INTRODUCTION TO INTERNET

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OBJECTIVES

- define Internet
- list different types of Internet connections
- explain various services provided by Internet
- download files
- send and receive e-mail
- be acquainted with the terminologies used in Internet

Internet

- The Internet is a giant network of networks.
  - A network may include PCs, and other devices like servers or printers.
  - A network is connected through a communication channel.
  - No one owns the internet
    - Every person makes a connection owns a slice of the internet
  - There is no central administration to the Internet.

History of the Internet

- - Grew out of a research network originally funded by U.S. Department of Defense.
- - Development of this network, known as the ARPAnet after the Advanced Research Projects Agency (ARPA), began in 1969.
- As the network grew, it was used for applications beyond research, such as electronic mail.
- In the early 1980s, the current versions of the core Internet protocols, TCP and IP, were introduced across the network.

History of the Internet

- The term Internet comes from the word inter-network - an interconnected set of networks.
- In 1992, the Center for European Nuclear Research (CERN) released the first versions of World Wide Web software.
- Subsequently, the number of Web servers has grown quickly.

Applications Of Internet

- Exchange messages using e-mail (Electronic mail).
- Transfer files as well as software.
- Browse through information on any topic on web.
- Communicate in real time (chat) with others connected to the Internet.
- Search databases of government, individuals and organizations.
- Read news available from leading news groups.
- Send or receive animation and picture files from distant places.
- Set up a site with information about your company's products and services.

Key Milestones in Evolution

- 1950's
  - ARPA (Advanced Research Projects Agency)
- 1970 –
  - ARPANET creates precursor to Transmission Control Protocol (TCP)
- 1971
  - Universities added to net
  - Telnet and FTP are available
- 1972
  - First electronic mail message sent

Key Milestones in Evolution

- 1973-
  - ARPANET connected to England and Norway
- 1974-
- TCP starts being used for communicating across a system of networks
- 1982-
  - US DoD starts building defense data
  - networks based on ARPANET technology
- 1983-
  - ARPANET splits into ARPANET and MILNET
  - Internet now in place
  - TCP/IP standardized

Key Milestones in Evolution

- 1986-
  - National Science Foundation (NSF) implements NFSNET; a system of regional network of routers connected over a backbone network
- 1991-
  - Archie and Gopher released1992-
  - Internet links more that 17,000 networks
  - in 33 countries; 3 million hosts
  - 1993-
  - World Wide Web is launched

  1995-
  - Interconnected network providers start offering service
  - About 30 million users

The Internet Properties

- Key properties of the Internet:
  - The Internet is interoperable.
  - The Internet is global.
  - The Web makes it easy.
  - The costs of the network are shared across multiple applications and borne by the end users.
- The striking characteristic of the Internet --> heterogeneity.

The Internet Layered Architecture

- The Internet, as a network of connecting many small networks, consists of four layers:
  - Application Layer (HTTP, SMTP..)
  - Transport Layer (TCP, UDP)
  - Network Layer (IP)
  - Physical Layer

Application layer (HTTP, SMTP)
Transport Layer (TCP, UDP)
Network Layer (IP)
Physical Layer (e.g. Ethernet)

The Internet: Design Principles

- The Internet has been successful because of some fundamental decisions about its design made early in its history.
- Interoperability: Independent implementations of Internet protocols actually work together.
- Interoperability means that systems can be assembled using client and server computers and software from different vendors.
- In the context of Internet commerce, interoperability means that buyers and sellers do not have to buy and upgrade software simultaneously from the same vendors to conduct commerce.

The Internet: Design Principles

- Layering:
- Internet protocols are designed to work in layers, with each higher layer building on the facilities provided by lower layers.
- Simplicity:
- One way to look at the layering of the Internet is that it grows both up and down from IP. IP is very simple, providing only addressing and formatting of packets.
- Below the level of IP, there is the complexity of many different kinds of networkhardware, topologies, and routers

The Internet: Design Principles

- IP hides that complexity from applications and insulates application developers from:
  - the complexities of different network devices
  - the complexities of implementing low-level network protocols.
- Above IP, higher-level protocols such as TCP offer service abstractions that are easy for application programmers to understand and use.

The Internet: Design Principles

- Uniform naming and addressing:
- The IP layer offers a uniform addressing structure that assigns a 32-bit address to each computer connected to the network.
- Domain name system (DNS) offers a uniform way to translate human-readable names for computers, such as www.openmarket.com to the numeric address for that computer.

The Internet: Design Principles

- End-to-end:
- Internet is designed around end-to-end protocols. That is, the interpretation of the data happens on the sending and receiving systems, but nothing in the network needs to look at anything but the destination address for delivering the packet.
- End-to-end protocols have several advantages:
  - hide the internal structure of the network
  - provide simple abstractions to programmers
  - shielding them from such things as the messy details of recovering from lower-level errors.

The Internet Protocols

- FTP:(File transfer protocol)
- One of the most oldest and probably the most popular protocol to be used to move files on the Internet.
- TCP/IP:(Transmission Control Protocol and Internet Protocol)
  - The low-level communications protocol that holds the Internet together.
  - It provides means to allows two software on difference machines on the Internet find each other, rendezvous, and transfer data.

The Internet Protocols

- It provides the essential service of making sure that each piece of data is transferred in the correct sequence and without error.

- SMTP: (the e-mail message protocol)
  - A protocol to allow two users to communicate through e-mail messages over the Internet.
- NNTP: (Net News Transfer Protocol)
  - A protocol, which can be used to access or transfer Usenet news over the Internet.
- Telnet:
  - The traditional teletype-style communications protocol for communicating with text-based information services.

Types of Internet Connections

- Dial-up
- This is the most common basic type of connection available from ISPs (Internet Server Providers).
- In Dial-up connection, you use your computer, dial a phone number (provider by ISP) to get connected to server at Providers end through which you access Internet.
- It means you are not directly connected to Internet; you access the Internet through an Internet Service Provider.
- ISDN (Integrated Services Digital Network)
- The process of connecting to server to access Internet is almost same as Dial-up, but it offers connectivity through the use of digital phone lines instead of Analog.

Types of Internet Connections

- It offers Internet connectivity at speeds of up to 128 Kbps, allows the user to receive or make calls simultaneously on the same line.
- ISDN comes through a regular telephone wire from the telephone pole on the street.
- The line combines two 64 Kbps channels to offer 128 Kbps bandwidth broken into three bands:
- One band for the ringing signal of your phone, one band for your telephone conversation, and one band for data transfer.

Types of Internet Connections

- Leased Line Connection (Direct Internet Access)
- A "permanent connection" between a computer system (single CPU or LAN, and the Internet). It is generally used by larger institutions, corporate and government agencies.
- It involves establishing your own Internet gateway (connection) and payment to have a direct full time line with the network.
- Dedicated links are established through an internet service provider who places a computer-controlled router (message director) at your site.
- A router is used to connect your local network to the Internet, allow all the members of network to have complete access to Internet.

Types of Internet Connections

- DSL (Digital Subscriber Line or Dedicated Service Line) Broadband Connection
- DSL, an "always-on' data connection is becoming widely available these days.
- It can provide an excellent Internet connection.
- It connects your home or office to the Internet through the same telephone wire that comes from telephone pole on the street. Like ISDN, with DSL, user can make and receive telephone calls while connected to the Internet.
- The difference between DSL and dialup / ISDN is that a DSL Internet connection uses a high-speed dedicated circuit filtering out standard phone calls and Internet signals.

The World Wide Web

- Latest revolution in the internet scenario.
- WWW Allows multimedia documents to shared between machines
  - Containing text. Image, audio, video,animations.
- Basically a huge collection of inter-linked documents
  - Billons of documents.
  - Inter-linked in any possible way.
  - Resembles cob-web.
- The World Wide Web: History
- March, 1989, Tim Berners-Lee of Geneva s European Particle Physics Laboratory (CERN) circulated a proposal to develop a hypertext system for global information sharing in High Energy Physics community.

The World Wide Web

- The World Wide Web project began to take shape at the beginning of 1991.
- October 1991, the gateway for WAIS search (a crucial development for the Web s future as search as well as a browsing tool),
- Before the end of 1991, CERN announced the Web to the High Energy Physics community in general.
- Essentially, 1992 was a developmental year. In March of 1993, WWW traffic clocked in at 0.1 percent of total Internet backbone traffic.
- In July of 1994, CERN began to turn over the Web project to a new group called the W3 organization, a joint venture between CERN and MIT to develop the Web further.

The World Wide Web

- The World Wide Web: HTML
- HTML is a simplified derivative of SGML, or Standard Generalized Markup language.
- Its code can be used to make documents readable across a variety of platforms and software.
- Like SGML, HTML operates through a series of codes placed within an ASCII doc. These codes are translated by a WWW client such as Lynx, Mosaic.
- Cello, Viola, or MacWeb into specific kinds of formats to be displayed on the screen.
  - Items include in a HTML page are:
  - links, lists, headings, titles, images, forms, and maps.
- Due to the limitation of HTML documents, now more advanced technologies are introduced to enrich its functions, such as , JavaScript,

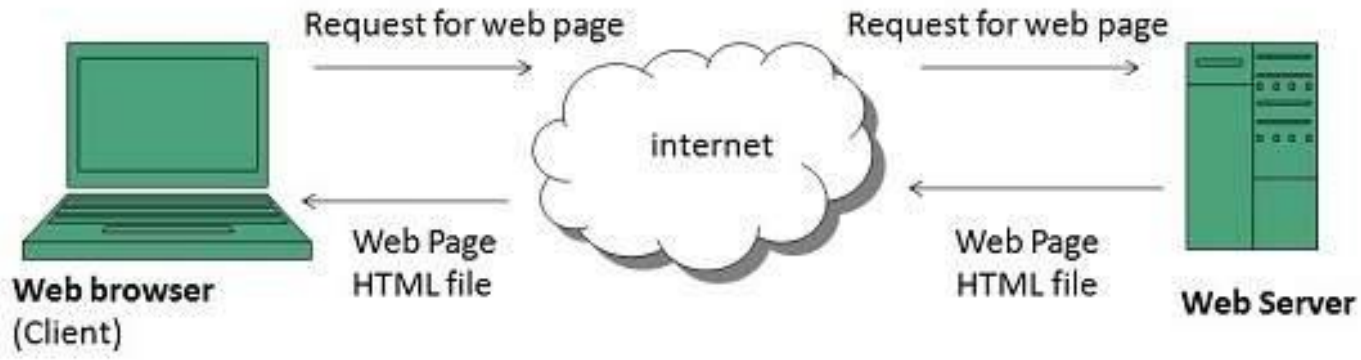
The World Wide Web

- The World Wide Web: HTTP
- HTTP stands for HyperText Transfer Protocol.
- It is a simple data transfer protocol that binds the Web together.
- It supports the communications between a web client (browser) and its web server.
- It consists of a set of messages and replies for both servers and browsers.
- It treats documents, files, menus, and graphics as objects.
- - It relies on the Universal resource identifier (URI), enclosed in the universal resource locator (URL), to identify files.
- - It uses the Internet s TCP/IP network protocol.

The World Wide Web

WWW Operation

4. Then web server receives request using HTTP protocol and checks its search for the requested web page. If found it returns it back to the web browser and close the HTTP connection.
5. Now the web browser receives the web page, It interprets it and display the contents of web page in web browser's window.



ELECTRONIC MAIL

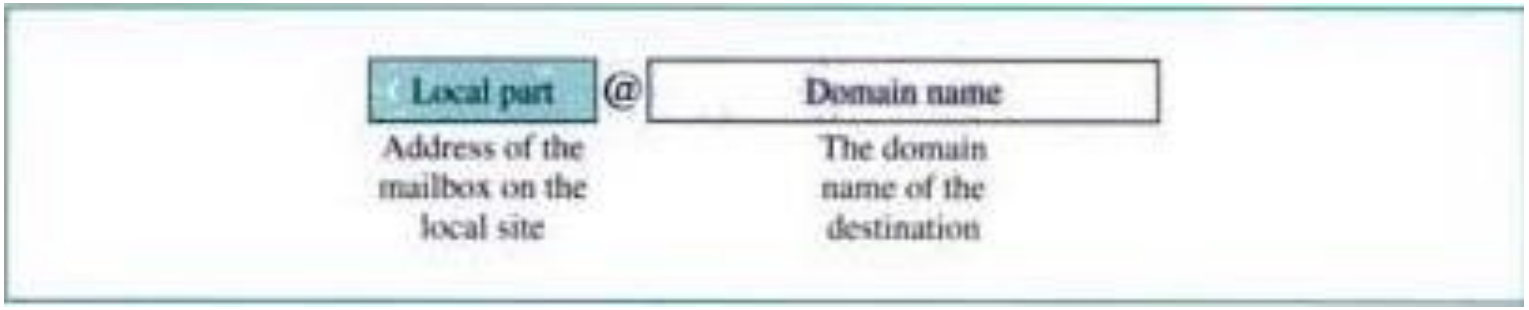
- One of the most popular network services is electronic mail (email).
- Electronic mail is used for sending a single message that includes text, voice, or graphics to one or more recipients.
- Simple Mail Transfer Protocol (SMTP) is the standard mechanism for electronic mail in the Internet.
- Sending email
- To send mail, the user creates mail that looks very similar to postal mail. It has an envelope and a message.
- Envelope: The envelope usually contains the address, the receiver address, and other information.

ELECTRONIC MAIL

- Message: The message contains the headers and the body. The headers of the message define the sender, the receiver, the subject of the message, and other information.
- The body of the message contains the actual information to be read by the recipient.
- Receiving Mail : The email system periodically checks the mailboxes. If a user has mail, it informs the user with a notice.
- If the user is ready to read the mail, a list is displayed in which each line contains a summary of the information about a particular message in the mailbox.
- The summary usually includes the sender mail address, the subject, and the time the mail was sent or received. The user can select any of the messages and display its contents on the screen.

ELECTRONIC MAIL

- Addresses
- To deliver mail, a mail handling system must use an addressing system with unique address.
- The addressing system used by SMTP consists of two parts: a local part and a domain name, separated by an @ sign



- Local Part: The local part defines the name of a special file, called the user mailbox, where all the mail received for a user is stored to be used by the user agent.

ELECTRONIC MAIL

- Domain Name: The second part of the address is the domain name.
- An organization usually selects one or more hosts to receive and send; they are called mail exchangers.
- The domain name assigned to each mail exchanger either comes from the DNS database or is a logical name (ex.: the name of the organization).

ELECTRONIC MAIL

- User Agent (UA) The first component of an electronic mail system is the user agent (UA). A user agent sometimes is called a mail reader
- User Agent Types: There are two types of user agents: command-driven and GUI-based.

1. Command Driven: Command –driven user agents belong to the early days of electronic mail.

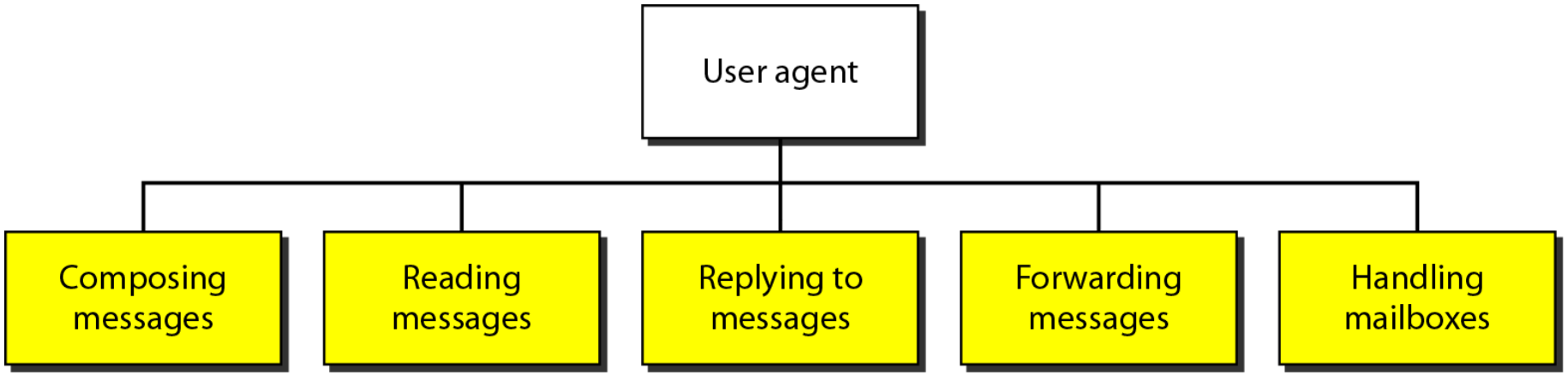
- They are still present as the underlying user agents in servers.
- A command-driven user agent normally accepts a one-character command from the keyboard to perform its tasks.

ELECTRONIC MAIL

- GUI – Based: Modern user agents are GUI-based.
- They contain Graphical User Interface (GUI) components that allow the user to interact with the software by using both the keyboard and the mouse.
- They have graphical components such as icons, menu bars, and windows that make the services easy to access.
- Some examples of GUI-based user agents are Eudora, Microsoft's Outlook, and Netscape.

ELECTRONIC MAIL

- Services provided by a User Agent: A user agent is a software package (program) that composes (new mail), reads, replies to, and forwards messages.
- It also handles mailboxes



ELECTRONIC MAIL

1. Composing Messages A user agent helps the user compose the e-mail message to be sent out.

- Most user agents provide a template on the screen to be filled in by the user.
- Some even have a built-in editor that can do spell checking, grammar checking, and other tasks expected from a sophisticated word processor.

2. Reading Messages The second duty of the user agent is to read the incoming messages.

- When a user invokes a user agent, it first checks the mail in the incoming mailbox.

ELECTRONIC MAIL

- Most user agents show a one-line summary of each received mail. Each e-mail contains the following fields.

  1. A number field.

  2. A flag field that shows the status of the mail such as new, already read but not replied to, or read and replied to.

  3. The size of the message.

  4. The sender.

  5. The optional subject field.

3. Replying to Messages After reading a message, a user can use the user agent to reply to a message. A user agent usually allows the user to reply to the original sender or to reply to all recipients of the message.

ELECTRONIC MAIL

4. Forwarding Messages Replying is defined as sending a message to the sender or recipients of the copy. Forwarding is defined as sending the message to a third party.

- A user agent allows the receiver to forward the message, with or without extra comments, to a third party.

5. Handling Mailboxes - A user agent normally creates two mailboxes: an inbox and an outbox.

- Each box is a file with a special format that can be handled by the user agent. The inbox keeps all the received e-mails until they are deleted by the user.
- The outbox keeps all the sent e-mails until the user deletes them. Most user agents today are capable of creating customized mailboxes.

ELECTRONIC MAIL

- MIME: Multipurpose Internet Mail Extensions
- Electronic mail can send messages only in (Network Virtual Terminal) NVT 7-bit ASCII format so it has some limitations
- it cannot be used for languages that are not supported by 7-bit ASCII characters (such as French, German)
- Also, it cannot be used to send binary files or video or audio data.
- Multipurpose Internet Mail Extensions is a supplementary protocol that allows non-ASCII data to be sent through e-mail.
- MIME transforms non-ASCII data at the sender site to NVT ASCII data and delivers them to the client MTA to be sent through the Internet. The message at the receiving side is transformed back to the original data.

ELECTRONIC MAIL

- MIME defines five headers that can be added to the original SMTP header section to define the transformation parameters:

  1. MIME-Version.
  2. Content - Type.
  3. Content – Transfer – Encoding.
  4. Content – ID.
  5. Content – Description.

1. MIME – Version: This header defines the version of MIME used. The current version is 1.1.
2. Content – Type: This header defines the type of data used in the body of the message.

- The content type and the content subtype are separated by a slash.

ELECTRONIC MAIL

- Depending on the subtype, the header may contain other parameters. MIME allows seven different types of data.

3. Content-Transfer-Encoding: This header defines the method used to encode the messages into 0s and 1s for transport.
4. Content-Id: This header uniquely identifies the whole message in a multiple- message environment.
5. Content-Description: This header defines if the body is image, audio, or video.

ELECTRONIC MAIL

- Mail (or Message) Transfer Agent (MTA)
- The actual mail transfer is done through Mail Transfer Agents (MTAs).
- To send mail, a system must have a client MTA: and to receive mail, a system must have a server MTA.
- In the Internet, message transfer is done through a protocol (and software) named Simple Mail Transfer Protocol (SMTP).
- To send a message, we need a client SMTP and a server SMTP, we show Alice sending an email to Bob with the SMTP clients and servers needed. Note that mail transfer occurs between the two mail servers, one at Alice's site and the other at Bob's site. The mail servers can belong to the ISPs to which Alice and Bob are subscribers, or they can belong to the companies

ELECTRONIC MAIL

- Mail Access Protocols
- Post Office Protocol, version 3 (POP3):
- It's simple, but it's limited in functionality.
- The client POP3 software is installed on the recipient computer; the server POP3 software is installed on the mail server.
- Mail access starts with the client when the user needs to download email from the mailbox on the mail server.
- The client (user agent) opens a connection with the server on TCP port 110. It then sends its user name and password to access the mailbox.
- The user can then list and retrieve the mail messages, one by one.

ELECTRONIC MAIL

- IMAP4: Internet Mail Access Protocol, Version 4 (IMAP4). IMAP4 is similar to POP3, but it has more features
- All mail is stored on the server. Messages will appear the same way every time you set up a new e-mail client, no need to move messages.You can switch between an e-mail client and webmail at any time and still have the same messages.
- If your computer crashes and you lose the data stored on your hard drive your e-mail is still safe, because it is stored on the server.
- Makes it easier to access your e-mail using a smartphone because the messages are not removed from the server.
- A user can create, delete or rename mailboxes on the mail server.

Archie

- The Internet community has been amassing text, image, software, and database resources for over twenty years.
- Historically, these resources have been stored in public repositories known as anonymous FTP servers.
- FTP is the Internet-standard high-speed file transfer protocol, used for exchange of private information by trusted parties with passwords as well as for publishing information without passwords, i.e., anonymously.
- Hundreds of archives now exist but, up until a year ago, no one tracked them.
- Archie (ARCHIvE server) was developed at McGill University to index the contents of all FTP servers and provide keyword searching of the index.

Archie

- Its approach is simple but powerful: Every night it re-indexes roughly one thirtieth of the servers; the result is a database that is completely refreshed each month.
- Although Archie enables you to locate information, it does not allow you to view or retrieve the information.
- To do that, you need FTP software on an IP-connected workstation or host .

WAIS

- Wide Area Information System (a joint project of Apple Computer, Dow Jones, KPMG Peat Marwick, and Thinking Machines Corporation) provides a uniform interface to many full-text databases, together with a sophisticated "relevance search" capability.
- You can search any WAIS database using any word or phrase and the system will return a menu of documents, ordered from more to less relevant.
- WAIS databases are commonly collections of related data (The Bryn Mawr Classical Review), primary source documents (Clinton speeches), or reference works (CIA World Fact Book, Roget's Thesaurus).
- There are currently almost 400 WAIS databases, and new ones appear frequently.

WAIS

- Since it can be difficult to determine the focus of a WAIS database from its name, a Directory of Servers, itself a WAIS database, was developed.
- You can search this directory for topics that interest you, and it will suggest WAIS databases for you to explore.
- For example, you could search the directory using the keyword "religion," and you would be referred to three WAIS databases: the Book of Mormon, the Qur'an, and the Bible.

Gopher

- Gopher began as the University of Minnesota's version of PennInfo, a menu-driven campus-wide information system (CWIS).
- Gopher's simplicity as a distributed, client/server CWIS led to its rapid adoption by other institutions, some of which developed new client or server software for desktop or host computers and contributed them to the Gopher software archive (accessible via anonymous FTP, naturally).
- Soon thereafter, Minnesota offered to provide a menu of all Gopher servers that any other Gopher could access.
- The result was what networkers have been talking about for years: an interoperating set of information systems linking several hundred organizations around the world, all with a common user interface

Gopher

- The next step in Gopher's evolution was addition of gateways to FTP, Telnet (the Internet standard remote terminal protocol), Archie, WAIS, and WWW.
- Gopher was thus transformed from an integrated set of CWIS programs into the most successful Internet navigation tool.
- But success became problematic: As the worldwide menu structure grew, locating information became increasingly tedious.
- Something like Archie was needed to help researchers locate information quickly in this new, ever expanding "Gopherspace."

Veronica

- In November, 1992 a search tool, Veronica, was contributed to Gopher by a team from University of Nevada at Reno.
- The original Veronica ("Very Easy, Rodent-Oriented, Net-wide Index to Computerized Archives," a comic acronym if ever there was one) provides a search through all menus using a single keyword.
- The result is a dynamically created menu of all Gopher resources that contain the keyword in their menus.
- Now, a second Veronica search tool has appeared--an indexed WAIS database extended to allow Boolean searches of menu documents.

Veronica

- Although both searches are limited to words in menus (as opposed to the full text of documents), the combination of Veronica and Gopher results in a powerful capability to search for and retrieve information from all over the Internet, with the location of the information effectively irrelevant.

Web Server

- A Web server is a program that generates and transmits responses to client requests for Web resources.
- Handling a client request consists of several key steps:
  - Parsing the request message
  - Checking that the request is authorized
  - Associating the URL in the request with a file name
  - Constructing the response message
  - Transmitting the response message to the requesting client

Web Server

- The server can generate the response message in a variety of ways:
  - The server simply retrieves the file associated with the URL and returns the contents to the client.
  - The server may invoke a script that communicates with other servers or a back-end database to construct the response message.
- Web site and Web server are different:
  - A Web site consists of a collection of Web pages associated with a particular hostname.
  - A Web server is a program to satisfy client requests for Web resources.

Web Server

- A Web server proceeds through the following steps in handling an HTTP request:
  - Read and parse the HTTP request message for example GET the resource /foo.htm
  - Translate the URL to a file name for example the resource be located in the base directory such as /www, where the URL http://www.bar.com/foo/index.html corresponds to the file of www/foo/index.html
  - Determine whether the request is authorized
  - Generate and transmit the response that includes header to show the status information

Web Server

- A Web server may limit which users can access certain resources. Access control requires a combination of authentication and authorization.
  - Authentication identifies the user who originated the request.
  - Authorization determines which users have access to a particular resource.

Web Server

- AUTHENTICATION
- Most client-server systems authenticate a user by asking for a name and password.
- Web server must perform authentication for every request for a resource that has access restrictions.
- The server returns an HTTP response that indicates that the request requires authorization.
- The response also identifies what kind of authentication is required.
- The response also identifies the realm
  - a string that associates a collection of resources at the server

Web Server

- AUTHORIZATION : To control access to Web resources, the server must employ an authorization policy.
- A policy typically expressed in terms of an access control list that enumerates the users who are granted or denied access to the resources.
- In addition to checking the user name, the server may allow or deny access to the resource based on other information associated with the HTTP request, such as the host name or IP address of the requesting client.
- Authenticating HTTP requests can impose a heavy load on the Web server.

PROXY SERVER

- Proxy server is an intermediary server between client and the internet.
- Proxy servers offers the following basic functionalities:
  - Firewall and network data filtering.
  - Network connection sharing
  - Data caching
- Proxy servers allow to hide, conceal and make your network id anonymous by hiding your IP address.

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Purpose of Proxy Servers

1. Improve performance

- Can dramatically improve performance for a group of users.
- It saves all the results of requests in a cache.
- Can greatly conserve bandwidth.

2. Filter requests

- Prevent users from accessing a specific set of web sites.
- Prevent users for accessing pages containing some specified strings.
- Prevent users from accessing video files

Major types of websites

1. Blog : The term blog comes from the word weblog.

- Until 2009 blogs were usually the work of a single individual, occasionally of a small group, and often covered a single subject.
- More recently "multi-author blogs" (MABs) have developed, with posts written by large numbers of authors and professionally edited.
- This type of site is usually displayed in a reverse chronological order, such as the most recent post or upload appears first.
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Major types of websites

2. Wiki : These websites are created to serve as a detail way of passing descriptive information to the society, e.g. WIKIPEDIA.

- Text is usually written using a simplified markup language or a rich-text editor.
- While a wiki is a type of content management system, it differs from a blog or most other such systems in that the content is created without any defined owner or leader, and wikis have little implicit structure, allowing structure to emerge according to the needs of the users.
- Trustworthiness and Security - the two biggest attribute for wikis. Critics of publicly editable wiki systems argue that these systems could be easily tampered with,

Major types of websites

3. Social : Social network site is a site that enable user to create a public profile within that website and form relationship with other users of the web, however it is referred to a profile site.

- Social site on the Internet is describes the community based site where it brings people together to talk, share ideas, share interests, make new friends, etc.
- However this type of collaboration and sharing of data is often referred to as social media. Below are examples of social site; Facebook, twitter, YouTube, instagram etc.

Web Browser

- Web browsers are mainly used to access pages of the World Wide Web. Or
- A Web browser acts as an interface between the user and Web server
- A Web browser contains the basic software you need in order to find, retrieve, view, and send information over the Internet. This includes software that lets you:
  - Send and receive electronicmail (or email) messages worldwide nearly instantaneously.
  - Read messages from newsgroups (or forums) about thousands of topics in which users share information and opinions.
  - Browse the World Wide Web (or Web) where you can find a rich variety of text, graphics, and interactive information.

Web Browser

- COMPONENTS OF WEB BROWSER

1. User Interface

- this includes the address bar, back/forward button , bookmarking menu etc

2. Rendering Engine
   - Rendering, that is display of the requested contents on the browser screen.
   - By default the rendering engine can display HTML and XML documents and images

Web Browser

- HISTROY
- The history of the Web browser dates back in to the late 1980s, when a variety of technologies laid the foundation for the first Web browser, WorldWideWeb, by Tim Berners-Lee in 1991.
- Microsoft responded with its browser Internet Explorer in 1995 initiating the industry's first browser war
- Opera first appeared in 1996; although it have only 2% browser usage share as of April 2010, it has a substantial share of the fast-growing mobile phone Web browser market, being preinstalled on over 40 million phones.
- In 1998, Netscape launched Mozilla

Web Browser

- Different types of browser

1. MOZILLA FIREFOX

- The Firefox Web Browser is the faster, more secure, and fully customizable way to surf the web
- Mozilla is a global community dedicated to building free, open source products like the award winning Firefox web browser and Thunderbird email software. Mozilla Firefox

Web Browser

2. MOSIAC

- Mosaic was developed at the National Center for Supercomputing Applications(NCSA) at the University of Illinois Urbana-Champaign beginning in late 1992. NCSA released the browser in 1993, and officially discontinued development and support on January 7, 1997.
- Mosaic was also the first browser to display images inline with text instead of displaying images in a separate window

Web Browser

3. NETSCAPE NAVIGATOR

- Netscape Navigator and Netscape are the names for the proprietary web browser popular in the 1990s
- It was the flagship product of the Netscape Communications Corporation and the dominant web browser in terms of usage share, although by 2002 its usage had almost disappeared

Web Browser

4. WINDOWS INTERNET EXPLORER

- Windows Internet Explorer (formerly Microsoft Internet Explorer), is a series of graphical web browsers developed by Microsoft and included as part of the Microsoft Windows line of operating systems starting in 1995

4. OPERA

- Opera is a web browser and Internet suite developed by Opera Software.
- The browser handles common Internet-related tasks such as displaying web sites, sending and receiving e-mail messages, managing contacts, chatting on IRC

Web Browser

- The browser handles common Internet-related tasks such as displaying web sites, sending and receiving e-mail messages, managing contacts, chatting on IRC downloading files via BitTorrent, and reading web feeds. Opera is offered free of charge for personal computers and mobile phones.

6. SAFARI

- Safari is a graphical web browser developed by Apple and included as part of the Mac OS X operating system.
- on the company's Mac OS X operating system, it became Apple's default browser

Web Browser

7. GOOGLE CHROME

- Google Chrome is a web browser developed by Google that uses the WebKit layout engine and application framework
- It was first released as a beta version for Microsoft Windows on 2 September 2008, and the public stable release was on 11 December 2008.

Web Browser

8. Mobile Browsers

- Mobile Browsers A mobile browser, also called a micro browser, minibrowser or wireless internet browser(WIB), is a web browser designed for use on a mobile device such as a mobile phone or PDA.
- Opera Mini, offered free of charge, is designed primarily for mobile phones, but also for smartphones and personal digital assistants.