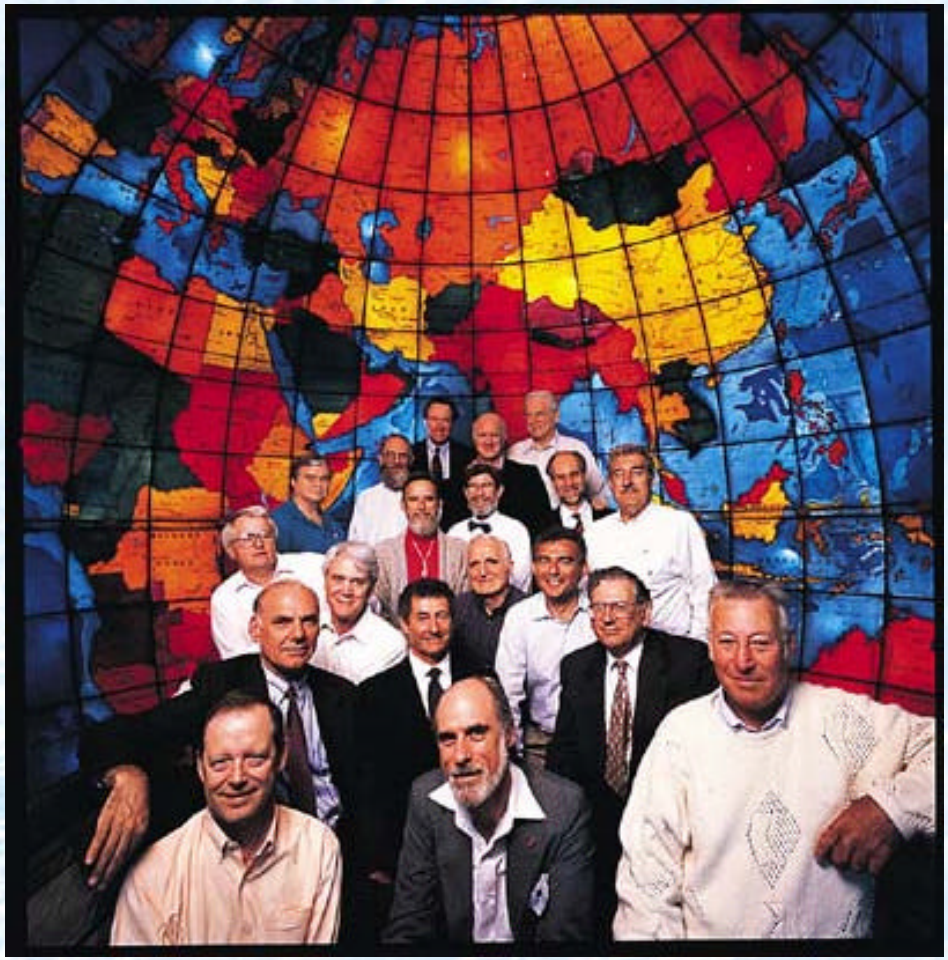
Chapter Ten



From Internet to Information Superhighway

After reading this chapter you should be able to:

- Describe the nature of the Internet and the variety of functions it performs
- Discuss several software tools for navigating and using the Internet effectively

After reading this chapter you should be able to:

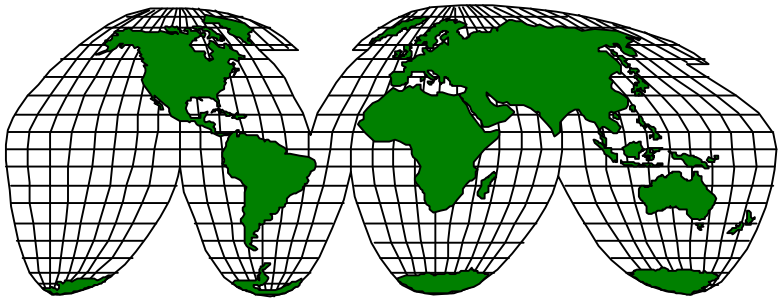
- Explain how the Internet and other telecommunication technologies are evolving into an information superhighway
- Discuss the future of the Internet in particular and cyberspace in general

Chapter Outline

- The Internet: A Network of Networks
- Communication Applications
- Information Exploration Applications
- The World Wide Web
- The Evolving Internet

The Internet: A Network of Networks

The **Internet** is an interconnected network of thousands of networks linking academic, research, government, and commercial institutions.



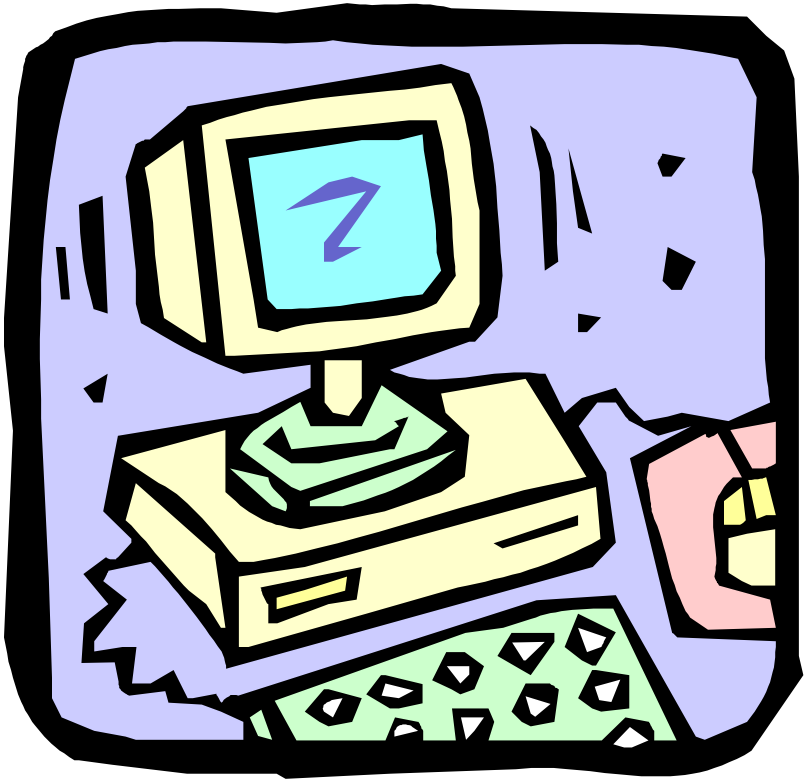
Internet Services

The Internet provides scientists, engineers, educators, students, business people, and others with a variety of services such as:

- Electronic mail (send/receive mail messages)
- Remote login (Telnet - access to other computers

Internet Services

- Transferring files (FTP - accessing archives of data)
- Newsgroups (Usenet - on-line public discussions)
- World Wide Web (a collection of multimedia documents)

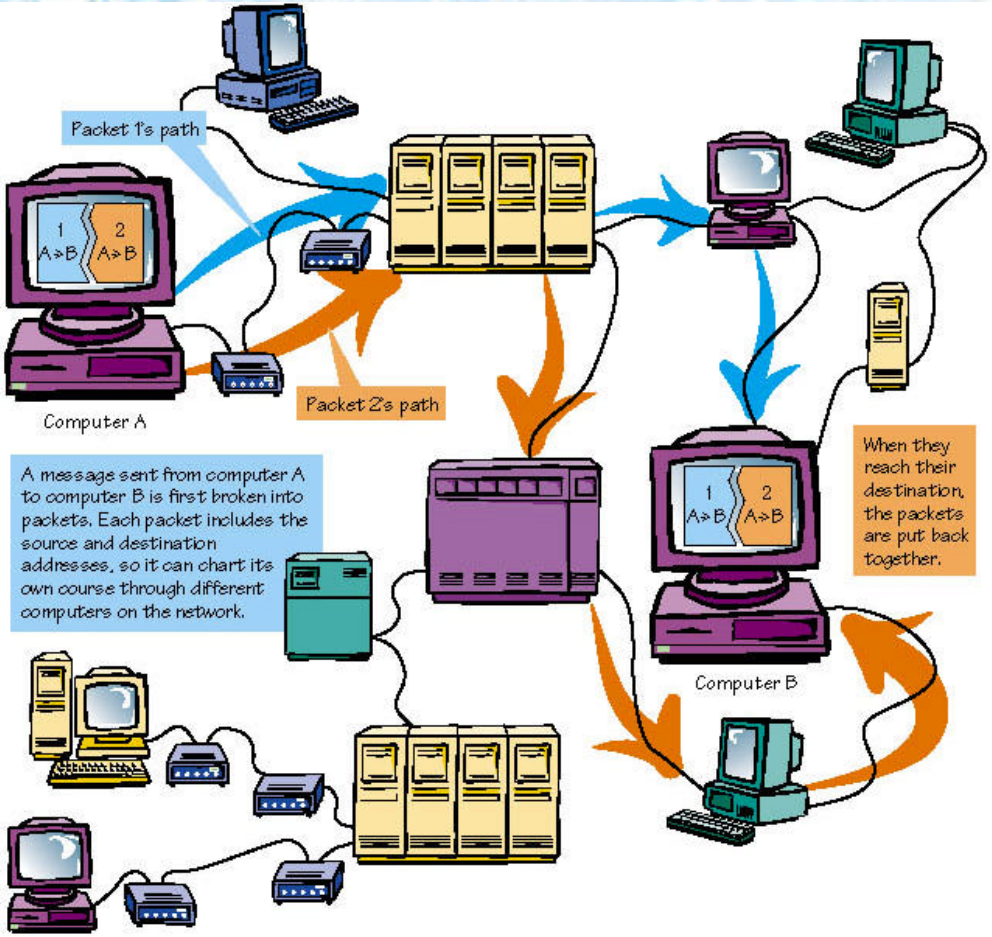


Counting Connections

Today, the Internet connects computers to about every country in the world. However, the Internet is:

- growing too fast to measure its growth
- too decentralized to quantify
- a network with no hard boundaries

Internet Protocols



TCP/IP

(Transmission Control Protocol/Internet Protocol) is the protocol at the heart of the Internet.

Internet Protocols

- TCP/IP translates into:
  - TCP (transmission control protocol) breaks messages into packets.
  - IP (Internet protocol) is the addressing for the packets.

Internet Protocols

TCP/IP specifications were published with **open standards**, not owned by any company.

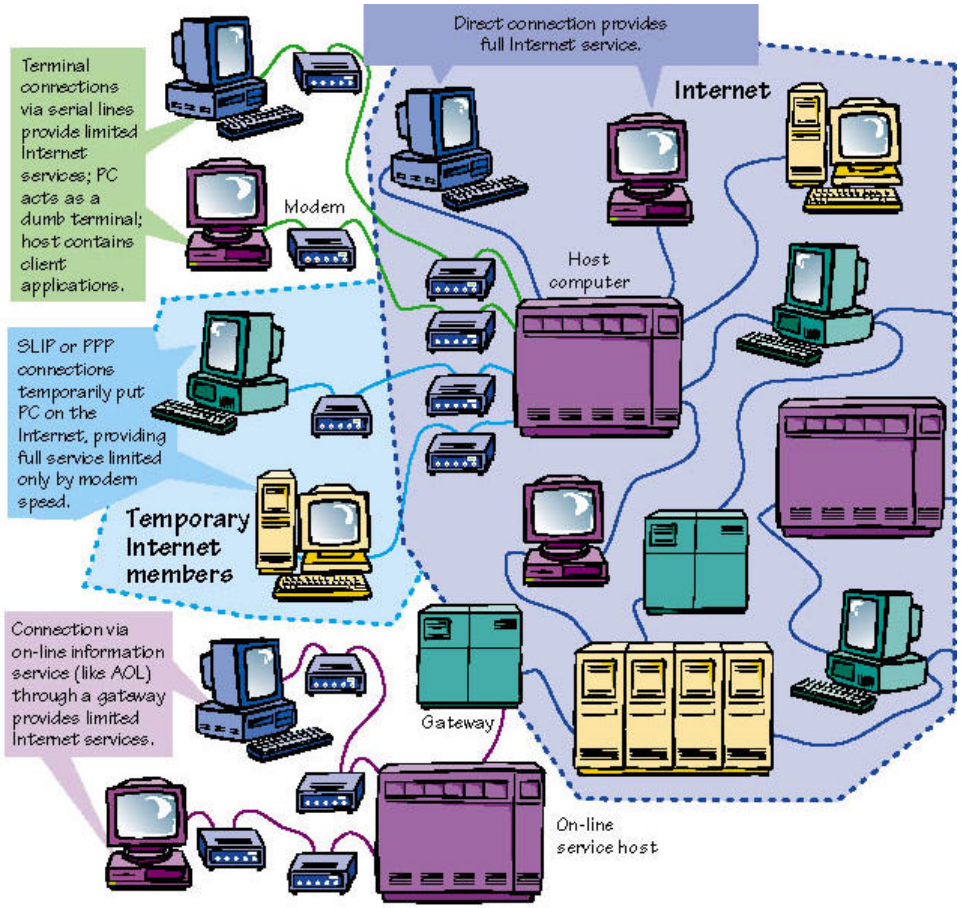
Internet Access Options

Direct (dedicated) connection: computer has an IP address and is attached to a LAN.

Internet Access Options

Dial-up terminal emulation: temporary, limited connection using a modem.

Full-access dial-up: uses SLIP or PPP via modem.

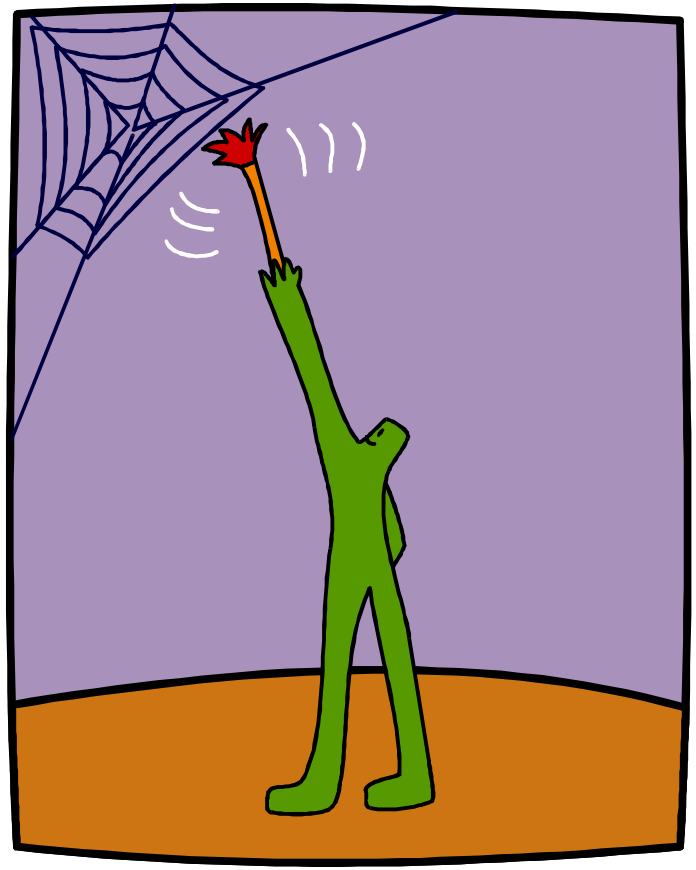


Intranets and Extranets

- Intranets - self-contained intraorganizational networks that are designed using the same technology as the Internet.
- Firewalls - used to prevent unauthorized communication and secure sensitive internal data.

Intranets and Extranets

- Typical intranets include
  - Email
  - Newsgroups
  - File transfer
  - Web Publishing
  - Other services



Intranets and Extranets

- Extranets - are designed for outside use by customers, clients, and business partners of the organization.
- Electronic Commerce - business transactions through electronic networks.

Intranets and Extranets

- Electronic data interchange (EDI) - a decade-old set of specifications for ordering, billing, and paying for parts and services over private networks.
- Virtual private networks - not subject to the traffic and security problems.

Communication Applications: The UNIX Connection

The user interface varies depending on which client/server application is being used.

UNIX - developed by Bell Labs, allows a timesharing computer to communicate with several other computers or terminals at once.

The UNIX Connection

- UNIX is the dominant operating system on the Internet, and the DOS-like character-based interface is still widely used on Internet hosts.

Internet Addresses

An **Internet address** is made up of two parts separated by the @ symbol:

- the person's user name
- the host name

The host is named using **DNS** (domain name system), which translates IP addresses into a string of **names**.

Internet Addresses

An Internet address includes:

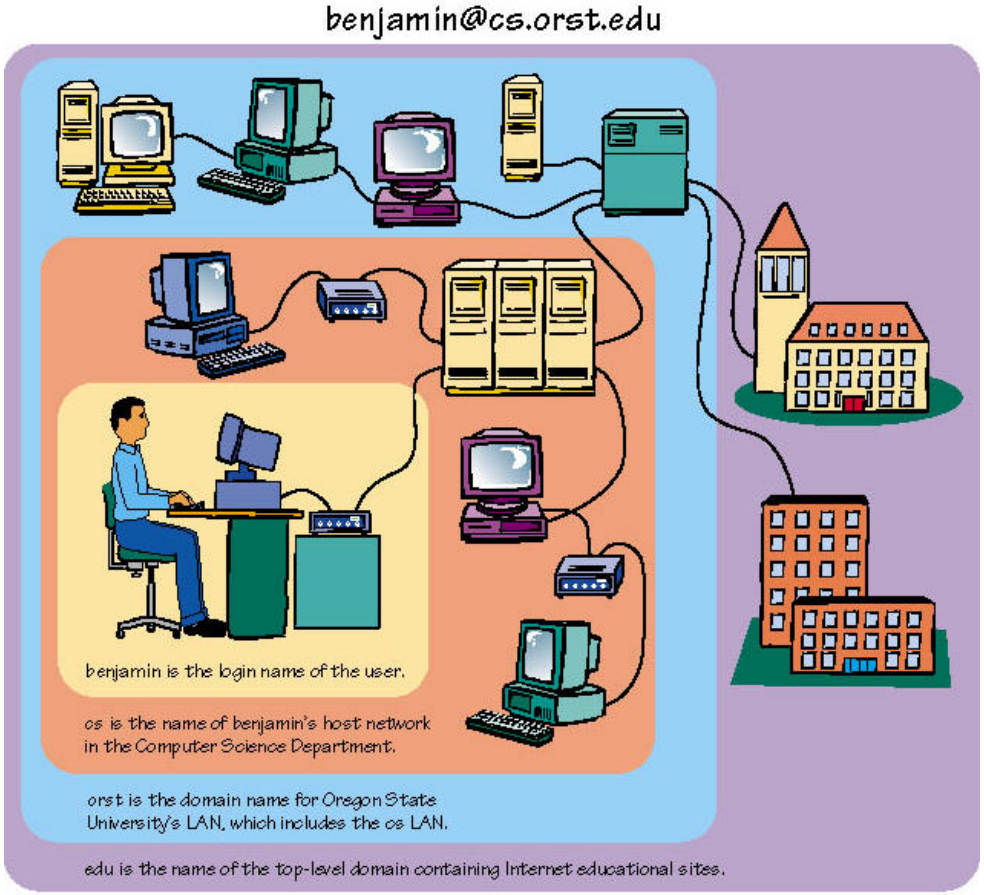
username@hostname.sub.dom

username is the person's "mailbox"

hostname is the name of the host computer and is followed by one or more domains separated by periods:

- host.subdomain.domain
- host.domain
- host.subdomain.subdomain.domain

Internet Addresses

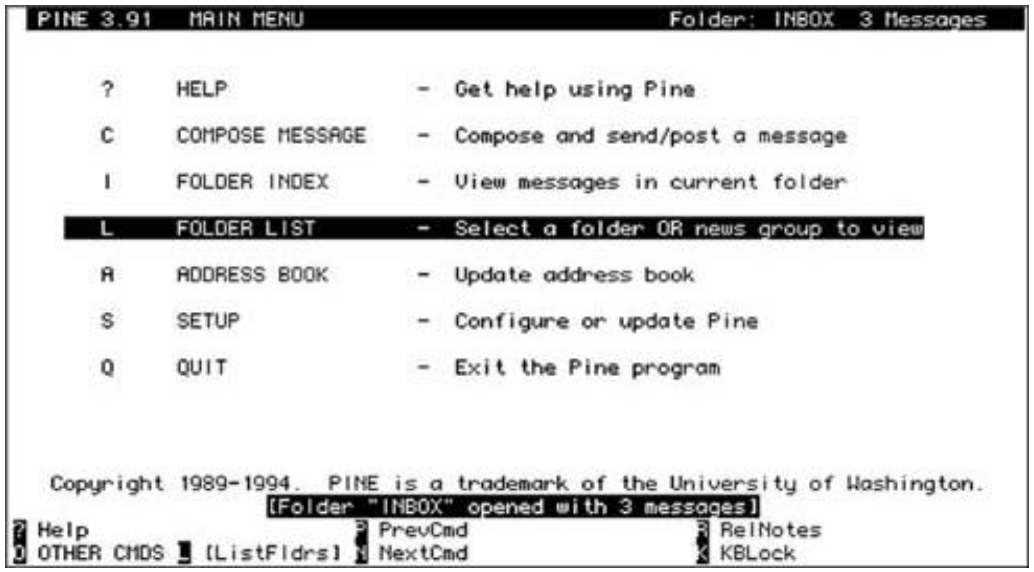


Top level domains include:

- .edu - educational sites
- .com - commercial sites
- .gov - government sites
- .mil - military sites
- .net - network administration sites
- .org - nonprofit organizations

Email on the Internet

- Email (one-on-one communication).
- Pine - UNIX-based mail program.
- MIME - Multipurpose Internet Mail Exchange - allows you exchange files through email.



Mailing Lists and Newsgroups

- Email is a valuable tool for one-to-one communication
- Mailing lists allow you to participate in email discussion groups on special-interest topics.
- Usenet Newsgroups are virtual bulletin boards that you access with a news reader

Real-Time Communication

Talk is a UNIX program that allows you to carry on a split-screen communication

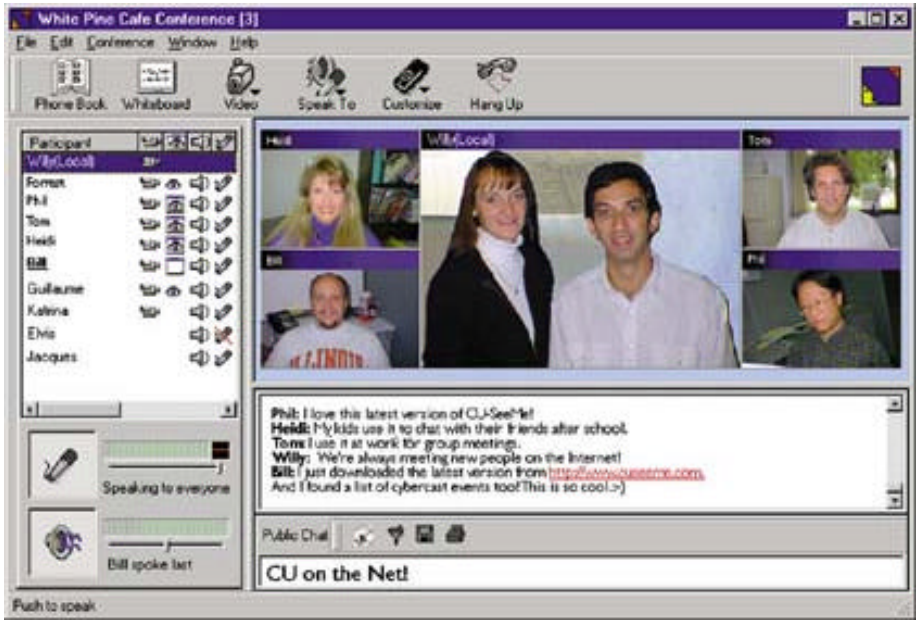
Internet relay chat (IRC) allows several users to type simultaneously

Multi-User Domains (MUD) are real-time group adventure games

Real-Time Communication

Video telephony
(see, hear, and type to another person).

- MBONE - Multicase Backbone - exchange of audio and video material over the Internet.



Information Exploration Applications

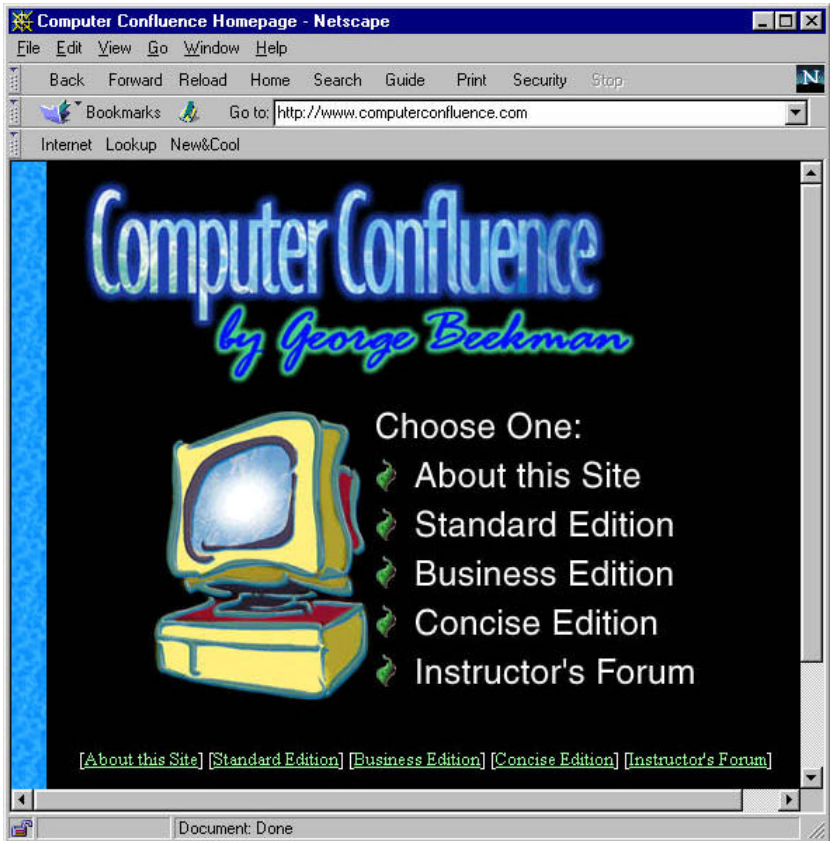
The most popular use of the Internet is information discovery and retrieval. Because the Internet is unorganized, you can use the following tools:

Telnet: for remote login to other computers.

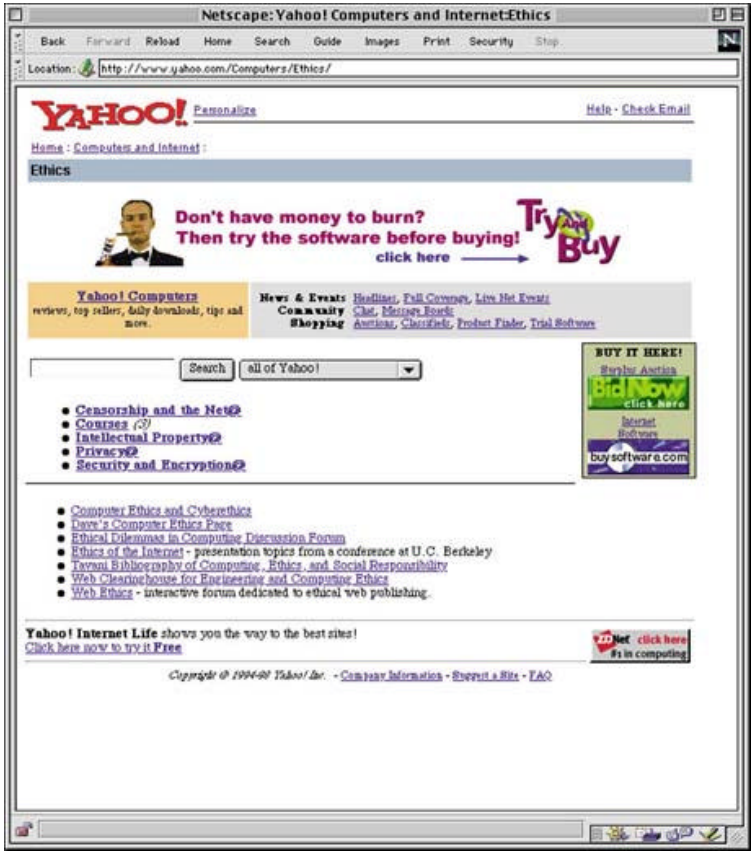
FTP: file transfer protocol; transfer files from remote computers.

Information Exploration Applications

- **Gopher, Archie, Veronica**, and **WAIS**: simple interfaces for file retrieval.
- **World Wide Web**: most popular system for exploring information.



The World Wide Web: Browsing the Web

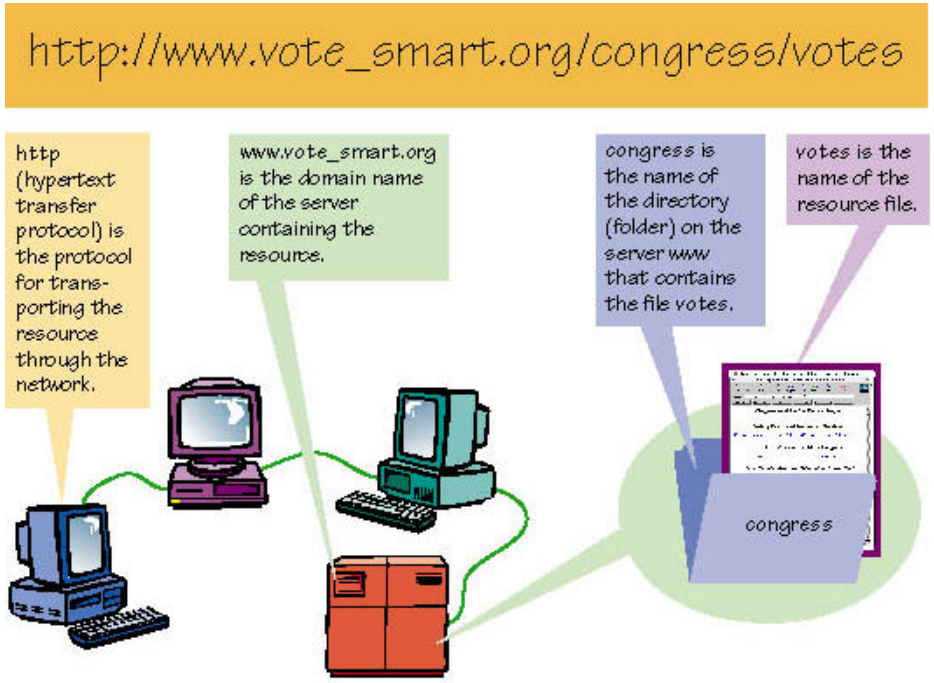


- WWW is a distributed browsing and searching systems developed by CERN.
- Use hypertext links and navigational aids to explore information on the Internet.

Web Addresses

URL (Uniform Resource Locator): addresses for the World Wide Web.

http (hypertext transfer protocol): the protocol of the WWW

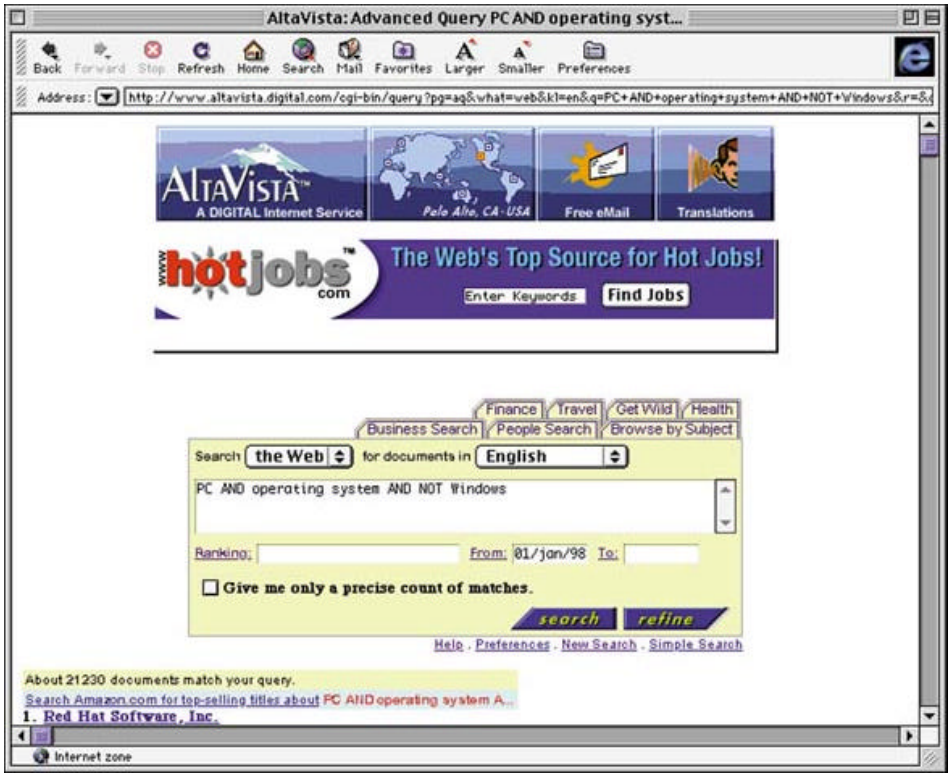


Searching the Web

- A **directory** (also an **index**) is a hierarchical catalog of Web sites compiled by researchers.

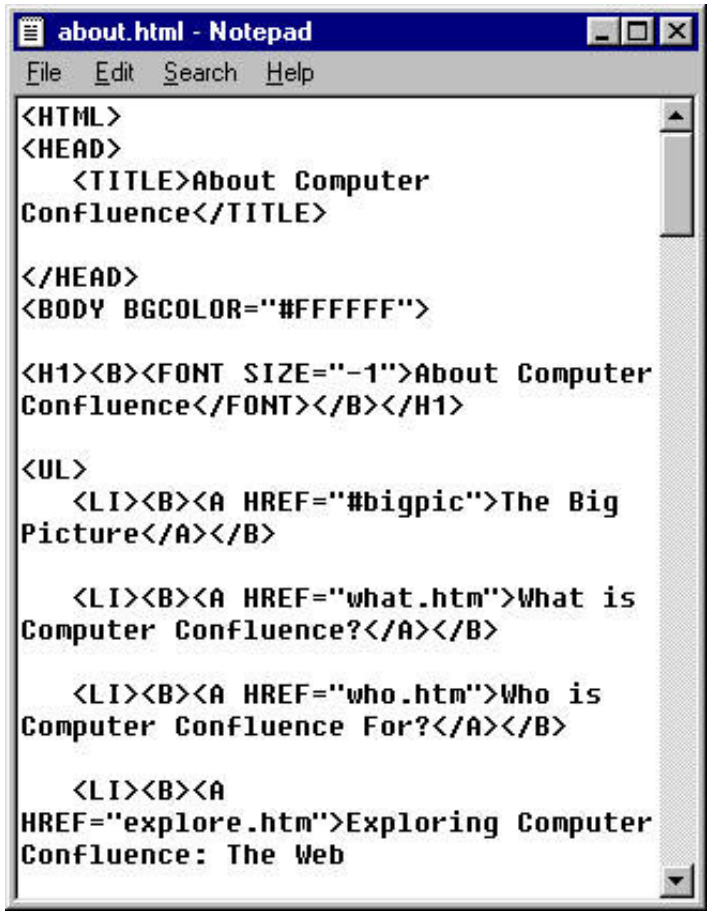
Searching the Web

- A **search engine** offers a more complete database of what is one the WWW. A **software robot or spider** retrieves the entries according to key word queries.



Publishing on the Web

HTML (HyperText Markup Language) document includes format, layout, and logical structure of a hypermedia document that will be published on the WWW.



Publishing on the Web

An example would be:

<H1>Welcome to Computer Confluence</H1>
Publishing on the Web

From Hypertext to Multimedia

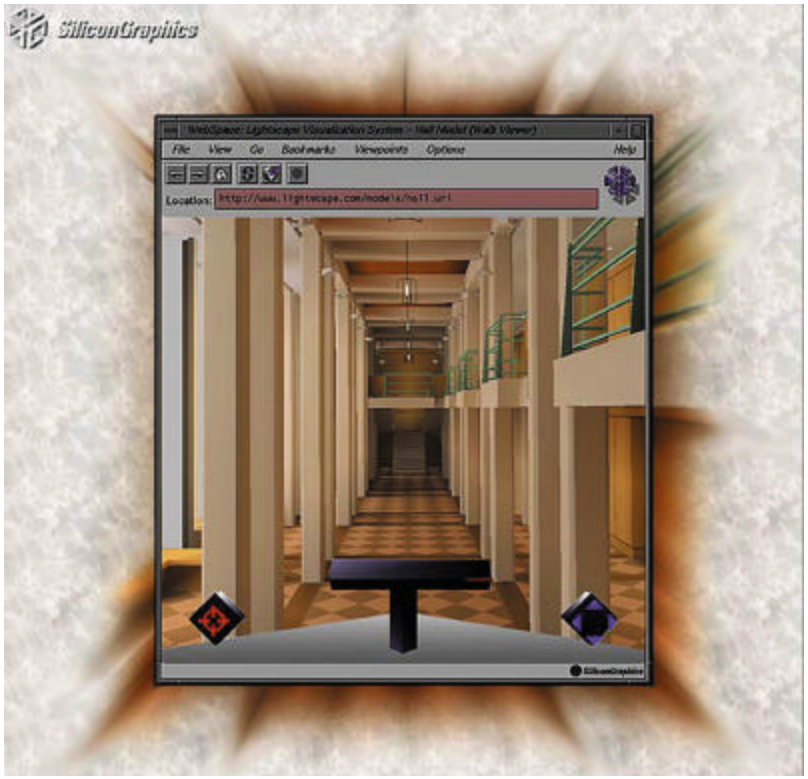
- Typical web pages can contain:
  - Tables
  - Frames
  - Forms
  - Streaming audio and video
  - Real-time live audio or video
  - 3-D environments

Beyond HTML

- Dynamic HTML - adds more programming power to HTML by allowing code to automatically modify itself under certain circumstances.
- XML - will be replace HTML plus provide additional features and extensions.

Beyond HTML

- VRML (virtual reality modeling language): creates 3-D virtual worlds.
- Java: an object-oriented programming language for the World Wide Web.



The Evolving Internet

The commercialization of the Internet has open a floodgate of new services to users.

The Internet is being used for about any purpose - sports scores, purchasing books, medical research, and subscribe to electronic magazines to name only a few.

The Road to the Information Superhighway

People are using the terms information superhighway and Internet interchangeably.

This *terrain* of electronic pulses is commonly referred to as **Cyberspace**.