

INTERNET

INTRODUCTION OF INTERNET

The latest buzzword in computer world is 'Internet'. It's cutting edge technology to connect people and computers throughout the world. Using Internet, organisations all over the world can exchange data, people can communicate with each other in a faster and effective way, and researchers can gather information in their respective areas of research. With the help of video conferencing over Internet, it has become possible that people can even see each other while communicating. Even one can do all his shopping sitting back at home. He does not bother to go to the crowded market place. Slowly shopkeepers are also opting for electronic commerce, which provides them greater reach and fastest way to do business over Internet.

HISTORY OF INTERNET

In 1969, the U.S. Defence Department funded a project to develop a network; basically the idea was to develop a very secure network which can work even after a nuclear attack. This project was known as ARPANET. The proposed network was not supposed to have a central control – which would be an obvious target. Ten years of research brought Local Area Ethernet Networks (LANs) and workstations were developed to get connected to LAN. These workstations and LANs were then connected to the ARPANET. For next decade the ARPANET grew and its decentralized features helped its rapid expansion. This standard used by ARPANET is known as NCP (National Control Protocol). Protocol is a network term used to indicate the standard used by a network for communication. But the passing time and rapid change in information technology suppressed NCP and brought TCP/IP (Transmission Control Protocol/Internet Protocol) in to the world of networking. TCP converts messages into streams of packets at the source, and they are reassembled back into messages at the destination. IP handles the dispatch of these packets. It handles the addressing and makes sure that a packet reaches its destination through multiple nodes and even across multiple networks with multiple standards. This flexibility of TCP/IP to handle multiple net-works with multiple protocols encourages other networks to get connected to ARPANET. Slowly the ARPANET became a massive network of networks and now it is known as 'Internet'.

The Internet is a rare example of a large democracy with no state of head, no official censors, no bosses and no board of directors. Nobody controls the Internet and in principle, any computer can speak to any other computer, as long as

it obeys the technical rules of the TCP/IP. This freedom of Internet helped it to move out of its original base in military and research institutions, into elementary and high schools, colleges, public libraries, commercial sectors even into the shop of a vegetable.

SERVICES OF INTERNET (E-mail, FTP, Telnet, WWW)

We describe as four things; basically, mail, discussion groups, long distance computing and file transfers. Internet mail is (e-mail or electronic mail), much faster as compared to normal postal mail. One can also send software and certain forms of compressed digital image as an attachment. News groups or discussion groups facilitate Internet user to join for various kinds of debate, discussion and news sharing. Long-distance computing was an original inspiration for development of ARPANET and does still provide a very useful service on Internet. Programmers can maintain accounts on distant, powerful computers, execute programs. File transfer service allows Internet users to access remote machines and retrieve programs, data or text.

(a) E-Mail (Electronic Mail)

E-mail or Electronic mail is a paperless method of sending messages, notes or letters from one person to another or even many people at the same time via Internet. E-mail is very fast compared to the normal post. E-mail messages usually take only few seconds to arrive at their destination. You need not wait for the post office to open and you don't have to get worried about holidays. It works 24 hours a day and seven days a week. What's more, the copy of the message you have sent will be available whenever you want to look at it even in the middle of the night. You have the privilege of sending something extra such as a file, graphics, images etc. along with your e-mail. The biggest advantage of using e-mail is that it is cheap, especially when sending messages to other states or countries and at the same time it can be delivered to a number of people around the world.

Although e-mail is faster and cheaper, it allows you to compose note, get the address of the recipient and send it. Once the mail is received and read, it can be forwarded, replied. One can even store it for later use or delete. In a-mail even the sender can request for delivery receipt and read receipt from the recipient.

(i) Features of E-mail:

1. One-to-one or one-to-many communications
2. Instant communications
3. Physical presence of recipient is not required
4. Most inexpensive mail services, 24-hours a day and seven days a week
5. Encourages informal communications

(ii) Components of an E-mail Address

As in the case of normal mail system, e-mail is also based upon the concept of a recipient address. The email address provides all of the information required to get a message to the recipient from anywhere in the world. Consider the e-mail ID sakshieducation@gmail.com

In the example above, “sakshieducation” is the local part, which is the name of a mailbox on the destination computer, where finally the mail will be delivered. Gmail is the mail server where the mailbox “sakshieducation” exist; .com is the type of organisation on net, which is hosting the mail server.

There are six main categories;

- com** Commercial institutions or organisation
- edu** Educational institutions
- gov** Government site
- mil** Military site
- net** Gateways and administrative hosts
- org** Private organisations

(b) FTP (File Transfer Protocol)

File Transfer Protocol, is an Internet utility software used to upload and download files. It gives access to directories or folders on remote computers and allows software, data and text files to be transferred between different kinds of computers. FTP works on the basis of same principle as that of Client/Server. FTP “Client” is a program running on your computer that enables you to talk to, and get stuff from, remote computers. The FTP client takes FTP commands and sends them as requests

for information from the remote computer or known as FTP servers. To access remote FTP server it is required but not necessary to have an account in the FTP server. Using anonymous login anyone can login in to a FTP server and can access public file archives, anywhere in the world, without having an account. One can easily Login to the FTP site with the username anonymous and e-mail address as password.

The basic objectives of FTP are

1. To give flexibility and promote sharing of computer programs, files and data.
2. Transfer data reliably and more efficiently over network.
3. To encourage implicit or indirect use of remote computers using Internet.
4. Shield a user from variations in file storage systems among hosts.

(c) Remote Computing or Telnet

Telnet or remote computing is telecommunication utility software, which uses available telecommunication facility and allows you to become a user on a remote computer. The TELNET works in a very step by step procedure. The commands typed on the client computer are sent to the local Internet Service Provider (ISP), and then from the ISP to the remote computer that you have gained access.

Features of Telnet:

Telnet is a method of connecting with another computer on the Internet. It allows access to a wide range of information which is available on the Internet. Using telnet, one can access Online Public Access Catalogs (OPACs), databases, supercomputers, various information repositories and other machines upon which one has accounts. Telnet can connect almost instantaneously with machines anywhere in the world! As more and more sites become connected to the Internet, it will become increasingly important to understand telnet as a method of connecting to other computers.

(d) WORLD WIDE WEB (WWW)

WWW is the acronym for the World Wide Web. It is also commonly known as 'The Web'. The WWW is hypertext based information retrieval tool. One can easily surf the Web by jumping from one document to another using the links in those

documents. These documents can be in many formats, such as text, graphics, animation, sound and latest is video. They may also be a combination of all these. All the information on Internet are presented to the user as a document or more popularly known as Web Page. All these Web Pages are link to each other or even to section within a Web Page. And these links are known as Hyper Links.

The tool used to view these Web Pages on Internet is known as Internet browser or simply browser. It is a software program specifically developed to extract information on user request from the Internet and present them as a Web Page to the viewer. There are several browsers available in the market. However the most popular are Internet Explorer from Microsoft and Netscape from Netscape Inc. The process of using browser to view information on Internet is known as Browsing or Surfing.

TCP/IP:

Introduction to TCP/IP:

TCP and IP were developed by a Department of Defense (DOD) research project to connect a number different networks designed by different vendors into a network of networks (the "Internet"). It was initially successful because it delivered a few basic services that everyone needs (file transfer, electronic mail, remote logon) across a very large number of client and server systems. Several computers in a small department can use TCP/IP (along with other protocols) on a single LAN. The IP component provides routing from the department to the enterprise network, then to regional networks and finally to the global Internet. This design allows the construction of very large networks with less central management.

Internet Protocol (IP):

Definition: IP (Internet Protocol) is the primary network protocol used on the Internet, developed in the 1970s. On the Internet and many other networks, IP is often used together with the Transport Control Protocol (TCP) and referred to interchangeably as *TCP/IP*.

IP supports unique addressing for computers on a network. Most networks use the Internet Protocol version 4 (*IPv4*) standard that features IP addresses four bytes (32 bits) in length. The newer Internet Protocol version 6 (*IPv6*) standard features addresses 16 bytes (128 bits) in length.

Data on an Internet Protocol network is organised into *packets*. Each IP packet includes both a header (that specifies source, destination and other information about the data) and the message data itself.

TCP/IP is composed of 4 layers. Figure of 4 layers of TCP/IP shown below.

Layer 4 - Application
Layer 3 - Transport
Layer 2 - Internet
Layer 1 - Network Interface

1. Layer 4 - Application Layer: *Application layer* is the top most layer of four layer TCP/IP model. Application layer is present on the top of the *Transport layer*. Application layer defines TCP/IP application protocols and how host programs interface with transport layer services to use the network. Application layer includes all the higher-level protocols which are used to at different levels during usage of internet.

2. Layer 3 - Transport Layer: *Transport Layer* is the third layer of the four layer TCP/IP model. The position of the Transport layer is between Application layer and Internet layer. The purpose of Transport layer is to permit devices on the source and destination hosts to carry on a conversation. Transport layer defines the level of service and status of the connection used when transporting data.

The main protocols included at Transport layer are **TCP (Transmission Control Protocol)**.

3. Layer 2 - Internet Layer: *Internet Layer* is the second layer of the four layer TCP/IP model. The position of Internet layer is between Network Access Layer and Transport Layer. Internet layer pack data into data packets known as IP datagrams, which contain source and destination address (logical address or IP address) information that is used to forward the datagrams between hosts and across networks. The Internet layer is also responsible for routing of *IP datagrams*.

4. Layer 1 - Network Access Layer: *Network Access Layer* is the first layer of the four layer TCP/IP model. Network Access layer defines details of how data is physically sent through the network, including how bits are electrically or optically signaled by hardware devices that interface directly with a network medium, such as coaxial cable, optical fiber, or twisted pair copper wire.

DNS (Domain Name System):

Description: *Domain Name System (Service or Server)*, an Internet service that translates *domain names* into IP addresses. Because domain names are alphabetic, they're easier to remember. The Internet however, is really based on IP addresses. Every time you use a domain name, therefore, a DNS service must translate the name into the corresponding IP address. For example, the domain name "www.example.com" might translate to 198.105.232.4.

If you've ever used the Internet, it's a good bet that you've used the **Domain Name System**, or **DNS**, even without realising it. DNS is a protocol within the set of standards for how computers exchange data on the Internet and on many private networks, known as the TCP/IP protocol suite. Its basic job is to turn a user-friendly **domain name** like "example.com" into an Internet Protocol (IP) address like 70.42.251.42 that computers use to identify each other on the network. Computers and other network devices on the Internet use an IP address to route your request to the site you're trying to reach. This is similar to dialing a phone number to connect to the person you're trying to call. Thanks to DNS, though, you don't have to keep your own address book of IP addresses. Instead, you just connect through a **domain name server**, also called a **DNS server** or **name server**, which manages a massive database that maps domain names to IP addresses. Whether you're accessing a Website or sending e-mail, your computer uses a DNS server to look up the domain name you're trying to access. The proper term for this process is **DNS name resolution**, and you would say that the DNS server resolves the domain name to the IP address. An oft-used analogy to explain the Domain Name System is that it serves as the phone book for the Internet by translating human-friendly computer hostnames into IP addresses. For example, the domain name www.example.com translates to the addresses 192.0.43.10 (IPv4) and 2001:500:88:200:: 10 (IPv6). Unlike a phone book, the DNS can be quickly updated, allowing a service's location on the network to change without affecting the end users, who continue to use the same host name. Users take advantage of this when they use meaningful Uniform Resource Locators (URLs) and e-mail addresses without having to know how the computer actually locates the services.

The Domain Name System distributes the responsibility of assigning domain names and mapping those names to IP addresses by designating authoritative name servers for each domain.

MODEL QUESTION PAPER

1. _____ is the cutting edge technology to connect people and computers throughout the world.

A. Internet

2. U.S. Defence Department funded a project to develop a network. This project was known as _____.

A. ARPANET

3. ARPANET is known as NCP. NCP stands for _____.

A. National Control Protocol (NCP)

4. TCP converts messages into streams of _____.

A. Packets

5. ARPANET became a massive network of networks and now it is known as _____.

A. Internet

6. File Transfer Protocol, is an Internet utility _____.

A. Software

7. Telnet or remote computing is _____ utility software.

A. Telecommunication

8. _____ is the acronym for the World Wide Web.

A. WWW

9. The WWW is hypertext based information _____.

A. Retrieval tool

10. TCP and IP were developed by a _____.

A. Department of Defense (DOD) of USA

11. TCP/IP is composed of _____.

A. 4 layers

12. The main protocols included at Transport layer are _____.

A. TCP (Transmission Control Protocol)

13. Network Access layer defines details of how data is physically sent through the

_____.

A. Network

14. _____ is the primary network protocol used on the Internet.

A. IP

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