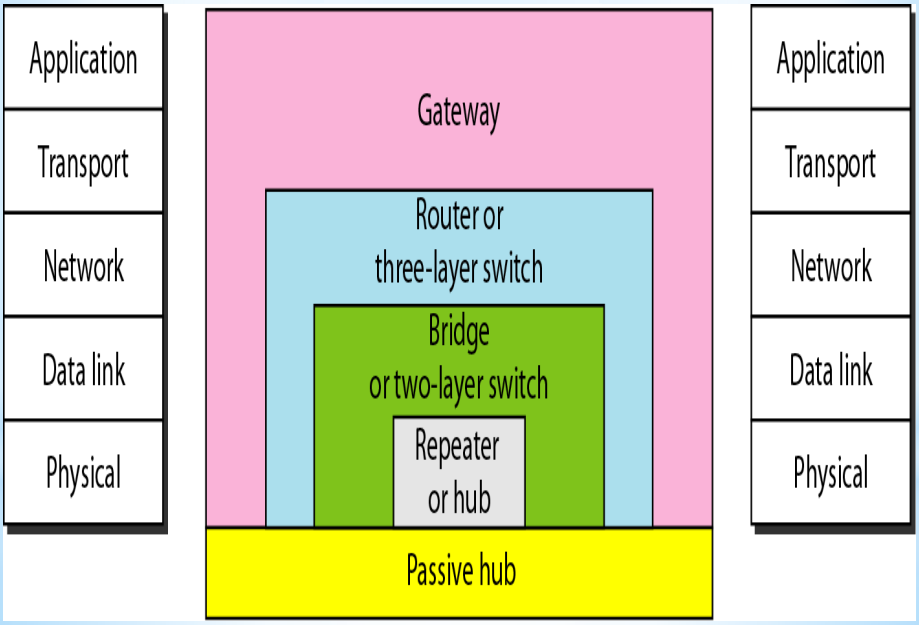
Unit 2.1: Network Connecting Devices - Part 1

Network Connecting Devices

- Network connecting devices are physical devices that are required for communication and interaction between hardware on a computer network.



Layer-wise connecting Devices

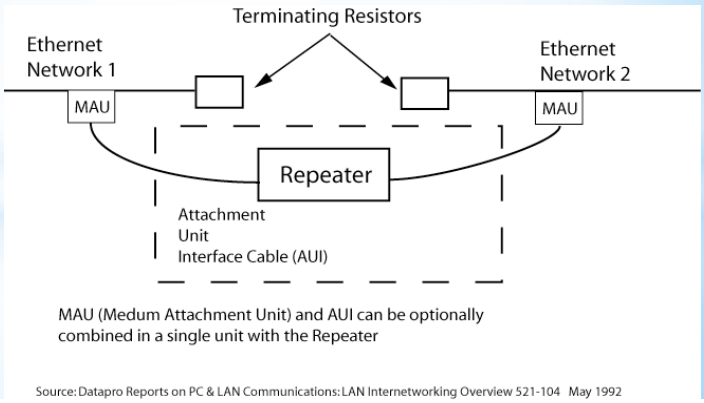


Passive Hubs

- Those hubs which operate below the physical layer are passive hub.
- A passive hub is just a connector. It connects the wires coming from different branches.
- It simply redirects the traffic on the connected machines.

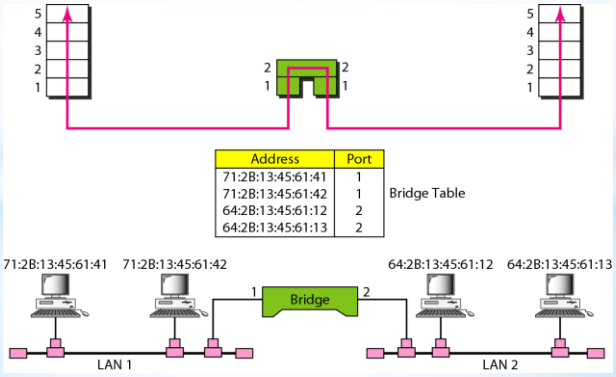
Active Hubs or Repeater

- Active hubs or a multiport repeaters operate only at the physical layer. It forwards each received frame, and can't filter traffic.
- Signals that carry information within a network can travel a fixed distance before attenuation endangers the integrity of the data.
- A repeater receives a signal and, before it becomes too weak or corrupted, amplify and regenerates the original bit pattern.
- The repeater then sends the refreshed signal.
- A repeater can extend the physical length of a LAN



Bridge

- Bridges are store and forward devices.
- Bridge operates in both the PHY and the DLL.
  - As a physical layer device, it regenerates the signal it receives.
  - As a DLL device, the bridge can check the MAC addresses (source and destination) contained in the frame.



Bridge

- A bridge with many ports and design allows better (faster) performance.
- A bridge with a few ports can connect a few LANs together.
- A bridge with many ports may be able to allocate a unique port to each station, with each station on its own independent entity. This means there is no competing traffic (no collision).
- There are various types of bridges such as:
  - Transparent bridges
  - Spanning tree bridges
  - Source routing bridges

References

* Data Communications and Networking by Behrouz A. Forouzan, McGraw-Hill Forouzan Networking Series

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Unit 2.2: Network Connecting Devices – Part 2

L2 & L3 Switches

- When we use the term switch, we must be careful because a switch can mean two different things.
- We must clarify the term by adding the level at which the device operates.
- We can have a layer 2 (L2) switch or a layer 3 (L3) switch.
  - The L3 switch performs up to the network layer; and is called router.
  - The L2 switch performs up to data link layers.
  - A L2 switch is a bridge.
  - A L2 switch, as a bridge does, makes a filtering decision based on the MAC address of the frame it received.
  - A L2 switch can have a buffer to hold the frames for processing.
  - It can have a switching factor that forwards the frames faster.

L2 & L3 Switches

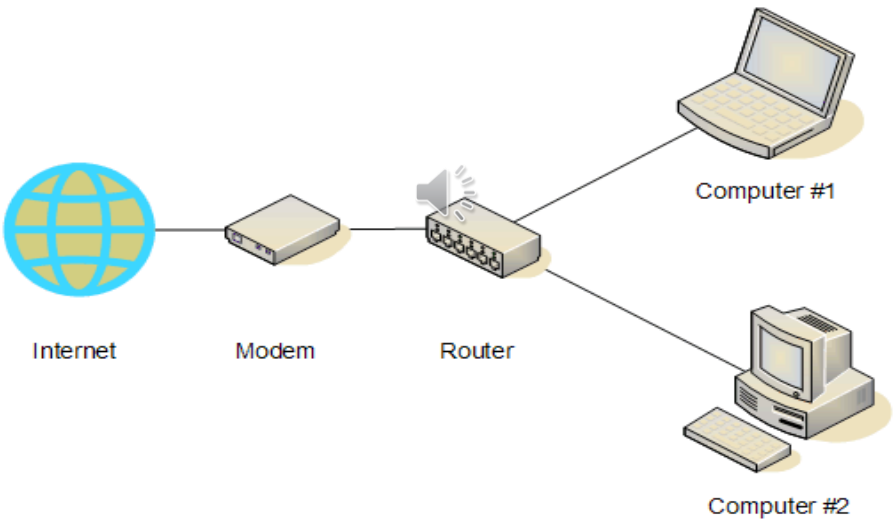
- A L3 switch is a router, but a faster and more sophisticated.
- The switching fabric in an L3 switch allows faster table lookup and forwarding.
- L3 switch and router is synonymous.

Router

- Routers are conceptually similar to bridges, except that they are found in the network layer.
- They just take incoming packets from one line and forward them on another, just as all routers do, but the lines may belongs to different networks and use different protocols.
- A router is a layer-3 device that routes packets based on their logical addresses.
- A router normally connects LANs and WANs in the Internet and has a routing table that is used for making decisions about the route.
- The routing tables are normally dynamic and are updated using routing protocols.

Router

- Following figure shows a router placement:

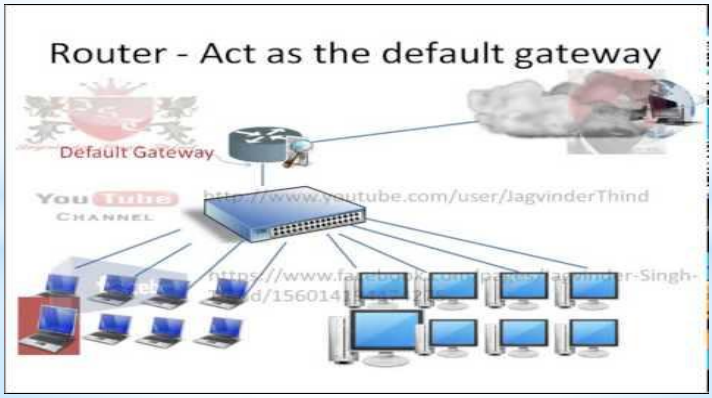


Gateway

- Gateway is a device that connects two or more dissimilar networks.
- Transport gateways make a connection between two networks at the transport layer.
- Application gateways connect two parts of an application in the application layer.
- A gateway is normally a computer that operates in all five layers of the Internet.
- A gateway takes an application message, reads it, and interprets it.

Gateway

- This means that it can be used as a connecting device between two internetworks that use different models.
- The gateway connecting the two systems can take a frame as it arrives from the first system, move it up to the OSI application layer, and remove the message.



Conclusion

- During these sessions, we learned the connecting devices used at various layers of protocol stack to prepare the network of different devices.
- We started with passive hub which works as a simple connecter and it simply redirects the in-coming signal to all connected lines. It works below the physical layer.
- Active hub or repeater is capable of regeneration of signals to make the power of the signal. It does not have any filtering capability. It works at physical layer.
- Bridge works at link layer. Bridge has capability of repeater and it can also performs the filtration of frames.
- Router is connecting device that performs important functions like creation and entry of routing table, doing table lookup, calculation of optimal out-going path for an in-coming packet and updating of routing table.
- Gateway is connecting device that connects two or more un-identical networks

References

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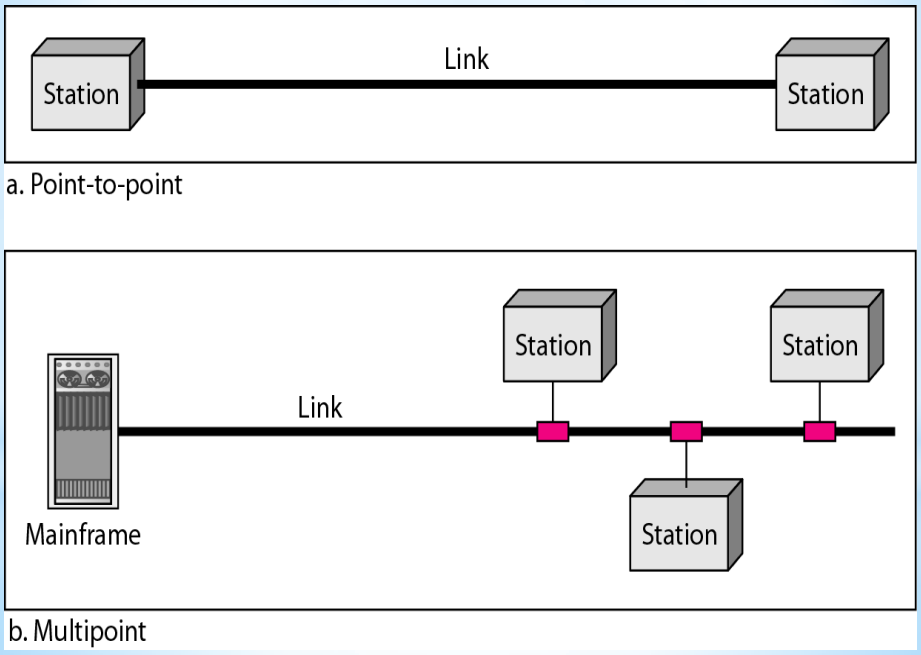
UNIT 3 Basics of Computer Networks

Unit 3.1: Basics of Computer Network - Part 1

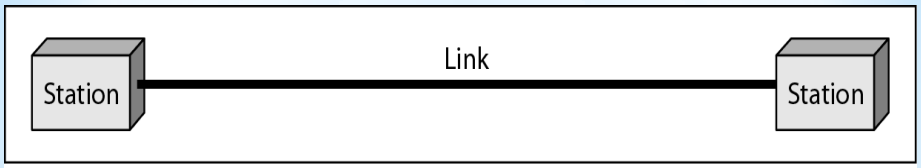
Basics of Computer Networks

- What is a computer network?
  - A network is a set of devices (often referred to as nodes) connected by communication links to share the computing resources.
  - A node can be a computer, printer, smart phone, refrigerator, car or any other device capable of sending and/or receiving data generated by other nodes on the network.
- Types of connections:
  - Point-to-point
  - Point-to-multipoint

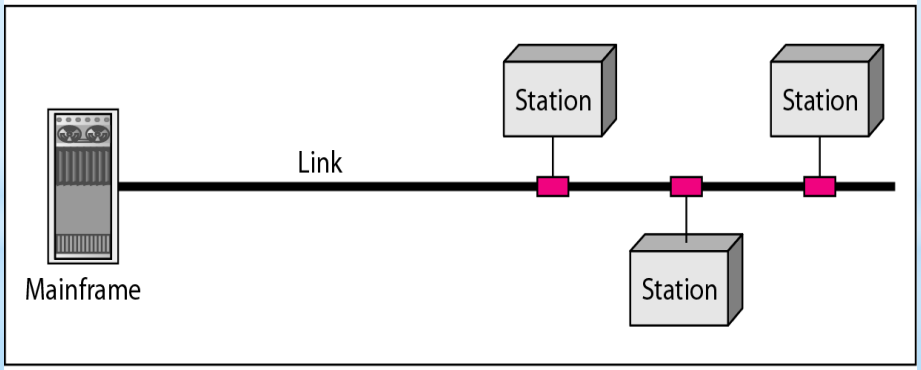
Point-to-point VS Point-to-multipoint



Point-to-point VS Point-to-multipoint

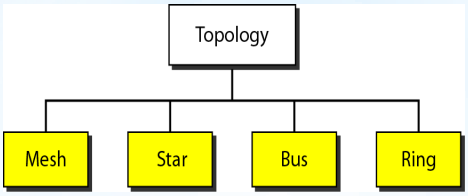


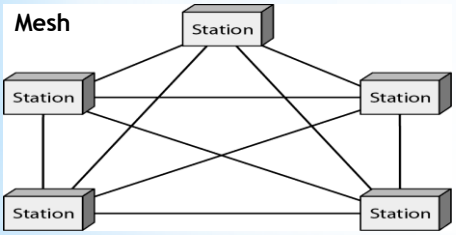
a. Point-to-point

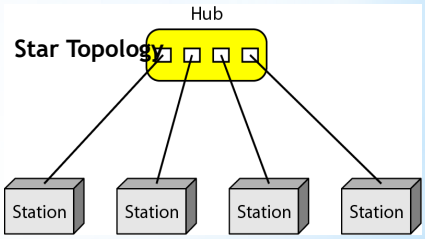


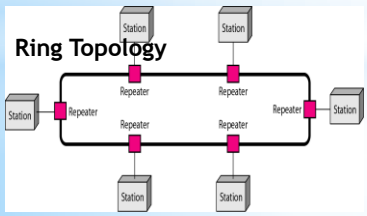
b. Multipoint

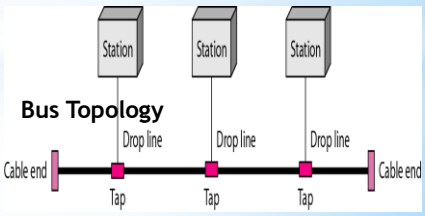
Types of Topologies











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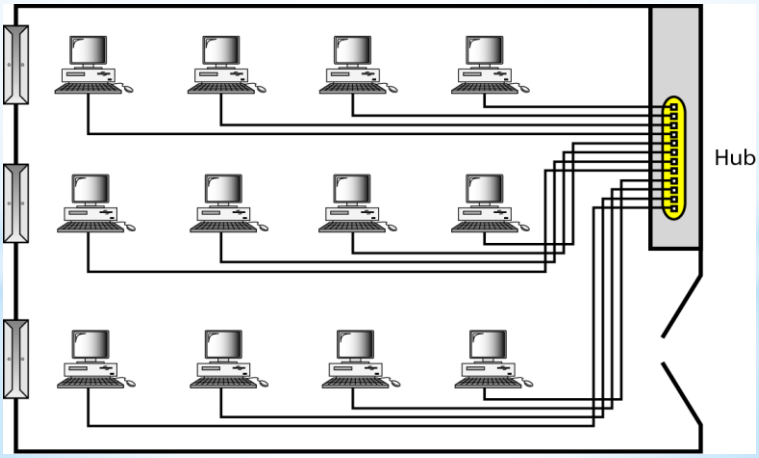
Unit 3.2: Basics of Computer Network - Part 2

LAN

- A local area network (LAN) is usually privately owned and links the devices in a single office, building, or campus as shown in figure given below:



LAN Cont....

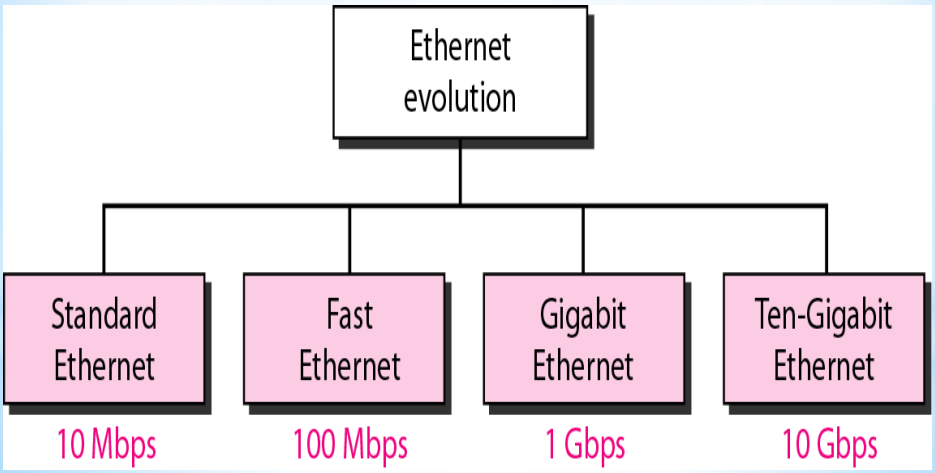
- Depending on the needs of an organization and the type of technology used, a LAN can be as simple as two PCs and a printer in someone's home office; or it can extend throughout a company and include audio and video peripherals.
- Currently, LAN size is limited to a few Kms.
- LANs are designed to allow resources to be shared between personal computers or workstations.
- The resources to be shared can include hardware (e.g., a printer), software (e.g., an application program), or data.

LAN Cont....

- One of the computers may be given a large capacity disk drive and may become a server to clients.
- Software can be stored on this central server and used as needed by the whole group.
- In addition to size, LANs are distinguished from other types of networks by their transmission media and topology.
- The most common LAN topologies are bus, ring, and star.
- Early LANs had data rates in the 4 to 16 Mbps range. Today, however, speeds are normally 100 or 1000 Mbps.

Ethernet (IEEE 802.3)

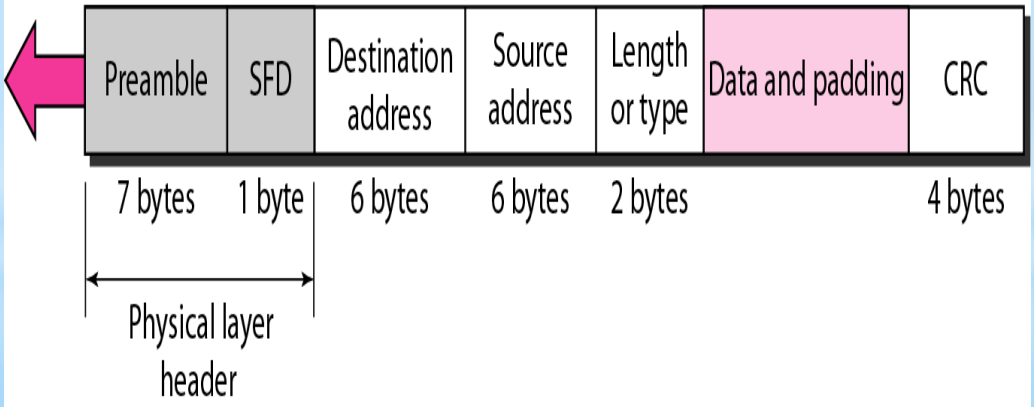
- Ethernet (IEEE 802.3) is one example of LAN which has evolved over the years as follows:



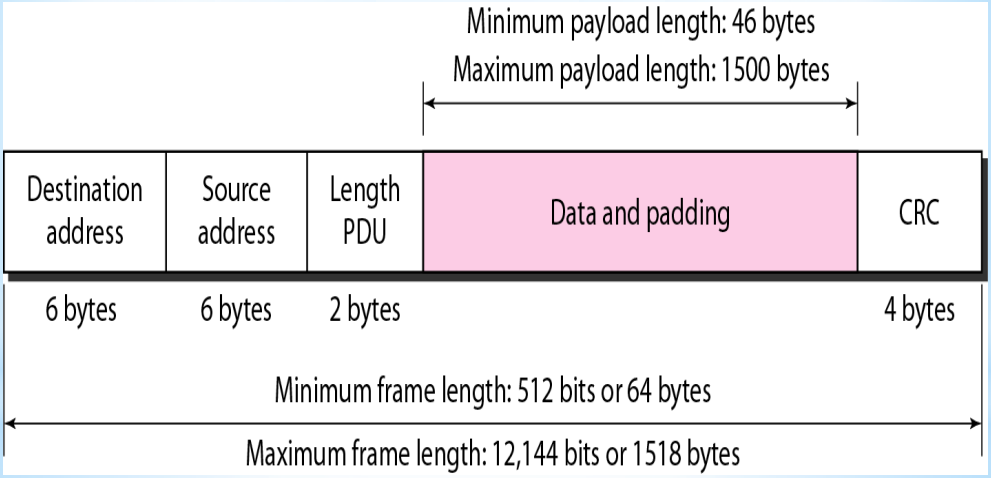
Frame format of Ethernet

Preamble: 56 bits of alternating 1s and 0s.

SFD: Start frame delimiter, flag (10101011)

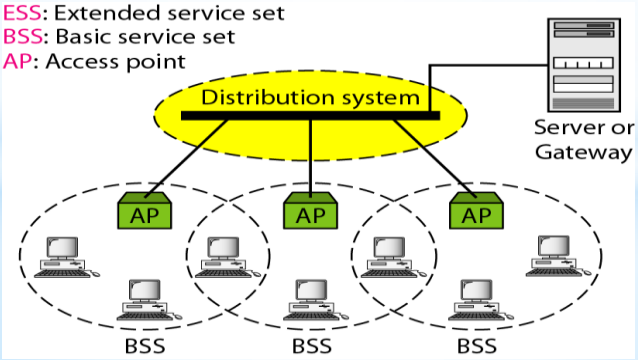


Frame length of Ethernet



WLAN (Wireless Ethernet IEEE802.11)

- IEEE has defined the specifications for a wireless LAN, called IEEE 802.11, which covers the physical and data link layers.
- *A BSS without an AP is called an ad hoc network; a BSS with an AP is called an infrastructure network.*

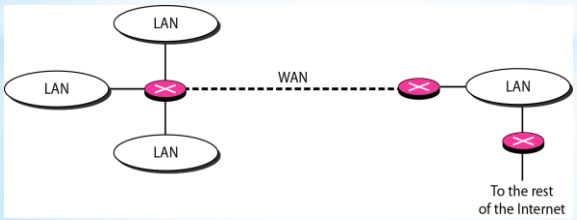


WAN (Wide Area Network)

- A wide area network (WAN) provides long-distance transmission of data, image, audio, and video information over large geographic areas that may comprise a country, a continent, or even the whole world.
- A WAN can be as complex as the backbones that connect the Internet or as simple as a dial-up line that connects a home computer to the Internet.
- We normally refer to the first as a switched WAN and to the second as a point-to-point WAN.

WAN Cont. …

- The switched WAN connects the end systems, which usually comprise a router (internet-working connecting device) that connects to another LAN or WAN.
- The point-to-point WAN is normally a line leased from a telephone or cable TV provider that connects a home computer or a small LAN to an Internet service provider (lSP). This type of WAN is often used to provide Internet access.



References

*Data Communications and Networking by Behrouz A. Forouzan, McGraw-Hill Forouzan Networking Series

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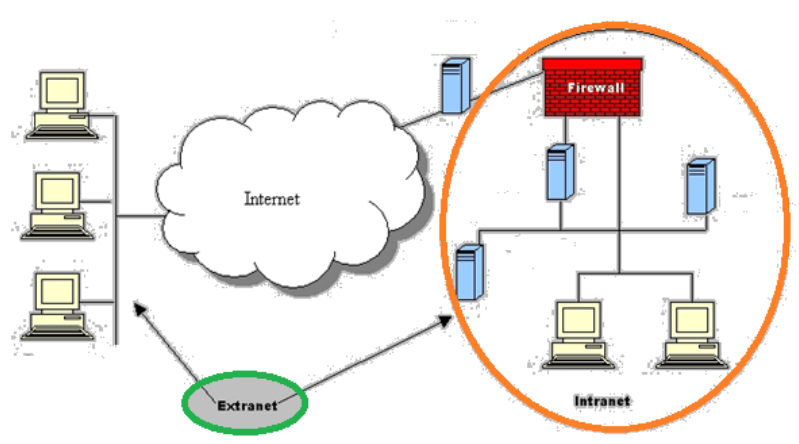
UNIT 4 Concept of Internet

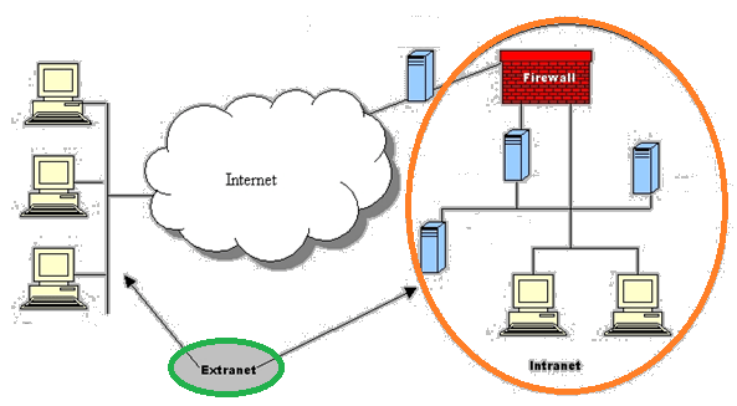
intranet & extranet

- An intranet is a web technology based private communication network which uses the internet technology but it is isolated from the Internet and is available to the employees of a company.



intranet & extranet

- Intranet is operated and controlled by a company for its internal operations.
- The extranet refers to an extension of an intranet that uses internet protocols for authorization to give limited access of the intranet to the outside users.

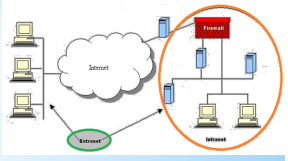


The benefits of implementing an intranet

- Improved internal communication
- Efficient project management and workflow systems.
- Centralized information that connects members
- The intranet is the digital workplace where employees communicate directly with colleagues, access department information, and collaborate on projects as efficiently as possible.

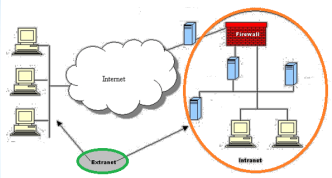
Introduction to Internet

- What is the Internet?
  - The Internet is a global network of networks connecting millions of users worldwide via many computer networks using a simple standard common addressing system and basic communications protocol called TCP/IP.
  - This allows messages sent over the Internet to be broken into small pieces, called packets, which travel over many different routes between source and destination computers.



Introduction to Internet

- Fortunately, nobody owns the Internet, there is no centralized control, and nobody can turn it off.
- Its evolution depends on rough consensus about technical proposals, and on running code.
- Engineering feed-back from real implementations is more important than any architectural principles.



Clients and Servers in the Internet

- Internet resources, information & services are provided through host computers, known as *servers*.
- The server is the computer system that contains information such as e-mail, database information, or text files.
- As a client, we access those resources via *client programs (apps)* which use *TCP/IP to deliver the information* to your screen in the appropriate format for your computer.

Clients and Servers in the Internet

- One kind of client program is called a *browser,* which is used to search through information provided by a specific type of server.
- A browser helps you view and navigate through information on the Internet.
- Today's most popular browsers?

Client/Server Operation

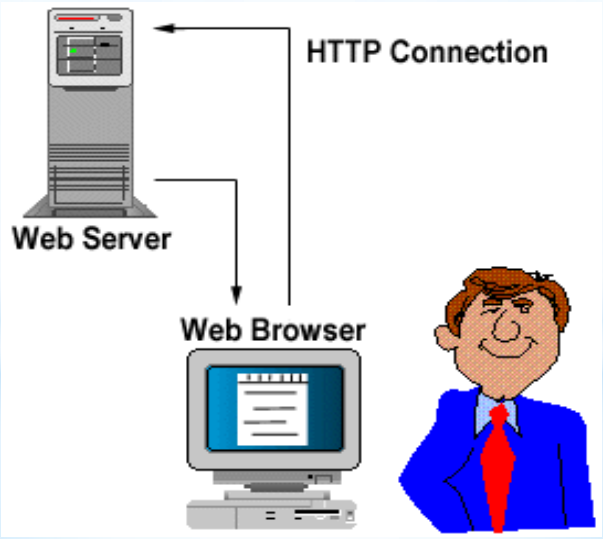
- A client/server system works as follows:
  - A server sits in some office with a bunch of files that people might want access to.
  - This computer runs a software package that listens all day long to requests over the wires.
  - Typically, these requests will be in some language and some format that the computer understands, but in English sound something like, "hello software package running on a big hunk of computer, please give me the file called "mydocument.txt" that is located in the directory "/usr/people/myname".

Client/Server Operation

- The "server software" will then access the server hardware, find the requested file, send it back over the wires to the "client" who requested it, and then wait for another request from the same or another client.
- Usually, the "client" is actually a software program, like chrome, that is being operated by a person who is the one who really wants to see the file.
- The client software however, deals with all the underlying client/server protocol stuff and then displays the document to the human user.

Client/Server Operation

The whole process looks something like the following figure :



Hypertext Documents

- The WWW makes extensive use of hypertext documents which contain Multimedia data such as text, images, sounds, video clips etc.
- Links to other documents (situated anywhere on the web).

HTTP

- The client/server protocol used to exchange hypertext documents is called HTTP (Hyper Text Transport Protocol).
- The main thing you need to know is that HTTP is a language spoken between your web browser (client software) and a web server (server software) so that they can communicate with each other and exchange files.
- HTTP is a "request-response" type protocol that specifies that a client will open a connection to a server then send a request using a very specific format. The server will then respond and close the connection.

Conclusion

- Intranet and extranet are used within an organization
- The Internet is the network of networks.
- The objective of Internet is to share the resources and information.
- Using client & server applications, the hypertext documents are exchanged using HTTP protocol.

References

* Data Communications and Networking by Behrouz A. Forouzan, McGraw-Hill Forouzan Networking Series
* http://staff.um.edu.mt/mros1/wwww/basic_web_concepts.html

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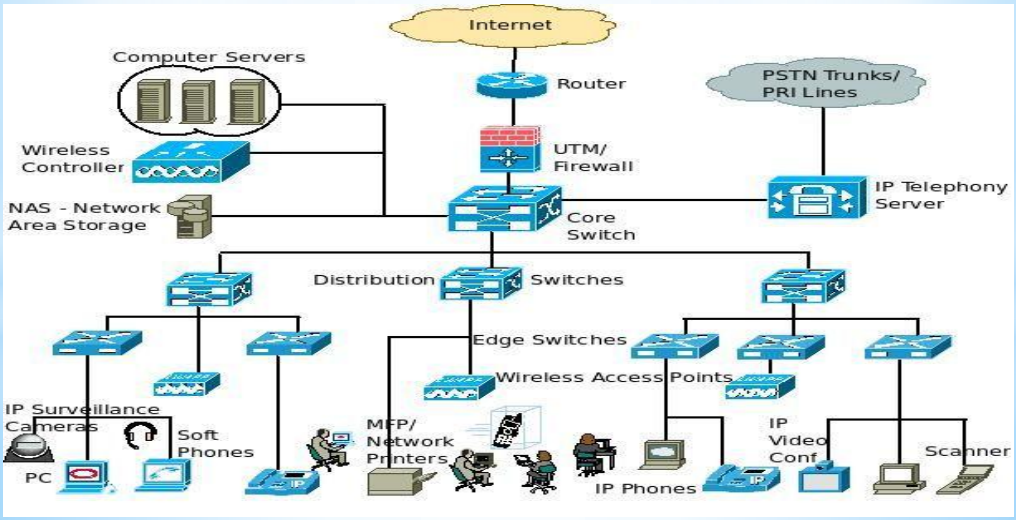
Unit 5: Basics of Internet Architecture

What is the Internet architecture?

- It is by definition a meta-network, a constantly changing collection of thousands of individual networks inter-communicating with a common protocol.



What is the Internet architecture?

- The Internet's architecture is described in its name, a short from of the compound word "inter-networking".
- This architecture is based on the specification of the standard TCP/IP protocol, designed to connect any two networks which may be very different in internal hardware, software, and technical design.

What is the Internet architecture?

- Once two networks are interconnected, communication with TCP/IP is enabled end-to-end, so that any node on the Internet has magical ability to communicate with any other no matter where they are.
- This openness of design has enabled the Internet architecture to grow to a global scale.
- In practice, the Internet technical architecture looks a bit like a multi-dimensional river system, with small tributaries feeding medium-sized streams feeding large rivers.

What is the Internet architecture?

- For example, someone's access to the Internet is often from home over a modem to a local ISP who connects to a regional network, connected to a national network.
- At the office, a desktop computer might be connected to a LAN with a company connection to a corporate Intranet connected to several national ISPs
- In general, small local Internet service providers connect to medium-sized regional networks which connect to large national networks, which then connect to very large bandwidth networks on the Internet backbone.

What is the Internet architecture?

- Most Internet service providers have several redundant network cross-connections to other providers in order to ensure continuous availability.
- The companies running the Internet backbone operate very high bandwidth networks relied on by governments, corporations, large organizations, and other Internet service providers.
- Their technical infrastructure often includes global connections through underwater cables and satellite links to enable communication between countries and continents.

What is the Internet architecture?

- As always, a larger scale introduces new phenomena: the number of packets flowing through the switches on the backbone is so large that it exhibits the kind of complex non-linear patterns usually found in natural, analog systems like the flow of water.
- Each communication packet goes up the hierarchy of Internet networks as far as necessary to get to its destination network where local routing takes over to deliver it to the addressee.
- In the same way, each level in the hierarchy pays the next level for the bandwidth they use, and then the large backbone companies settle up with each other.

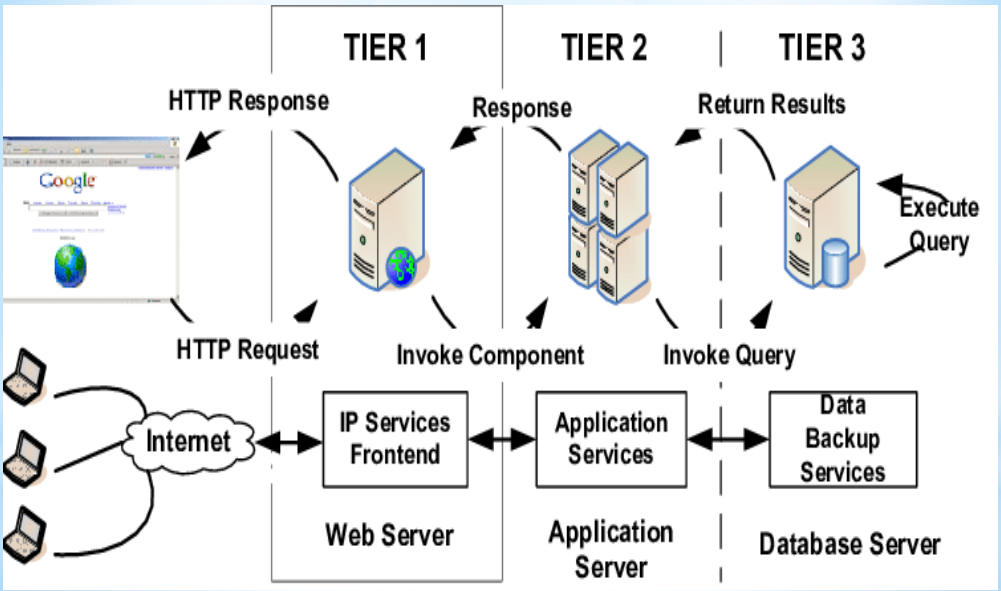
What is the Internet architecture?

- Bandwidth is priced by large ISPs by several methods, such as at a fixed rate for constant availability of a certain number of megabits per second, or by a variety of use methods that amount to a cost per gigabyte.
- Due to economies of scale and efficiencies in management, bandwidth cost drops dramatically at the higher levels of the architecture.
- The Internet architecture, which is also sometimes called the TCP/IP architecture after its two main protocols, is given in the figure given on next slide.

Evolution of Internet architecture

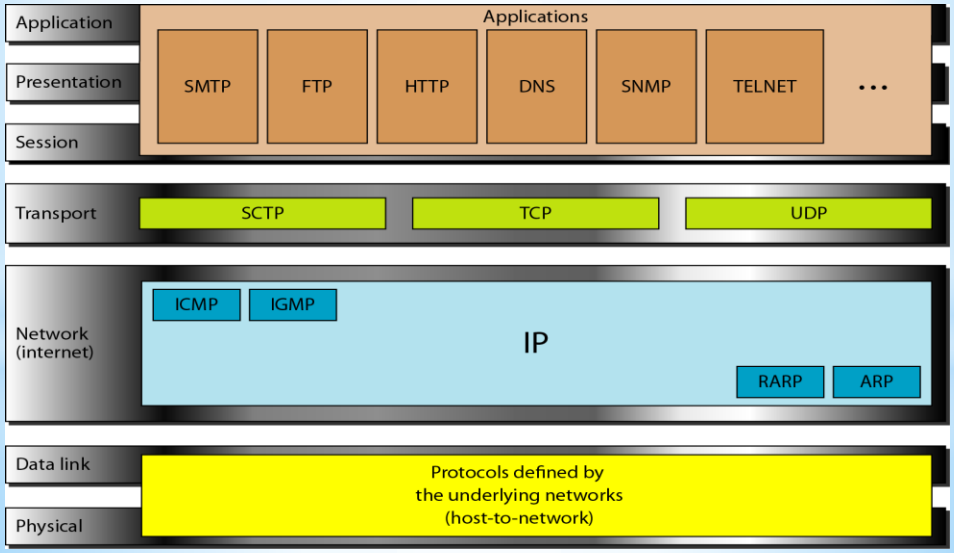
- The Internet architecture evolved out of experiences with an earlier packet-switched network called the ARPANET.
- Both the Internet and the ARPANET were funded by the Advanced Research Projects Agency (ARPA), one of the research and development funding agencies of the U.S. Department of Defence.
- The Internet and ARPANET were around before the OSI architecture, and the experience gained from building them was a major influence on the OSI reference model.

3- Tier Internet architecture

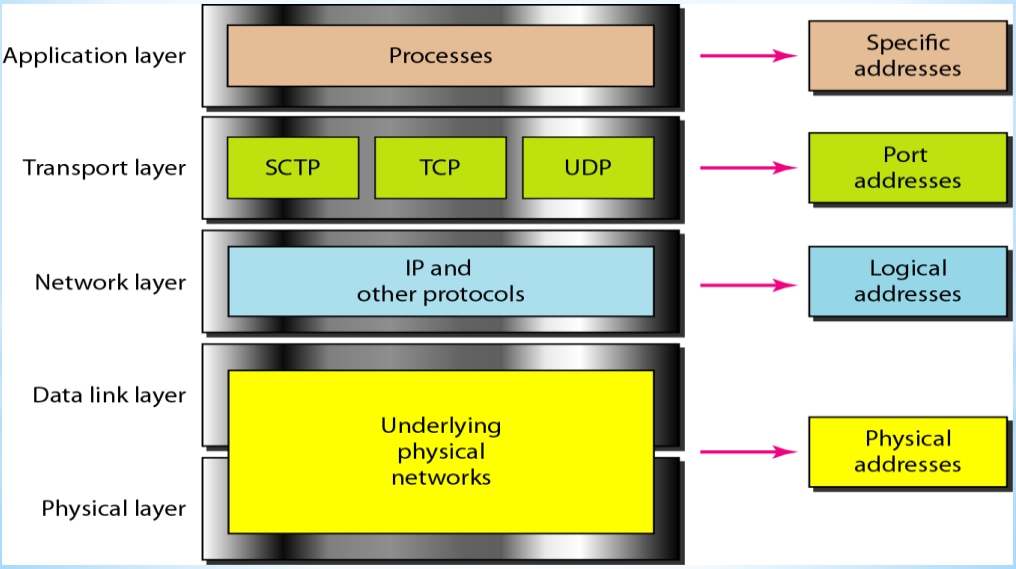


TCP/IP Network Model VS OSI Model

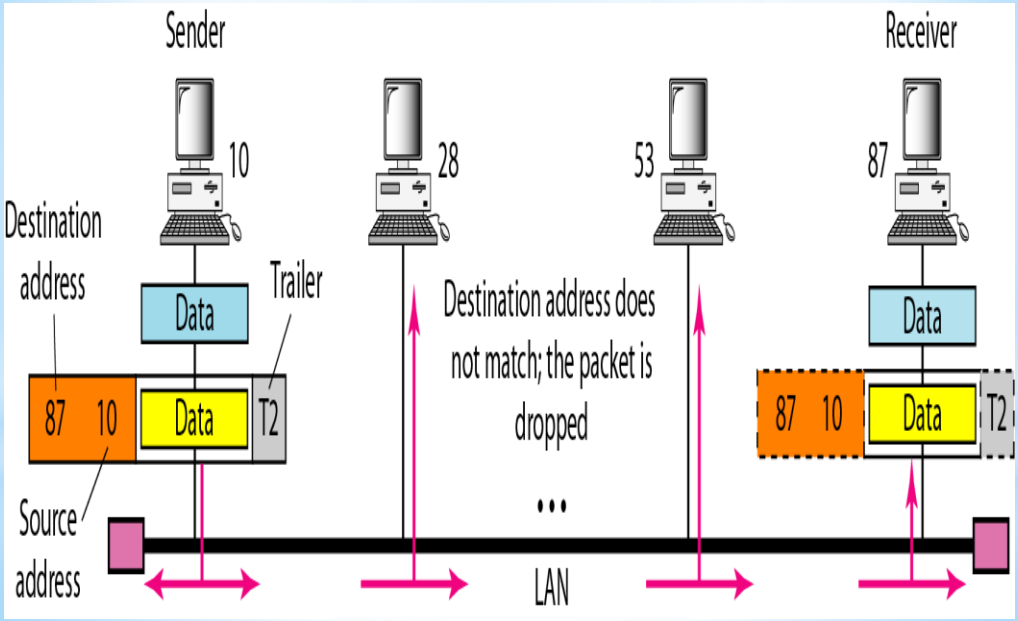
The figure given below shows the comparison of TCP/IP and OSI network models.



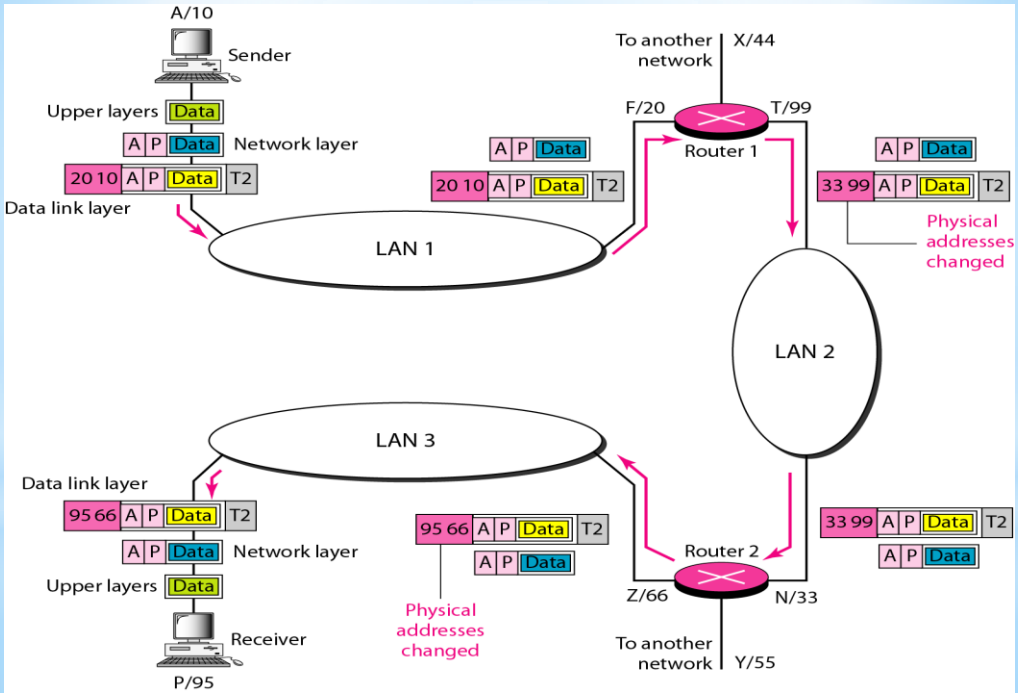
Addresses in TCP/IP: MAC Address IP Address, Port Address



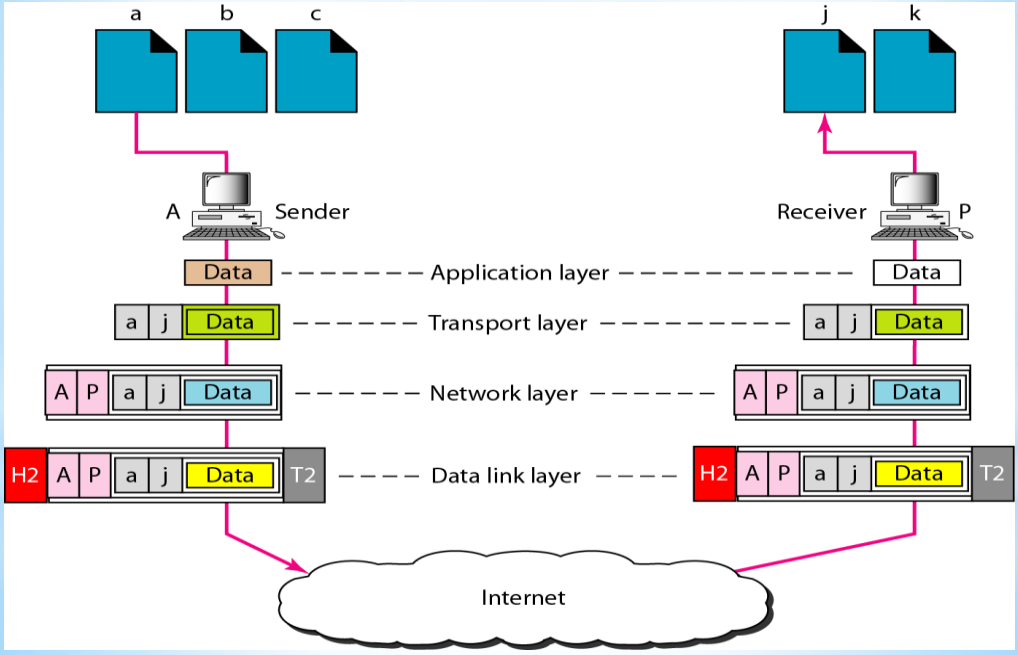
MAC Address



IP Address



Port Address



Conclusion

- Internet architecture consists many devices like computers, routers, firewalls, switches, modems, gateways etc.
- It is based on TCP/IP protocol suite
- There is a hierarchical system to provide the access in the internet.
- ARPANET was the starting point of the internet
- 3- tier architecture is used in the internet
- Three types of addresses are predominantly used in the internet: port address, IP address and MAC address

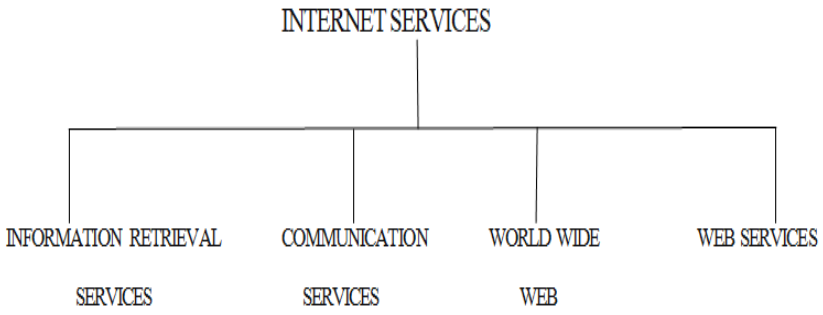
Unit 6: Services on Internet

About the Course Unit

- **Objective:** The objective of the unit is to help the students to get the conceptual knowledge of Services on Internet.

- **Learning Outcome:** After completion of this unit, students will be able to:
  - Understand the significance of Internet Services.
  - Familiar with communication service protocols.
  - Understand world wide web

Services on Internet



Information Retrieval Services

- File Transfer Protocol(FTP)
- Archie
- Gopher

Communication Services

- Electronic Mail
- Telnet
- Newsgroup
- Internet Relay Chat (IRC)
- Mailing Lists
- Instant Telephony (VoIP)
- Instant Messaging

Continued…

- World Wide Web (WWW)
- Web Services

Unit 7: World Wide Web

- **WWW** stands for **World Wide Web.**
- Technically the World Wide Web can be defined as "All the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP)".
- The World Wide Web, or simply web, is a way of accessing information over the medium of the internet.
- The World Wide Web is the universe of network-accessible information.

Facts about www

WWW is also known as W3.

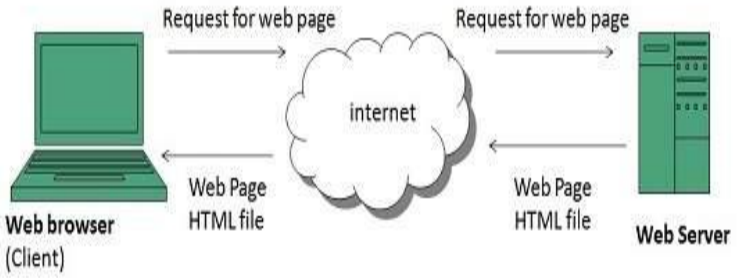
Tim Berners-Lee invented the World Wide Web in 1989. While working at CERN, he wrote the code for WWW using a NeXT computer, to share documents among researchers across the world using hyperlinks.

The World Wide Web (WWW) was conceived in 1989 at the CERN lab in Geneva, Switzerland, as a way for scientists to share knowledge.

There are more than 1.9 billion websites online today on internet.

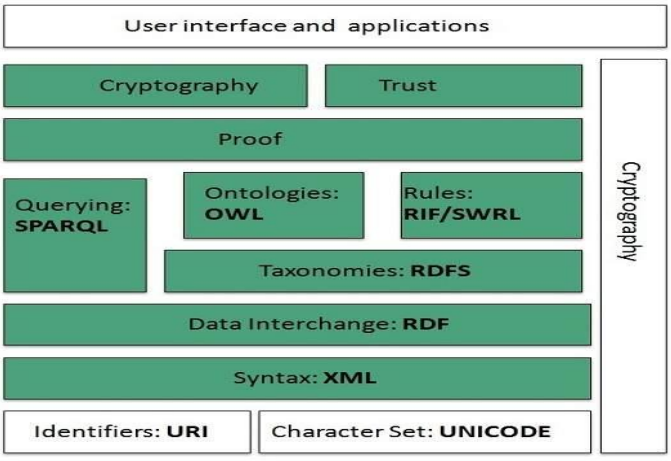
WWW Operation

WWW works on client- server approach. Following steps explains how the web works-



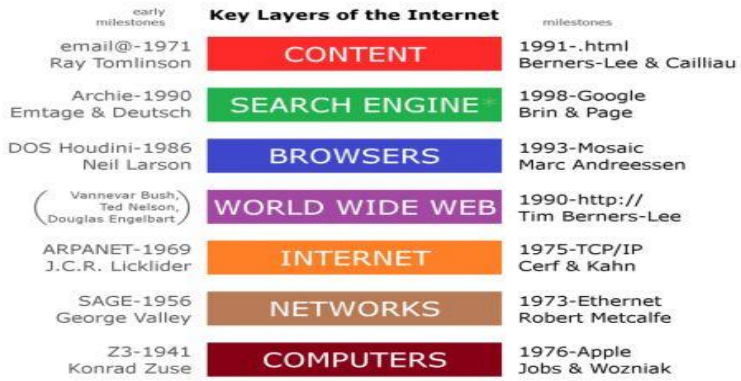
WWW Architecture

WWW architecture is divided into several layers as shown in the following diagram:



Key Layers on Internet

The World Wide Web functions as a layer on top of the Internet, helping to make it more functional. The advent of the Mosaic web browser helped to make the web much more usable.



Advantages

- Mainly free information
- Low cost of initial connection
- Rapid interactive communication
- Facilitates the exchange of huge volumes of data
- Accessible from anywhere
- Has become the global media

Disadvantages

- Danger of overload and excess information
- Difficult to filter and prioritize information
- No guarantee of finding
- what one is looking for No regulation
- No quality control over available data

Conclusion

- World Wide Web is the largest source of information in an open platform.
- Maximum availability and reachability was considered so that lot of people will have access to it.
- Web has got several functions and lot of contributions are involved in its development.
- Information is the good for sale.

Unit 8: Communication on Internet

COMMUNICATION ON INTERNET

- Online communication is a kind of communication between organization or individuals that starts and ends on the Internet

Continued….

Different Ways to Communicate Online

- **Video Calls and Conferencing**
- **Social Networking Apps**
- **Smart phone messaging apps**
- **Chat Room**
- **Instant Messaging Services**
- **VoIP**

Video Calls & Conferencing

- **Video conferencing** is a visual communication session between two or more users regardless of their location, featuring audio and video content transmission in real time.

Social Networking Apps

- Tools that enable people to connect with and follow posts from a chosen group of associates, sharing updates about their lives, careers or musings throughout the day.

Smart Phone Messaging Apps

- Smart phone messaging apps make communication easy with respect to such as instant **messaging** and voice calls.

Chat Rooms

- Chat rooms are designated areas or forum on the internet where users communicate with one another through text-based messages.

Instant Messaging Services

- Instant messaging is the exchange of near real time messages through a stand-alone application or embedded software.
- Unlike chat rooms with many users engaging in multiple and overlapping conversations, IM sessions usually take place between two users in a private, back-and-forth style of communication.

Voice over IP (VoIP)

- VoIP is Voice over Internet Protocol.
- more specially for phone services over internet.

Other ways for Online Communication

- **Email**
- **WWW**
- **Internet Relay Chat**
- **Early days of Usenet**
- **Audio Conferencing**
- **Forums**

Unit 9: World Wide Web

Internet Service Provider

- An **Internet service provider** (**ISP**) is an organization that provides services for accessing, using, or participating in the Internet.
- Internet services typically provided by ISPs include Internet access, Internet transit, Domain name registration, web hosting, and Usenet Service.

Types of ISPs

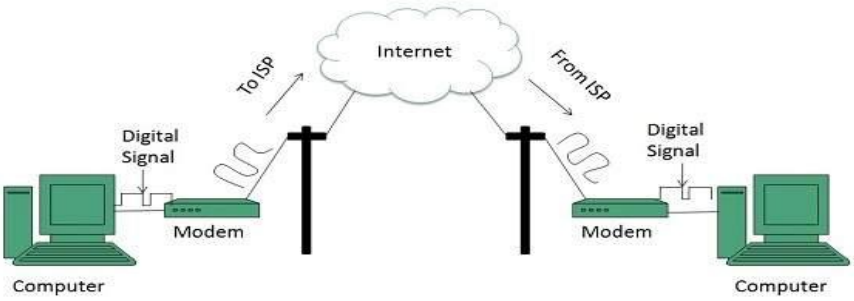
- Dial-up services
- Broadband high-speed Internet
- Digital Line Subscribers (DSL)

Connection Types

- Dial-up Connection
- Integrated Service Digital Network (ISDN)
- Digital Subscriber Line (DSL)
- Cable TV Internet Connection
- Satellite Internet Connection
- Wireless Internet Connection

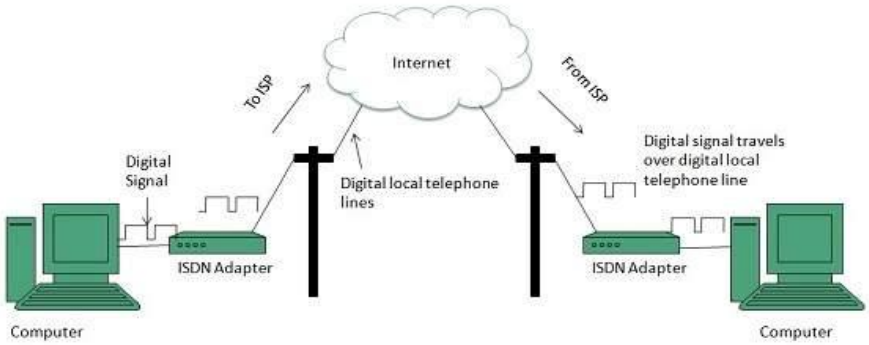
Dial-up Connection

- 'Dial-up' connection is also known as Level Two connection. This provides connection to Internet through a dial-up terminal connection.



ISDN

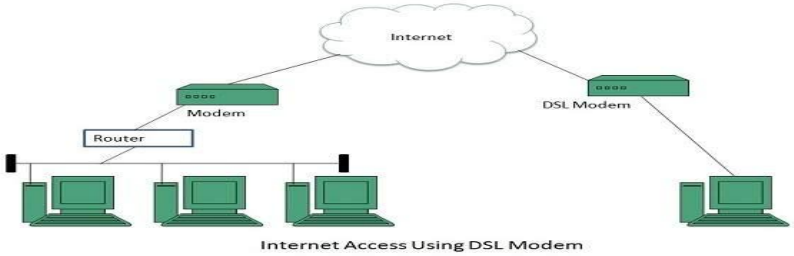
- **ISDN** is acronym of **Integrated Services Digital Network.** It establishes the connection using the phone lines which carry digital signals instead of analog signals



DSL

- **DSL** stands for **Digital Subscriber Line.** It is a form of broadband connection as it provides connection over ordinary telephone lines.

- Several versions of DSL technique available today:
  - Asymmetric DSL (ADSL)
  - Symmetric DSL (SDSL)
  - High bit-rate DSL (HDSL)
  - Rate adaptive DSL (RDSL)
  - Very high bit-rate DSL (VDSL)
  - ISDN DSL (IDSL)



Internet Access Using DSL Modem

ADVANTAGES OF DSL

- One-to-one or one-to-many communications
- Cheapest and fastest mail services
- We can send any type of data through mail idea, image, text, audio, video to anyone.
- Physical presence of receiver is not required
- Same email can be send to one or more users
- Email can be read anywhere in the world
- Instant communications
- Physical presence of recipient is not required
- Most inexpensive mail services, 24-hours a day and seven days a week
- Encourages informal communications

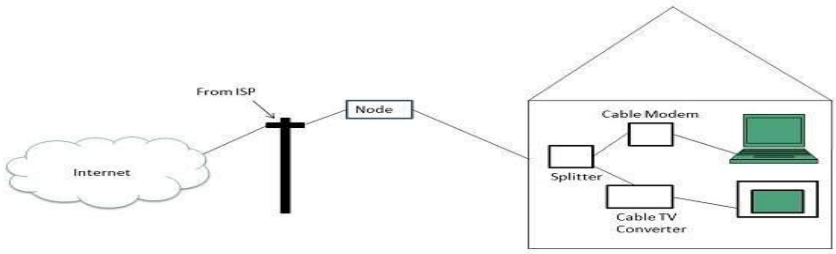
DISADVANTAGES OF DSL

- Expensive
- Distance Dependence

Cable TV Internet Connection

Key Points:

- A cable modem is used to access this service, provided by the cable operator.
- The Cable modem comprises of two connections: one for internet service and other for Cable TV signals.
- Since Cable TV internet connections share a set amount of bandwidth with a group of customers, therefore, data transfer rate also depends on number of customers using the internet at the same time.



Advantages

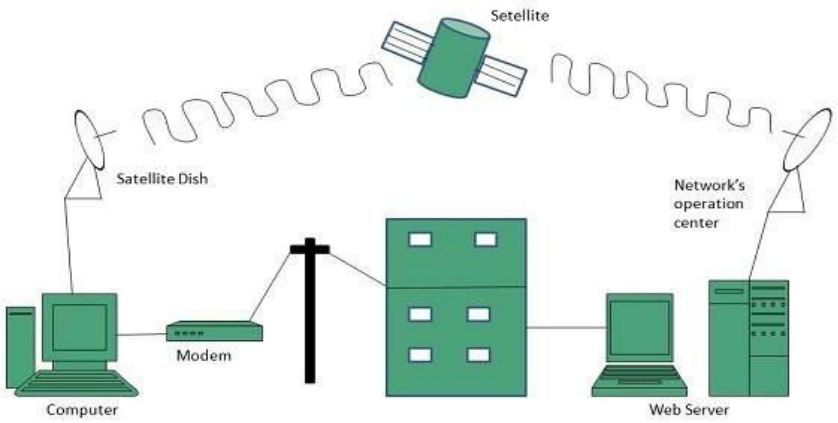
- Always Connected
- Bandwidth
- File Transfer Capabilities
- Signal Integrity
- Routing
- Rely on Existing Connections

Disadvantages

- Cable internet technology excels at maintaining signal strength over distance.
- Bandwidth equals money, so cable's advantage in throughput comes with a price.

Satellite Internet Connection

- Satellite Internet connection offers high speed connection to the internet.



Wireless Internet Connection

- Wireless Internet Connection makes use of radio frequency bands to connect to the internet and offers a very high speed.

- Can be obtained either by
  - Wi-fi or Bluetooth
  - VSAT

Unit 10: Electronic Email

What is an Email used for?

- Speed
- Convenience
- Attachments
- Accessibility
- A Record
- Unlimited Space and Time
- Free communication

E-Mail

- What is E-Mail?

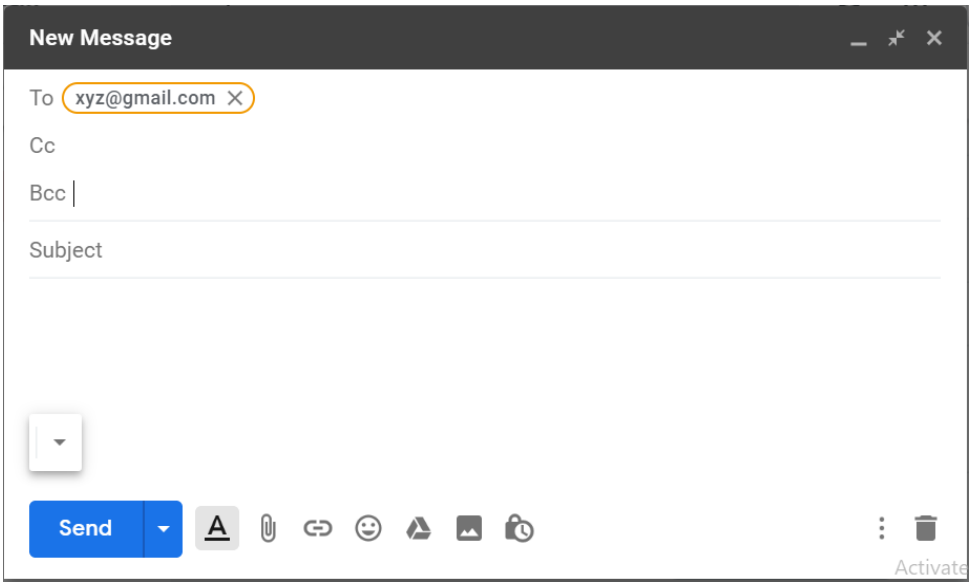
- Email was invented by Ray Tomlinson in 1972.
- Email or e-mail is short for electronic mail.
- **Electronic mail** is one of the most commonly used services on the Internet that allows people to send messages to one or more recipients.

E-Mail Addresses

- Why use E-Mail?
- E-mail Address -- User@domain

Eg. Firstname.Lastname@provider.domain

Components of E-Mail Address



Features of E-Mail

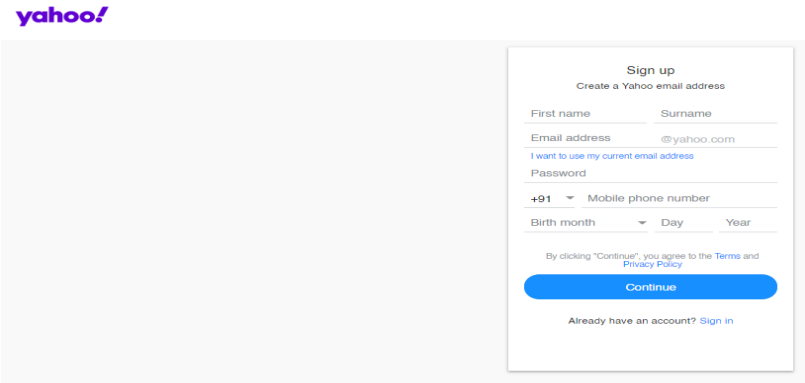
- One-to-one or one-to-many communications
- Cheapest and fastest mail services
- We can send any type of data through mail idea, image, text, audio, video to anyone.
- Physical presence of receiver is not required
- Same email can be send to one or more users
- Email can be read anywhere in the world
- Instant communications
- Most inexpensive mail services, 24-hours a day and seven days a week
- Encourages informal communications

Advantages

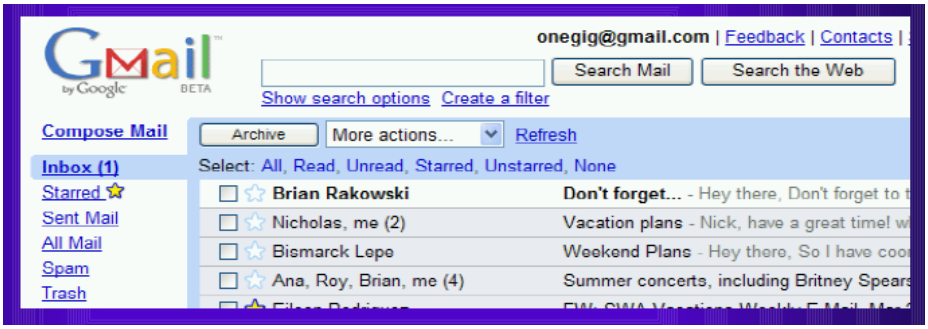
- Free delivery
- Global delivery
- Instant delivery
- File attachment
- Long term storage
- Environmental friendly

Create new account

- Click on “Create new account”
- Be sure to have user name and password ready
- Fill in as many blanks as required
- When finished – “Create new Account”



Inbox



Reading what’s in your inbox

• The Inbox shows how many new messages you have in parentheses.

• New messages are highlighted.

• Select any message to read the content. When done select Inbox again to get back to your list.

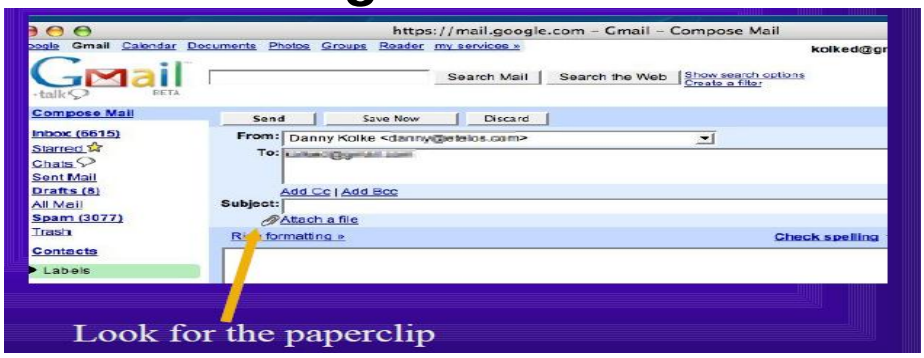
Compose, Sending and Drafts Emails

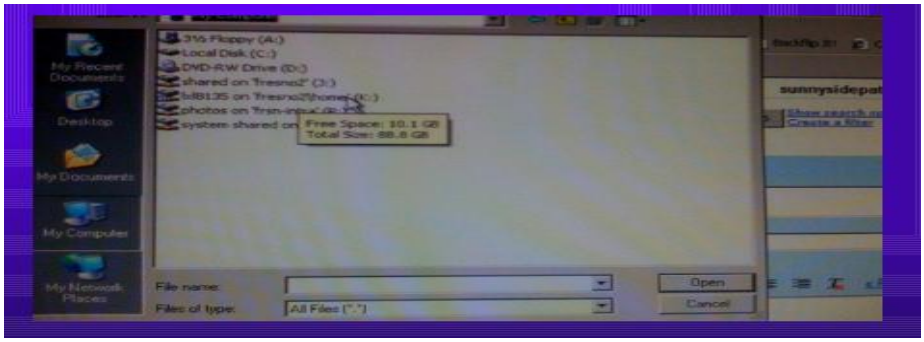
Let's compose an email!
- Click on NEW
- Have email address ready for the person to receive your email

Sending an email
- Click on SEND to mail your letter
- Message will now appear in your SENT folder
- Once an email is sent, you cannot stop it or take it back
- Check your SENT box now
- Check your inbox for your BCC

Draft Emails
- When creating an e-mail the computer will automatically save your work periodically. If for any reason you should be interrupted you can retrieve your latest work in the DRAFT BOX.

Sending an attachment



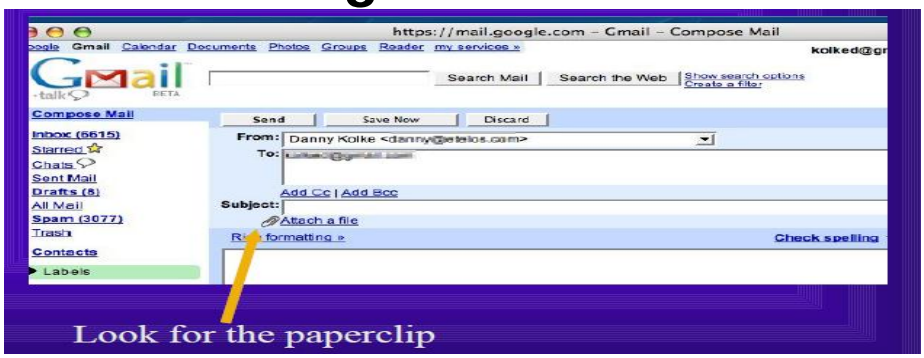


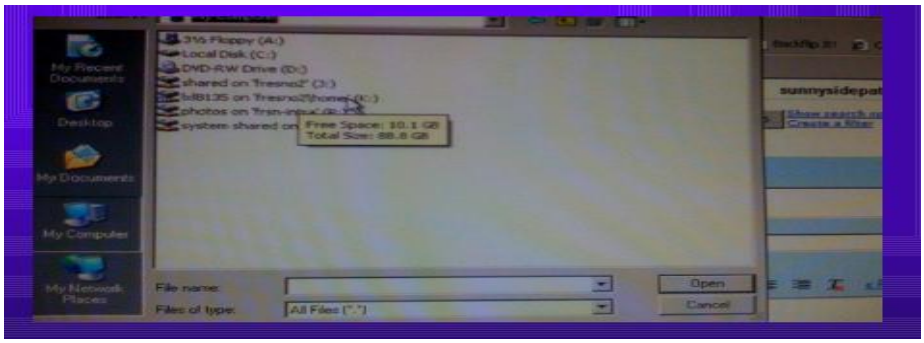
Receiving an Email

- If you have any messages you should see them listed in your Inbox.
- At the top of each message is a header with information about the sender, date, and routing of each message.

Receiving email
From: snoopy@gmail.com
To: you@gmail.com
CC:
Subject: Email Basics class
Date: Wednesday , 10 March 2019 10:31 IST

Sending an attachment





Receiving an Email

- If you have any messages you should see them listed in your Inbox.
- At the top of each message is a header with information about the sender, date, and routing of each message.

Receiving email
From: snoopy@gmail.com
To: you@gmail.com
CC:
Subject: Email Basics class
Date: Wednesday , 10 March 2019 10:31 IST

Replying to an Email

Reply vs Reply All

- When you click on **Reply**, your message will automatically be sent to the person who sent you the email (FROM field in header.)

- When you click on **Reply All**, your message will automatically be sent to the person who sent you the email AND everyone in the CC fields in the header.

Deleting & Forwarding Emails

Deleting email

- Once you've read an email, you should decide if you want to save/file it or delete it.
- Click on delete to send the email to the TRASH CAN(delete folder)
- The message disappears from your list of messages but is not truly deleted, so if you make a mistake you can get the message back – look in the trash folder. Once you exit the program, the Messages are usually deleted for good.

Forwarding an email

- When you click on FORWARD, you may share the email you've received by sending it to others.
- You may add your own message before sending.
- Enter the TO's and CC's if using
- Click on SEND