Internet and WWW

INTERNET

- Global system of interconnected computer networks
- Use the standard Internet Protocol Suite (TCP/IP)
- It is a *network of networks*
- Carries a vast range of information resources and services
  - Inter-linked hypertext documents of the WWW
  - Infrastructure to support electronic mail

FEATURES OF INTERNET

- Sharing of information globally
- Search engines
- E-mail services
- Chat facility
- Permits launching of one's own web site
- It provides a platform to advertise and market products
- Several distance education courses are available
- Online shopping
- BBS News Services
- Organizations can collect and compile information from their offices spread over a huge geographical area
- Shareware software can be downloaded

Advantages of Internet

1. Faster Communication
2. Abundant Information Resources
3. Inexhaustible Education
4. Entertainment for Everyone
5. Social Networking and Staying Connected
6. Online Services and E-commerce

Disadvantages of Internet

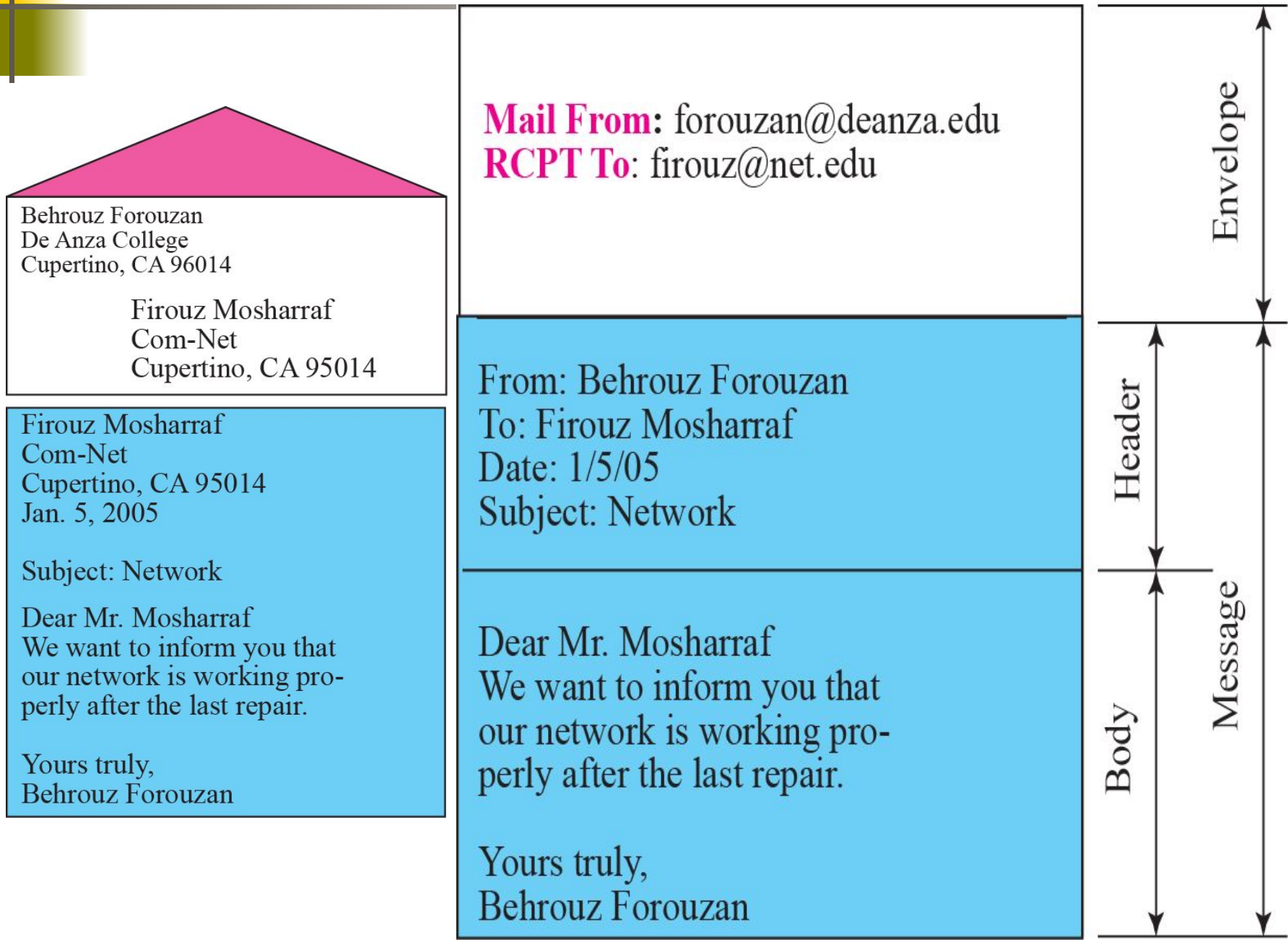
- Theft of Personal Information
- Spamming
- Malware Threats
- Age-inappropriate Content
- Social Isolation, Obesity, and Depression

Applications of Internet

Electronic mail

- Method of exchanging digital messages from an author to one or more recipients.
- Transmitting data, text files, digital photos, and audio and video file
- Store-and-forward model
- E-mail -asynchronous form of communication
- Telephone -synchronous form of communication
- Three components
  - Message *envelope*
  - Message header contains control information, including, an originator's email address and one or more recipient addresses, subject header field and a message submission date/time stamp
  - Message *body*

Figure 23.6 *Format of an email*



Applications of Internet

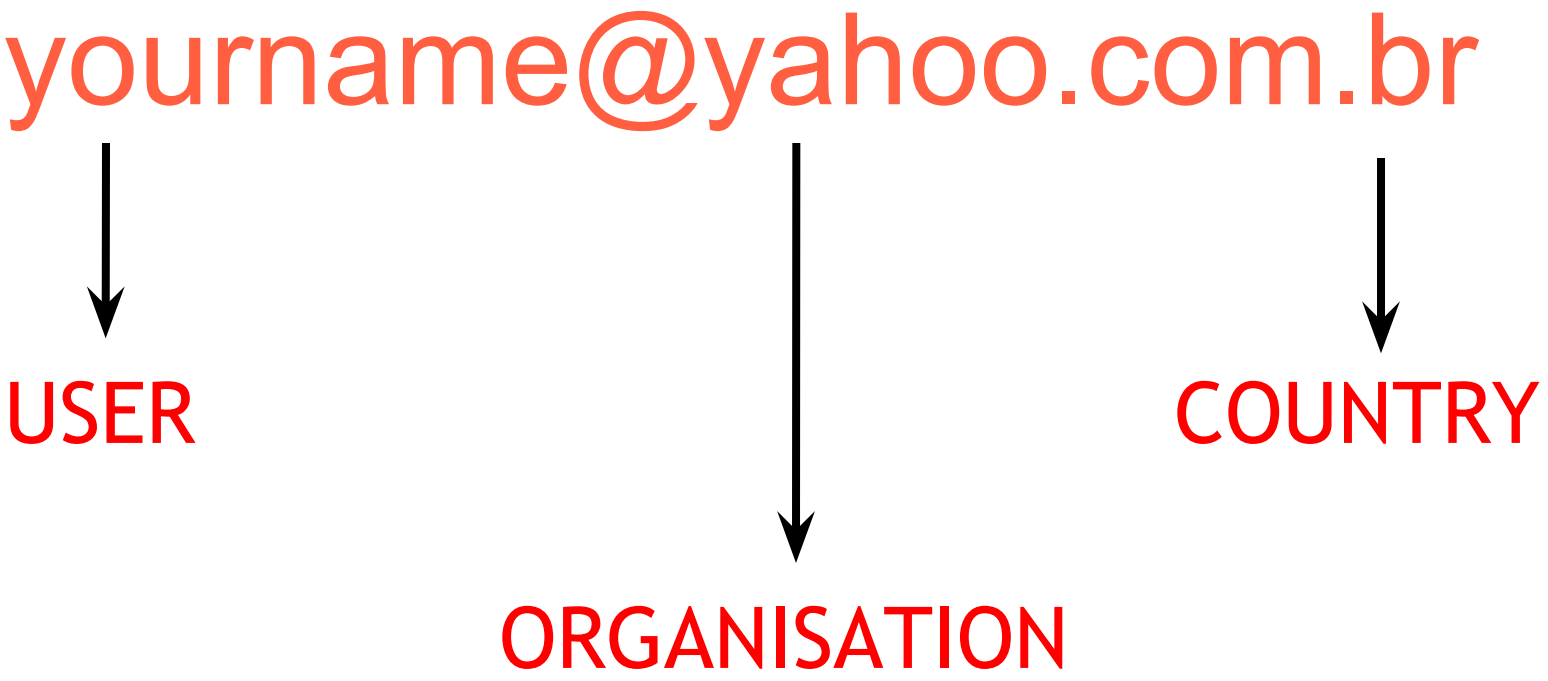
E-mail

Parts of an email address: dwalker@surfcity-hb.org

- user name : dwalker (you create your own) (each is unique)
- @ symbol : unique to email addresses
- email provider's name: surfcity-hb
- domain : .org

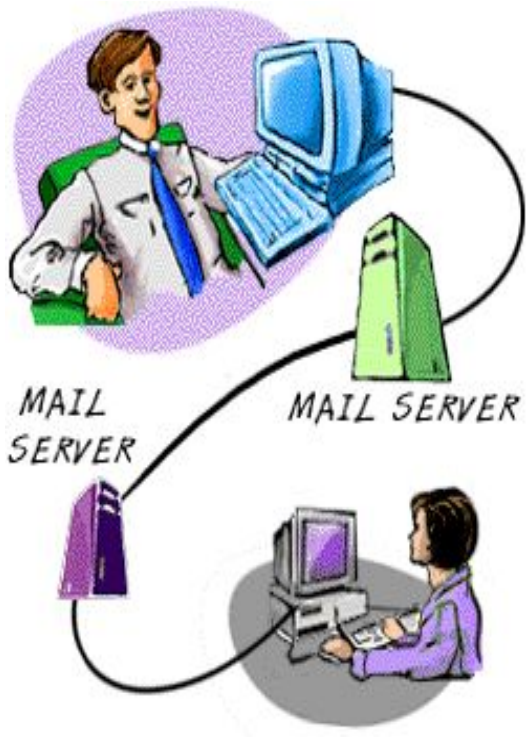
Password: Something easy to remember, but difficult to guess

The email address needs to be followed by the symbol @ (means “at”), the organization's name, followed by the domain, and finally the country.



How does Email Work?

- Email travels via the Internet from one computer to another.
- Computers known as mail servers direct outgoing mail and store incoming the mail.
- Once email reaches your mail server, it waits in an electronic mail box, the "Inbox" for you to collect it.



Things You Can Do with Email

- Compose and Send: write an email and send it to others.
- Reply: reply to an email that you received.
- Forward: pass on an email that you received to others.
- Attachment: You can send files with your email such as:
  pictures, music, software and documents

Two Ways People Check Email

1. Web-Based Email

- Login to a web site
- Messages stay on the mail server
- Can be accessed from any computer with internet connection

2. Using Email Software

- Open and login to your email software application (e.g. Outlook)
- The application retrieves your messages from the mail server and saves them to your computer's hard drive

- **Telnet**

- User command and an underlying TCP/IP protocol for accessing remote computers.
- 'telecommunications network'
- An administrator or another user can access someone else's computer remotely
- HTTP and FTP protocols allow you to request specific files from remote computers, but not to actually be logged on as a user of that computer

- With Telnet, you log on as a regular user with whatever privileges you may have been granted to the specific application and data on that computer

- **Telnet**

- A Telnet command request looks like this (the computer name is made-up):
  - telnet the.libraryat.whatis.edu

- The result of this request would be an invitation to log on with a userid and a prompt for a password

- Telnet is most likely to be used by program developers and anyone who has a need to use specific applications or data located at a particular host computer.

- Now the telnet has been replaced to SSH(the Secure Shell)

Uses of telnet service

- Allows to use the power of remote computer (powerful server)
- A software available on remote computer can be used
- Remote computer's database or archive can be used
- Used to log in to own computer from the remote computer

Applications of Internet

File Transfer Protocol (FTP)

Standard network protocol used to copy a file from one host to another over a TCP-based network.

FTP is built on a client-server architecture and utilizes separate control and data connections between the client and server

If you are using a public--or anonymous--FTP server

To do FTP, a user invokes one of two commands

Get-The command for transferring a file from another server to your own computer.

Put-The command for moving a file from your computer to another one.

Applications of Internet

Resources available via FTP:

Freeware:

- The author continues to carry the copyright to the software ,but permits you to use the program for free
- Can share freeware with others ,as long as you don't sell it

Public Domain:

- The creator carries no copyright, and has released it for anyone to use
- There are no limits on distribution or sale – and anyone can modify the program

Shareware:

- The author continues to carry the copyright to the software ,but you're permitted short-term use of the program for evaluation purposes

Applications of Internet

- Electronic Commerce
  - Buying and selling of products or services over electronic system
  - Electronic funds transfer ,supply chain management ,online transaction processing,..
  - Online retailers e-tail
    - B2B (Buying tires)
    - B2C(Amazon.com)
    - C2B (job board)
    - C2C(eBay.com)

Applications of Internet

- Electronic Business
  - Application of information and communication technologies (ICT) in support of all the activities of business
- E-business is broader in scope and e-commerce is just an aspect or a subset of it
- E-commerce only covers business transactions such as buying and selling of goods and services over the internet
- E-commerce essentially involves monetary trade while in e-business, money transactions are not necessary
- E-business involves marketing, product design, consumer service evaluation, and more
  - Pure-Play
  - Brick and Click

Applications of Internet

Video Conferencing

- Set of interactive telecommunication technologies which allow two or more locations to interact via two-way video and audio transmissions simultaneously
- To connect remote users with each other as if they were in the same room
- Each user needs a computer, webcam, microphone, and internet connection for participation in video conferencing

Applications of Internet

Video Conferencing

Dedicated systems

- Have all required components packaged into a single piece of equipment, usually a console with a high quality remote controlled video camera. (PT cameras)
- The console contains all electrical interfaces, the control computer, and th software or hardware-based codec
- There are several types of dedicated videoconferencing devices:
  - Large group videoconferencing
  - Small group videoconferencing.
  - Individual videoconferencing

Desktop systems

- Are add-ons (hardware boards, usually) to normal PCs, transforming them into videoconferencing devices.
- A range of different cameras and microphones can be used with the board, which contains the necessary codec and transmission interfaces.
- Most of the desktops systems work with the H.323 standard.

Video Conferencing

Echo cancellation

- Echo can be defined as the reflected source wave interference with new wave created by source.
- AEC (Acoustic Echo Cancellation)is an algorithm which is able to detect when sounds or utterances reenter the audio input of the videoconferencing codec, which came from the audio output of the same system, after some time delay.
- If unchecked, this can lead to several problems including:
  - ✔ The remote party hearing their own voice coming back at them
  - ✔ Strong reverberation, rendering the voice channel useless as it becomes hard to understand
  - ✔ Howling created by feedback

Video Conferencing

Technical and other issues

- 'virtual' entry by computer hackers and criminals into company premises and corporate boardrooms, via their own videoconferencing systems
- **Eye Contact:**
  - Some telepresence systems have cameras located in the screens that reduce the amount of parallax observed by the users.
- **Appearance Consciousness:**
- **Signal latency**:
  - The information transport of digital signals in many steps need time.
  - In a telecommunicated conversation, an increased latency larger than about 150–300 ms becomes noticeable and is soon observed as unnatural and distracting.

Internet service provider

- **Internet access provider**(**IAP**), is a company that offers its customers access to the Internet.
- The ISP connects to its customers using a data transmission technology appropriate for delivering Internet Protocol packets or frames, such as dial-up, DSL, cable modem, wireless or dedicated high-speed interconnects.
- ISPs may provide services such as remotely storing data files on behalf of their customers, as well as other services unique to each particular ISP.

Virtual ISPs

- A Virtual ISP (VISP) is an operation which purchases services from another ISP ("wholesale ISP")
- Allow the VISP's customers to access the Internet using services and infrastructure owned and operated by the wholesale ISP.

Free ISPs

- Provide service free of charge.
- Many free ISPs display advertisements while the user is connected; like commercial television
- Other free ISPs, often called freenets , are run on a nonprofit basis, usually with volunteer staff.

Domain name server

- Standard technology for managing the names of Web sites and other Internet domains.
- DNS technology allows you to type names into your Web browser like *compnetworking.about.com*
- Your computer to automatically find that address on the Internet.

- **Domain Name System (DNS):**
- Allows the IP address to be translated to words.
- Eg whatismyip.com ☐192.168.1.1
- A **DNS server** is any computer registered to join the Domain Name System.
- A DNS server runs special-purpose networking software, features a public IP address, and contains a database of network names and addresses for other Internet hosts.

Internet Address

- IP address is a numerical label assigned to each device participating in a **computer network**participating in a computer network that uses the **Internet Protocol** for communication.
- An IP address serves two principal functions: host or network interface **identification**An IP address serves two principal functions: host or network interface identificationand location **addressing**.
- "*A **name** indicates what we seek. An address indicates where it is. A route indicates how to get there.*"

World Wide Web

Way of accessing information over the medium of the Internet.

The Web uses the HTTP protocol, only one of the languages spoken over the Internet, to transmit data.

The Internet refers to the physical connection of the paths between two or more computers

Uniform Resource Locator

Where an identified resource is available and the mechanism for retrieving it

The best-known example of the use of URLs is for the *addresses* of web pages on the World Wide Web, such as http://www.example.com/.

HTTP protocol

- ***H****yper****T****ext* ***T****ransfer* ***P****rotocol*, the underlying protocol used by the World Wide Web.
- HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.

- The other main standard that controls how the World Wide Web works is HTML, which covers how Web pages are formatted and displayed.
- HTTP is called a *stateless* protocol because each command is executed independently

Search engine

- A **web search engine** is designed to search for information on the World Wide Web and FTP servers.
- The search results are generally presented in a list of results and are often called *hits*.
- The information may consist of web pages, images, information and other types of files. Search engines operate algorithmically or are a mixture of algorithmic and human input.

Web browser

- software application for retrieving, presenting, and traversing information resources on the World Wide Web.
- Hyperlinks present in resources enable users to easily navigate their browsers to related resources.
- Eg Internet Explorer,Netscape Navigator,Opera,FireFox,Chrome,Mozilla

Internet Explorer

1.Standards support

2.Non-standard extensions

introduced the need for a "quirks mode" to allow for rendering improper elements meant for Internet Explorer in these other browsers.

- **quirks mode** refers to a technique used by some web browsers refers to a technique used by some web browsers for the sake of maintaining backward compatibility refers to a technique used by some web browsers for the sake of maintaining backward compatibility with web pages designed for older browsers
- innerHTML property, which provides access to the HTML string within an element ;
- the XMLHttpRequest object, which allows the sending of HTTP request and receiving of HTTP response

3.Favicon

It allows web pages to specify a 16-by-16 pixel image for use in bookmarks.

4.Usability and accessibility

Pop-up blocking and tabbed browsing were added respectively in IE6 and E7

5.Cache

Internet Explorer caches visited content in the Temporary Internet Files folder to allow quicker access (or offline access) to previously visited pages.

The content is indexed in a database file, known as Index.dat.

6.Group Policy

Administrators of can apply and enforce a variety of settings on computers that affect the user interface (suc

Nescape Navigator

Opera

displaying **web sites**, sending and receiving **e-mail** messages, managing contacts, **chatting** on **IRC**(Internet Relay Chat), downloading files

Features include **tabbed browsing**, **page zooming**, **mouse gestures**, and an integrated **download manager**.

Its security features include built-in **phishing** and **malware** protection, **SSL/TLS** (Secure Sockets Layer / Transport Layer) **encryption** when browsing **HTTPS** websites, and the ability to easily, delete private data such as **HTTP cookies**

Firefox

Mozilla Firefox is a free and open source web browser descended from the Mozilla Application Suite and managed by Mozilla Corporation.

Principal Firefox features include tabbed browsing, spell checking, incremental find (As the user types text, one or more possible matches for the text are found and immediately presented to the user.), live bookmarking (allow users to dynamically monitor changes to their favorite news sources), a download manager, private browsing (browse the Internet without leaving any traces in the browsing history),...

CHROME

Google Chrome is a **web browser** developed by **Google**

Google Chrome aims to be secure, fast, simple and stable.

Chrome's strength is its application performance and **JavaScript** processing speed, both of which were independently verified by multiple websites to be the swiftest among the major browsers of its time

Web Servers

A web server can be referred to as either the hardware (the computer) or the software (the computer application) that helps to deliver content that can be accessed through the Internet.

Every Web server has an IP address and possibly a domain name.

For example, if you enter the URL *http://www.pcwebopedia.com/index.html* in your browser, this sends a request to the Web server whose domain name is *pcwebopedia.com*.

The server then fetches the page named *index.html* and sends it to your browser.

Apache

- From server-side programming language support to authentication schemes.
- A sample of other features include Secure Sockets Layer and Transport Layer Security ,a URL rewriter (also known as a rewrite engine), custom log files, and filtering support.
- Popular compression methods on Apache include the external extension module, implemented to help with reduction of the size (weight) of web pages served over HTTP.
- Virtual hosting allows one Apache installation to serve many different actual websites.
- For example, one machine with one Apache installation could simultaneously serve www.example.com, www.example.org, test47.test-server.example.edu, etc.
- Apache features configurable error messages, DBMS-based authentication databases.
- It supports password authentication.
- Apache has a built in search engine and an HTML authorizing tool and supports FTP.

Internet Information Services (IIS)

- HTTP modules – Used to perform tasks specific to HTTP in the request-processin pipeline, such as responding to information and inquiries sent in client headers, returning HTTP errors, and redirecting requests.
- Security modules –specifying authentication schemes, performing URL authorization, and filtering requests.
  - For example, you can selectively deny or allow access to specific files or folders (addressed by means of a URL) to nominated users.
- Content modules – processing requests for static files, returning a default page when a client does not specify a resource in a request, and listing the contents o a directory.
- Compression modules – compressing responses, applying Gzip compression transfer coding to responses, and performing pre-compression of static content.
- Caching modules –storing processed information in memory on the server and using cached content in subsequent requests for the same resource.
- Logging and Diagnostics modules - passing information and processing status to HTTP.sys for logging, reporting events, and tracking requests currently executing in worker processes.

Proxy server

- A proxy server is a server that acts as an intermediary between a workstation user and the Internet so that the enterprise can ensure security, administrative control, and caching service.
- A **proxy server** is a server that acts as an intermediary for requests from clients seeking resources from other servers.
- A client connects to the proxy server, requesting some service, such as a file, connection, web page, or other resource available from a different server and the proxy server evaluates the request as a way to simplify and control its complexity.
- A proxy server receives a request for an Internet service from a user.
- If it passes filtering requirements, the proxy server, assuming it is also a cache server , looks in its local cache of previously downloaded Web pages.
- If it finds the page, it returns it to the user without needing to forward the request to the Internet.
- If the page is not in the cache, the proxy server, acting as a client on behalf of the user, uses one of its own IP addresses to request the page from the server out on the Internet.
- When the page is returned, the proxy server relates it to the original request and forwards it on to the user.

Proxy server

A proxy server has a variety of potential purposes, including:

To keep machines behind it anonymous, mainly for security

To speed up access to resources (using caching). Web proxies are commonly used to **cache** web pages from a web server[1]

To prevent downloading the same content multiple times (and save bandwidth).

To log / audit usage, e.g. to provide company employee Internet usage reporting

To scan transmitted content for malware before delivery.

To scan outbound content, e.g., for data loss prevention.

Access enhancement/restriction