

C LEARNING OBJECTIVES

- To know about history of computer networking & the Internet
- Discuss about the explosion on the Internet
- Demerits of Internet
- To learn about the growth of computer networking
- Uses of computer networks at home, business, mobile, social media

10.1 Introduction

A set of computers connected together for the purpose of sharing resources is called as computer networks. At present, Internet is the most common resource shared everywhere. Some of the shared resources shown in Figure 10.1 are file server, web camera, speakers, printer, scanner, fax machine etc., Accessing services such as WWW (World Wide Web), Digital audio, Digital video which are shared to use applications, software, and storage servers.



Figure 10.1 Devices in Network

Computer networking is a technique of digital telecommunications network one that permits nodes to share its resources. This computer networking exchanges the data with each other through wired or wireless connections between different terminals called nodes. The data from these wires is transferred over any cable media such as fiber optic cable wire or a wireless media such as WiFi.

A Computer which is connected to a network is called as **node**. The data originates and terminates at these particular nodes is called as a source and destination. In networking, nodes are identified by its IP addresses i.e.,(network address) and can include hosts such as mobile phones, tabs, personal computers, huge servers and other networking device. Connecting more than one device is called as network.



10.2 History of Computer Networking and the Internet

The history of computer networks and its development were briefly explained in the table given below:

Table 10.1 History of computer Networking					
S. No	Period	Method	History		
1	Late 1950	SAGE (Semi – Automatic Ground Environment)	It was used at U.S Military Radar system.		
2	1960	SABRE(Semi Automatic Business Research Environment)	At Commercial Airline Reservation system online connected with two main frame computers.		
		Packet switching	Packet switching was developed by Paul Baran and Donald Devices to transfer the information between computers and network.		
			NPL network (National Physical Laboratory) at united kingdom local area network (LAN) using line speed of 768kbit/s was implemented by Davies pioneered		
3	1963	Intergalactic Computer network	Intergalactic Computer network was send by J.C.RLicklider to his office colleagues discussing about this concept, a computer network engaged to access communication with users of computers.		
4	1965	Telephone switch	At first widely used Telephone switch was introduced by Western Electric which implemented true computer control.		

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5	1966	WAN (Wide Area Network)	An experimental paper on WAN (Wide Area Network) has been published by Thomas Marill and Lawrence G.Roberts published in the area of time sharing.
6	1969- 1970	ARPANET (Hierarchical routing after 1970's Internet today)	 First In 1969, four nodes of ARPANET were connected between four universities namely the university of California at Los Angeles, at Santa Barbara, the Stanford Research Institute and the university of Utah using the 50 Kbit/s circuits. Packet –switched networks was the theoretical work to model was performed by Leonard Kleinrock , ARPANET was which underpinned the development of it and his theoretical work on hierarchical routing in late 1970 s with his student Farouk Kamoun remains critical to the operation of the Internet today.
7	1972	X.25 TCP/IP	Using X.25 as commercial services were deployed then was using an infrastructure for expanding TCP/IP networks.
8	1973	Hosts	In1973, a French network named CYCLADES was the first for making hosts which is responsible for reliable delivery of data, later it became centralized service of network in itself.
9	1973- 1979	Ethernet	A memo at Xerox PARC was written by Robert Metcalfe describing Ethernet in 1973, in an Aloha based networking system which was developed in 1960s by Norman Abramson and colleagues at the University of Hawaii. At July 1976 the paper published "Ethernet: Distributed Packet Switching for Local Computer Networks" by Robert Metcalfe and David Boggs, then collaborated on many patents received in 1977 and 1978. Robert Metcalfe pursued making on open standard at 1979.
10	1976	ARCNET	ARCNET was created by John Murphy of Data point corporation in which token-passing network was used first to share the storage device in 1976.
11	1995	NEW FIBRE OPTIC CABLES	The speed capacity of transmission for Ethernet was slightly elevated from 10 Mbit/s to 100Mbit/sat 1995.After 19913, Ethernet supported transmission speed capacity towards gigabit. Frequently, highest speeds up to 100 Gbit/s were appended (still 2016). Ethernet has ability to grow easily (such as quick compatible to support new fiber optic cable speed)



Figure 10.2 Evolution of Internet

INTERNET Stands for

- INTERnational NETwork (Technology, telecom, intelligence)
- Internet is a network of networks-A global network.
- Internet stands for Interesting Notions Transmitted Electronically Round Newly Engineered Technology.

Now a days the Internet plays a vital role. It provides all the information and services to us. Earlier days if we want anything, we have to go to market and purchase in person. Nowadays we order anything and everything (food, clothes, stationeries, vegetables...etc.) through online(Internet). Online service providers are Flipkart, Amazon, snap deal etc to buy products via Internet and have the product at door steps. Online payments help in sending and receiving money via payment gateway using this Internet. Refer Figure 10.2 for the Evolution of Internet

e-Governance has made our work easy by providing all government information online easily. As Internet provides its service 24x7 - 365 days, people around the world can access the government websites at their own pace.

Merchandising via Internet helps us get good branded products at offer rates through free delivery service.

Powerful search engine can take us to imaginary concept to our hand with all as a text, audio, video, with briefly and by without moving to library, or taking advice from expert. Current affairs can be updated immediately without any delay. For example on olden days Internet

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Explorer, Yahoo, bing were powerful search engine. Later, Google stepped in with user friendly gmail, youtube, googledrive, google maps, etc. and are useful applications. Students, researchers can get their relevant study and research materials easily via Internet.

Disadvantages of Internet

- Simply wasting the precious time on Internet by surfing, searching unwanted things.
- Lot of unnecessary wrong informations are sometimes posted by some people on their web pages, blog etc.
- Different types of thefts related to money and other valuables can take place through Internet as hackers and viruses are always active around.

10.2.1 The Internet Explosion

Internet is simply defined as the World Wide Web connection of individual networks operated by academic persons, industry



people, government, and private parties.

In few years, the Internet built itself as a highly powerful platform that changed our way we do business and the way we communicate. Internet promotes as the universal source of information of billions of people, at work, at home, at school.

As Internet is growing, markable evolution has come mobile technology and social web. These two innovations have changed the life style of people. We may find many communities in social web. Facebook was created in 2004 but today has more than 2,230 million active users. Mobile technology has increased the use of Internet all over the world.

The Internet allows all to be democratic in mass media. Anyone can have a webpage in Internet with very low investment. Similarly any business can reach a very large market directly, economically and fast, no matter of location or size of their business. Almost anyone that who can read and write can have a access and a presence in World Wide Web with very low investment. People everywhere can express and publish their ideas and opinions via blogging.

10.2.2 Growth of Computer Networking

The Internet is a global network of computers linked by high-speed data lines and wireless systems. It is estimated that the Internet links 50 million users in more than 80 countries world wide. This may increase to around 300 million in next five years.

Lot of difficulties were faced by the service providers (including Google) in expanding their residential fiber optic cables Internet service due to increased competition and installation cost from other broadband providers. Even though 4G LTE mobile network was not reached to many parts of world, the industry of telecommunication has been working hard on the development of their next generation "5G" cellular communication Technology. This 5G intense to boost up the speed the mobile connections dramatically. When 4G was initially being developed, companies did not wait to advertise about the 5G efforts.

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Figure 10.3 shows Generation of Mobile Networks



Figure 10.3 Generation of Mobile Networks

Artificial intelligence will help to maintain, manage, and protect the network problems. Now the networks are monitored by algorithm that enables for anomalous build-ups of traffic and activity which may be the result of nasty activities such as (DDos) Distributed Denial-of-Service attacks and attempted hacks. This Artificial Network powering algorithms will become most intelligent; it might find faster and reliable methods of anticipating threats and cleaning networks. Artificial intelligence will be able to predict traffic as it collects and analyzes data in real time.

10.3 Uses of the Computer Networks

The computer networks play a major role in providing information to large, small organization as well as common man. Now a days almost all the companies, bank and stores have implemented the computerized transactions. It may be in same campus, building, city, or at different places (or) cities. For all these purpose the computer networks are used.

The common uses of computer network are

- Communication
- Resource sharing
- Data (or) software sharing
- Money saving

Communication

Using computer networks, we can interact with the different people with each other all over the world. It provides a powerful communication among widely separated employees, team, section. They can easily communicate at very low cost via mobile, social media, telephone, e-mail, chatting, video telephone, video conferencing, SMS, MMS, groupware etc...

Resource sharing

Resource sharing means when one device is accessed by many systems. It allows all kind of programs, equipment's and available data to be accessed by anyone via network irrespective of the physical location of the resource. Simply resource sharing is sharing such as printers, scanner, PDA, fax machine, and modems. For example, many computers can access one printer if it is in network.

Software (or) Data sharing

Using computer network, any application or other software can be stored at a central computer or server. The software can be shared among other computers of the network. It provides high reliability and backup can also be stored at one location for easy availability in case of crash.

Money saving

Computer networking is also money saving as it reduces paper work, manpower, resources sharing, software sharing and also time saving.

10.3.1 Networks in Business

In twenty first century, communication is very important factor for successful business operations. There by with the growth of computer network and speedy Internet services, business also developed drastically.

With the development of cloud computing, global access and security issues were restricted. Internet conversation made conversation faster, quick decision making and money saving e-banking paved way for easy transactions. Business large or small scale B2C, B2B, B2G,C2B, C2C, C2G, G2B,G2C, G2G or commercial that transfer information across the Internet can be done. Cheap marketing and easy selection of products through Internet with customers satisfaction can also be done. Company renewals, license, other payments, receipts, certificates, bill invoice, stock maintenance, can be done without any geographical boundaries via Internet and computer networks. Government subsidies were available for their business to promote their business by digitization.

Direct human interactions are reduced because of Internet. Buyer directly purchases any product from manufacturer with less cost, middle person brokerage charges are reduced. The network connectivity in business is shown in Figure 10.5

10.3.2 Networks at Home

Now a day, network has become common as it facilitates communication among devices with in the close vicinity of a home. Devices in this network can be smart devices, mobile computers, network printers which are capable of interacting and thereby increase the quality of life inside home in a variety of ways like automation of repetitive tasks, increased personal productivity, enhanced home security and easier access to entertainment. Networks at home were connected in two ways they are:

- Wired network
- Wireless network

A Wired network system is connected with a network cable . For example speakers, CCTV, printers, outdoors, and scanners etc., with cables.

A Wireless network is connecting devices like tablets(tab), indoor cameras and E-readers, etc., without cables (WiFi). Wired network



Figure 10.4 Wired and Wireless Network

Network at home helps us to perform e-banking, e-learning, e-governance, e-health, telemedicine, call centers, video conferencing, digitalization of memories, etc. Refer Figure 10.4

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10.3.3 Mobile Networks

Mobile network is the network connecting devices without cable (wireless). Mobile computers, such as laptop, tablet, and hand held computers, were fastest growing segments. At land areas network was distributed as cells, each will be served by single - location transceiver, but generally three cell sites or a base transceiver station. This base station provides the cell with network coverage and other features that can be utilized for transmission of voice, data and other content as well. Joining together all radio coverage is called as wide geographical area. This portable transceivers used to communicate with one another with fixed transceivers and moving via more than one cell during transmission. For example mobiles, tablets, pagers, laptops, engaged with mobile broadband just like modems etc. Refer Figure 10.6

Features of Mobile Networks

• Less consumption of power is used by mobile devices compared to a single transmitter or satellite since the cell towers are closer.

- Huge capacity than a large transmitter, at single frequency can be used for different or many links as long as they are in different in cells.
- As mobile phones are now heavily used for data communication, the mobile network traffic is fully busy.

Mobile phone converts voice, text, multi-media message or data calls into Radio-frequencies (RF). Mobile phone base stations transmit and receive these RF signals and connects callers to other phones and other network.

Private cellular networks can be used at various locations like research, large organizations and small industries.

After the reach of mobile and access to Internet work progress faster. People can be in touch with others even while traveling. Important informations can be received any time without much problems. Searching important topics, checking mail, watching progress of company can be done easily sitting at one place. Adequate computer knowledge is sufficient to access Internet via mobile network.



Figure 10.5 Networks in Business

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10.3.4 Social Application

To get connected to with people around the world through social network media, applications like Whatsapp, Facebook, Twitter, Blogs, Pinterest, Classmate and so on are in full fledge use.

Through the social media we share our thoughts, ideas, files and also chats. Refer Figure 10.7 given below.



Figure 10.7 Social Media Outline

These social networks share several attributes in common:

• *Membership*. Social nets generally requires user to register names and accounts to avoid duplicate and maintain secrecy. So many public

networks offer free registration and some meagre charges for their services. Private networks (such as BANK ACCOUNT HOLDERS groups) restrict registration to people who meet certain eligibility criteria.

- *Content contribution*. These networks allow members to easily share comments, movies, music, short films and/or photos with others.
- *Frequent return visits*. Healthy social net have a group of members who check in regularly to contribute their share and also for new updates
- *Human relationship building*. The common goal of most social networks is to allow interaction among people, which create stronger connection with people of different communities.

Benefits of Social Networks

Besides being a fun place to meet and relax with people, social networking leads to some extremely useful benefits to individuals and communities:



Figure 10.6 Mobile Networks

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- *Group information sharing over long distances.* Although friends and family members can keep in contact via mobile phone calls or by text messages, social nets provide a much richer environment for staying connected. We can also share photo albums, videos and convey daily wishes through the social network. Group discussions and Group chats go on in various groups through which people are kept in touch with each other.
- Broadcast announcements. Quick, easy way to spread informations of emergencies and natural calamities. Venues and local shops can advertise upcoming events on social networks.

Business people can market their products through these networks.

• Fostering diversity of thought. Some critics of social networks say that online communities attract people by similar interests and backgrounds. Indeed, when the people with different opinions do get together on online, many discussions seem to degenerate into personal attacks and so-called "flame wars." The arguments goes online, healthy debate takes place and some of them become viral also.

Such arguments and talks bring out a relaxation for busy people from their regular work schedules. It also enriches with current affairs and keep in touch with people.

POINTS TO REMEMBER

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- A set of computers connected together for the purpose of sharing resources is called as computer network. Internet is the most common resource shared on today.
- Computer networking is a technique of digital telecommunication network that permits nodes to share its resources with one another. Computer networking exchanges the data as a main element. These link were transferred over cable media like optic cables or wire or wireless media such as Bluetooth and WIFI
- Packet switching is a method of grouping data that is transmitted over a digital network into packets.
- In 1966 WAN (WIDE AREA NETWORK) was introduced for time sharing.
- Artificial intelligence helps to predict traffic as it collects and analyzes data in real time.
- The common uses of computer networks were
 - Communication
 - Resource Sharing
 - Data (or) software sharing
 - Money savings
- Networks at home were connected by two ways they are
 - Wired network
 - Wireless network
- When group of people of different opinion come together online, many discussions arise which lead to personal attacks called **"flame wars."**

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	GLOSSARY
WWW	World wide web
SAGE	Semi – Automatic Ground Environment
SABRE	Semi Automatic Business Research Environment
Packet Switching	It used to transfer the information between computers and network
Telephone Switches	First widely used to which implemented true computer control.
WAN	Wide Area Network
Arpanet	Advanced Research Projects Agency Network
Hosts	the service provider that leases this infrastructure, which is known as hosting.
NEW FIBER OPTIC cable	Here speed capacity of transmission has increased 10 Mbit/s to 100 Mbit/s now on this fibre optic cable has speed upto 100 Gbit/s
e-Governance	This is an application of ICT for access the government services, communication transactions, of various standards system between government to citizen, government to business.
e-Banking	It was a safe, fast, easy and efficient electronic service that enables you access to bank account and to carry out online banking services, 24 hours a day, and 7 days a week.
Hackers	Hackers were skilled computer experts, some who with their technical knowledge access our accounts.
Viruses	Malware treats or computer warms that replicates it By its own is called as virus
Globalized	Developed to make international influence or operation possible.
Blogging	Add new material to or regularly update a blog.
Cloud Storage	Just a storage of data on online, access in different area no geographical limits was in need
Cloud Computing	It is based on Internet computing, to share resources, software and information.
e-Readers	E-Readers is similarly called as e-book reader these were designed for the purpose of reading via mobile electronics device to read digital e-books and periodically
Flame wars	Flame wars are nothing that lengthy exchange of angry or abusive messages between users of an online forum or other discussion area.

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A-Z





Part - I Choose the correct answer

- 1. A set of computers connecting together is called as ----
 - a) Network b) Server
 - c) Hub d) Node
- 2. Computer network devices that originates route and terminate the data were called as
 - a) Hub
 - b) Resource
 - c) Node
 - d) Cable
- Match the period and mehods available on history of computer networking in the Internet
 - 1) 1950 X.25 TCP/IP
 - 2) 1966 SAGE
 - 3) 1976 WAN
 - 4) 1972 ARCNET
 - a) 4, 3, 2, 1 b) 3, 4, 2, 1
 - c) 1, 2, 3, 4 d) 2, 3, 4, 1
- **4.** Western Electric introduced the first widely used ------ that implemented true computer control.
 - a) Packet switch
 - b) Arpanet
 - c) Host
 - d) Telephone switch
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- 5. Wi-Fi is short name for
 - a) Wireless Fidelity
 - b) Wired fidelity
 - c) Wired fiber optic
 - d) Wireless fiber optic
- 6. In which one of the following periods, the speed capacity supported towards gigabit on computer network?
 - a) SABRE
 - b) SAGE
 - c) NEW FIBRE OPTICS
 - d) ARCNET
- Which among them was challenging to the business people on computer networking
 - a) Hacking
 - b) Viruses
 - c) Both a & b
 - d) none of this above
- **8.** ------ helps to predict, manage, and protect the computer network at problems.
 - a) Artificial intelligence
 - b) Broadband provider
 - c) Cloud computing
 - d) Transceivers

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- **9.** -----use less power comparing with single transmitter or satellite with cell towers closer.
 - a) Mobile devices
 - b) Transistors
 - c) WIFI
 - d) Communication
- 10. People now a days getting relaxed via
 - a) Business
 - b) Corporate company
 - c) News papers
 - d) Social media
- **11.** Which one of the following is not the social media
 - a) Gmail
 - b) Facebook
 - c) twitter
 - d) Linkedin
- 12. Facebook was created in -----year
 - a) 2002 b) 2004
 - c) 2013 d) 2010
- **13.** In mobile network, land areas for network coverage was distributed as
 - a) Firmware b) cells
 - c) Range d) Service
- **14.** Which one of the following are harmful to computer?
 - a) Bloggers
 - b) Browser
 - c) Hackers
 - d) twitter

- **15.** Which innovation made the people to use Internet?
 - a) Social web
 - b) Mobile technology
 - c) Mobile App
 - d) Both a & b.

Part - II

Short Answers

- **1.** Define Computer Network.
- **2.** Define Internet.
- **3.** What are the common uses of computer network?
- **4.** List out some features of mobile network.
- **5.** Difference between wired and wireless networks.

Part - III Explain in Brief Answer

- 1. Define ARPANET.
- 2. Write the disadvantages of Internet.
- **3.** What is meant by artificial Intelligence?
- **4.** List out some benefits of social networks.
- 5. How computer networks are money saving?

Part - IV

Explain in detail

1. Define computer networking and Internet. Explain different developments on computer network and Internet.

- 2. Explain the growth of the computer networking.
- 3. Mention some uses of network at business, home, mobile, social application.

STUDENT ACTIVITIES

List out the wireless network?

- 1. Find out how your family members and other public use the network ?
- 2. Instead of landline (wired network) what were the types of wireless network you know?
- 3. Some example devices with wireless networks

How social media has its memory management?

- 1. Do you have a account on social media (or) create an account
- 2. Analyse how the social media applications transfer a huge data

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