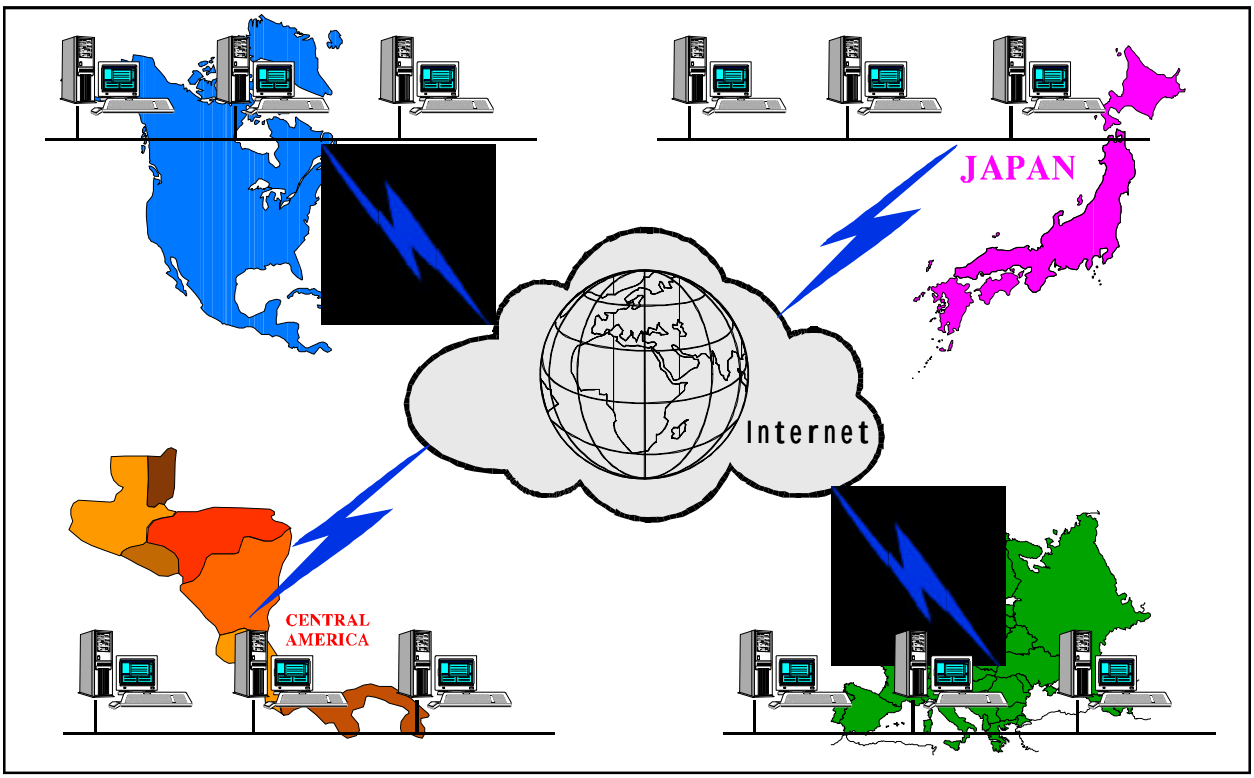


Desired Outcomes

- Student can describe the Internet and how it works
- Student can describe the World Wide Web portion of the Internet
- Student understands how Web documents are linked to one another
- Student understands how Web browser software works
- Student can describe several types of multimedia available on the Web
- Student can explain how to use a Web search tool to find information
- Student understands how to connect to the Internet and the World Wide Web
- Student knows how to use other Internet services
- Student knows how to locate the CSU, Chico Web page
- Student knows how to locate the Library ReSEARCH Station page
- Student knows what information is available on the CSU, Chico Web page
- Student can use the Web based University Course Catalog
- Student can use the Web based University Course Schedule

What is the Internet?

The Internet is a worldwide system of computer networks connected together creating a global "network of networks." A network is two or more computers connected together sharing information and resources. A Local Area Network (LAN) is a computer network that covers a limited geographical area such as a computer laboratory, an office, or several buildings. The University Academics Computer Laboratory located in O'Connell 133 is a LAN. Twenty-six personal computers are connected to one another through communications media and networking hardware allowing users to share printers and file servers. There are a number of LANs on the CSU, Chico campus. For example, the Construction Management Department has its own network of computers, as does the Library, the College of Business, as well as other areas. Each of these LANs is connected to a high-speed link, called a backbone, to form a campus-wide Wide Area Network (WAN).

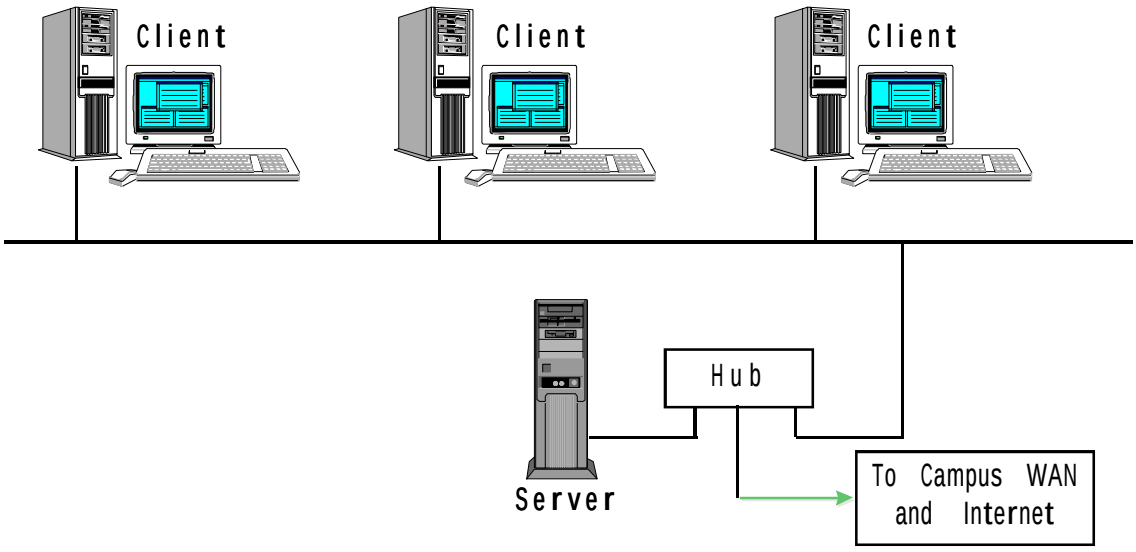
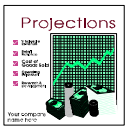


Figure 3-1. Local Area Network (LAN).

Connecting our campus WAN to the outside world creates access by other networks that may or may not be part of the California State University system. This is how the Internet's network topology is formed. Over 40 million autonomous networks are voluntarily connected together forming the Internet. When you connect to the Internet your computer becomes part of this worldwide network of computers. The Internet is a collection of interconnected computer networks from around the world that provides a wealth of information on nearly any topic you can imagine. Each of these networks are voluntarily allowing outsiders access to certain resources on their network. These resources range from allowing data to be transmitted through their networking hardware (routers) to accessing files and web pages. Without this voluntary system of connectivity between networks reading Web pages and delivery of your electronic mail (email) to people who are not users on our campus network would be impossible.

The Internet is Not a Company
There is no single authority that controls the Internet. Each autonomous network on the Internet makes its own rules, regulations, and decisions about which resources to make publicly available. The Internet is continually re-invented by its users.

What Does the Internet Provide?
On the Internet:

- You can exchange electronic mail. 
- Access and participate in discussion forums: ***alt.aliens.I.was.one***
- Search databases.
- Transfer files: **FTP To ftp.funet.fi** 

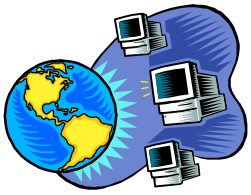
- Share information locally and globally.
- Surf the World Wide Web. 

Internet Connections
All Net connections require software that provides the suite of protocols known as TCP/IP (Transmission Control Protocol/ Internet Protocol).
Windows 95 has TCP/IP built in.
Freeware package known as Trumpet Winsock provides other users TCP/IP capability.
LANs such as Windows NT, Novell NetWare, and UNIX support TCP/IP.

Internet Addressing
In general, Internet addressing is a systematic way to identify people, computers and Internet resources. On the Internet, the term "address" is used loosely. Address can mean many different things from an electronic mail address to a web page address called a URL (Uniform Resource Locator). What makes the Internet work efficiently and reliably is the precise method of uniquely addressing everything on the Internet numerically. Just like your phone number is assigned to your telephone line Internet Protocol (IP) addresses are assigned to Internet resources.

Internet Protocol (IP) Address
To be part of the Internet a computer must be assigned an “Internet Protocol (IP) address.” IP addresses follow a specific set of rules:

- An IP address is made up of four numbers separated by dots, i.e. 132.241.66.6
- Each number is called an octet and can range from 0 to 255.
- IP is a global addressing scheme.
- IPs are assigned to organizations by an Internet governing body called Internic.
- To work no two computers can share the same IP address.



This is the kind of address by which hosts and routers on the Internet “find” each other.

Domain Name

Since it is difficult to remember long numbers, a text-based naming system was devised to take the place of IP numbers. The text address required to reach a host computer on the Internet is called a Domain Name. For example, **ecst.csuchico.edu** is the domain name of a particular computer at CSU, Chico. The domain name provides us with the ability to refer to computer networks by name rather than by a number. Even though most computers have domain names, all Internet computers are known by their Internet Protocol (IP) address. The numeric IP addresses are the official addresses of the Net. Domain names are only for the convenience of human beings. A special computer called a DNS server is set up to translate domain names into a numeric IP. All of this is done automatically by an Internet service called Domain Name System (DNS). Domain names are given out by request and must be unique. The top level of a domain name (on the right) is limited by the type of organization or geographical location of the requesting body. The top level domains for Internet sites in the U.S. are:

.gov for government institutions
.edu for educational institutions
.net for places that provide networking services
.org for nonprofit organizations
.com for commercial organizations
.mil for military sites
.us for United States, preceded by a state code

Domain names for sites outside of the US have a top level domain which is a two letter country code. For example, **au** for Australia and **br** for Brazil.

Internet Services

The Internet provides several different services for accessing information. Each service generally requires a different piece of software. The Internet services, each of which has its own protocol associated with it, are:

Service	**Protocol**
World Wide Web	http://
Telnet	telnet://
FTP (File Transfer Protocol)	ftp://
Newsgroups	news://
Email	mailto://
Gopher	gopher://

Each of these services can be used independently with the corresponding piece of software written to support the service. Netscape, a browser program written to use the World Wide Web, can be configured to run telnet applications, FTP files between computers, participate in newsgroups, send and receive Email, and access Gopher computers. Although all of these services are conveniently accessed using Netscape, each service needs to be setup and configured to work on your computer. Additional programs or "plug-ins" may need to be installed in order for the service to run properly.

The World Wide Web

Before the World Wide Web (WWW, W3, The Web) finding, accessing and obtaining information from the Internet was a difficult task. Cryptic commands known only by a small group of computer science types were issued at a UNIX prompt by those who knew where to look for information. Using the Internet was not for the feeble keyboard tapper or the easily frustrated end user.

In the late 1980's, a scientist named Berners-Lee was working on a hypertext information system at CERN, a European Laboratory for particle physics in Geneva, Switzerland. Berners-Lee was creating a "web" consisting of a "network of links." Berners-Lee thought it would be handy to share information with other scientists throughout the world timely and easily using a software program and the Internet to access a "web." Was he right. In August 1991, the World Wide Web was announced on Usenet (a global system of discussion groups). In January of 1992, the first program to access the Web was made available to the public. The Web quickly exploded into an enormous Internet based information system. Today, the Web is the place everyone wants to be. Recently, a NASA web site covering the Mars Pathfinder Mission and expedition of the rover Sojourner experienced over one million "hits" in two days. Web surfers of every age dialed into Internet Service Providers all over the world to witness first hand the charting of Martian terrain.

So, how does the Web work? The Web is a system of hypertext hypermedia documents that provide links to other documents. Wow. Hyperwhat? Hypertext. Hypertext means that highlighted text displayed in a document is actually a link pointing to additional information that may be somewhere in the same document or located in a different document. On the Web, these links can point anywhere else on the Internet. This makes it possible to "jump" from one document to another, from one computer to another, all around the Net. To locate a web site or particular Web document you need to know the Web address called the Uniform Resource Locator (URL).

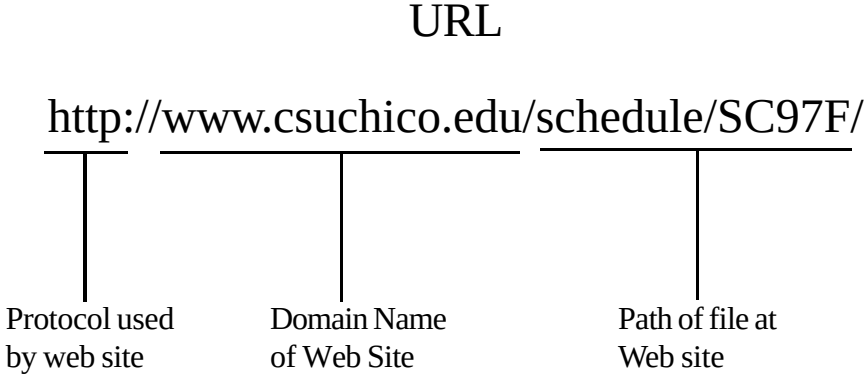
URL

Web pages are uniquely identified by a special address called the Uniform Resource Locator or URL. A URL is an international standard for describing the location of a file and includes all the information necessary to retrieve the file.

URLs follow the format:

`protocol://domain.name/directory/subdirectory/filename.ext`

A URL may contain the path to a specific file located on the computer. In most cases, if no file name is specified, a default Web home page document will load automatically.



Basic Web Terminology

Web Site
Each computer within the Web containing hypermedia that can be referenced by hypertext links is called a Web site. Web servers store files called *documents*, or *Web pages*. The set of instructions that defines the display of a Web document is called *Hypertext Markup Language* (HTML). Authoring your own Web pages requires learning HTML or using a commercial program such as Microsoft Front or Claris Homepage.

Hypertext
A hypertext document is a document that contains links to other parts of the document or to other documents. Users can select hypertext links in order to view documents in a nonlinear and individual way.

Hypermedia
Hypermedia is hypertext which may include nontext elements such as images, video and sound. The Web is a hypermedia system.

Hypertext Link
Hypermedia is accessed through the use of a hypertext link, or simply link, which is a special software pointer that points to the location of the computer on which the hypermedia is stored and to the hypermedia itself.

Server Software
Web servers must run *Hypertext Transfer Protocol* (HTTP). HTTP is a simple data transfer protocol that binds the Web together. HTTP makes sure that the hypermedia files gets from the Web server to your computer.

Client Software
A *browser* is a program that enables your computer to access the World Wide Web. Netscape is currently the most widely used Web browser.

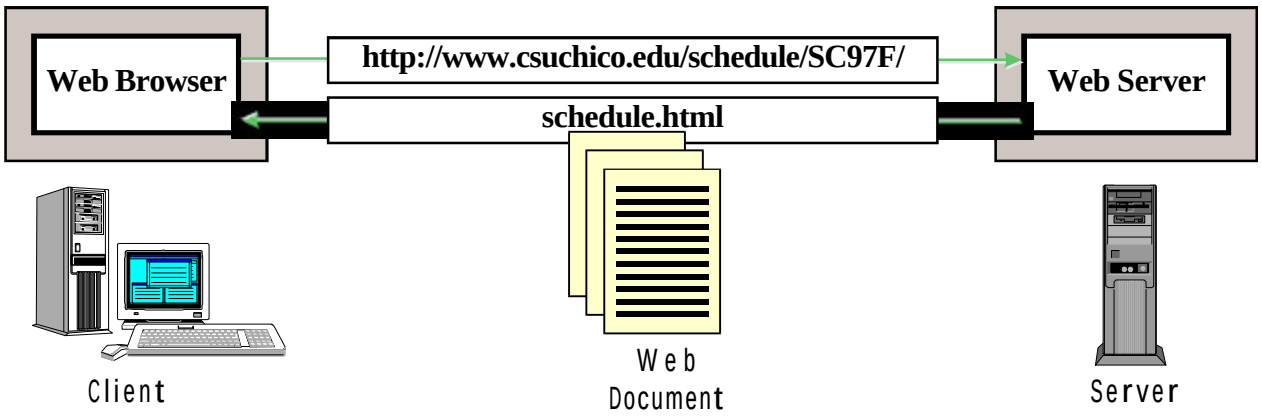


Figure 3-2. HTTP is used to send web documents from the web server to your workstation (client).

To locate a specific web site, like Microsoft's web site, you need to know the URL. Microsoft's main Web page is located at http://www.microsoft.com read as http colon forward slash forward slash www dot microsoft dot com. To receive the document at your workstation, you would enter the address of the web site in your browser and send a request to Microsoft's web server to send back the web document. If the URL is valid the request is received and the web server sends a copy of the web document back to your workstation. This is one reason why all computers on the Internet must have their own unique IP address. The only way the document can find its way to your computer is by knowing the destination IP address.

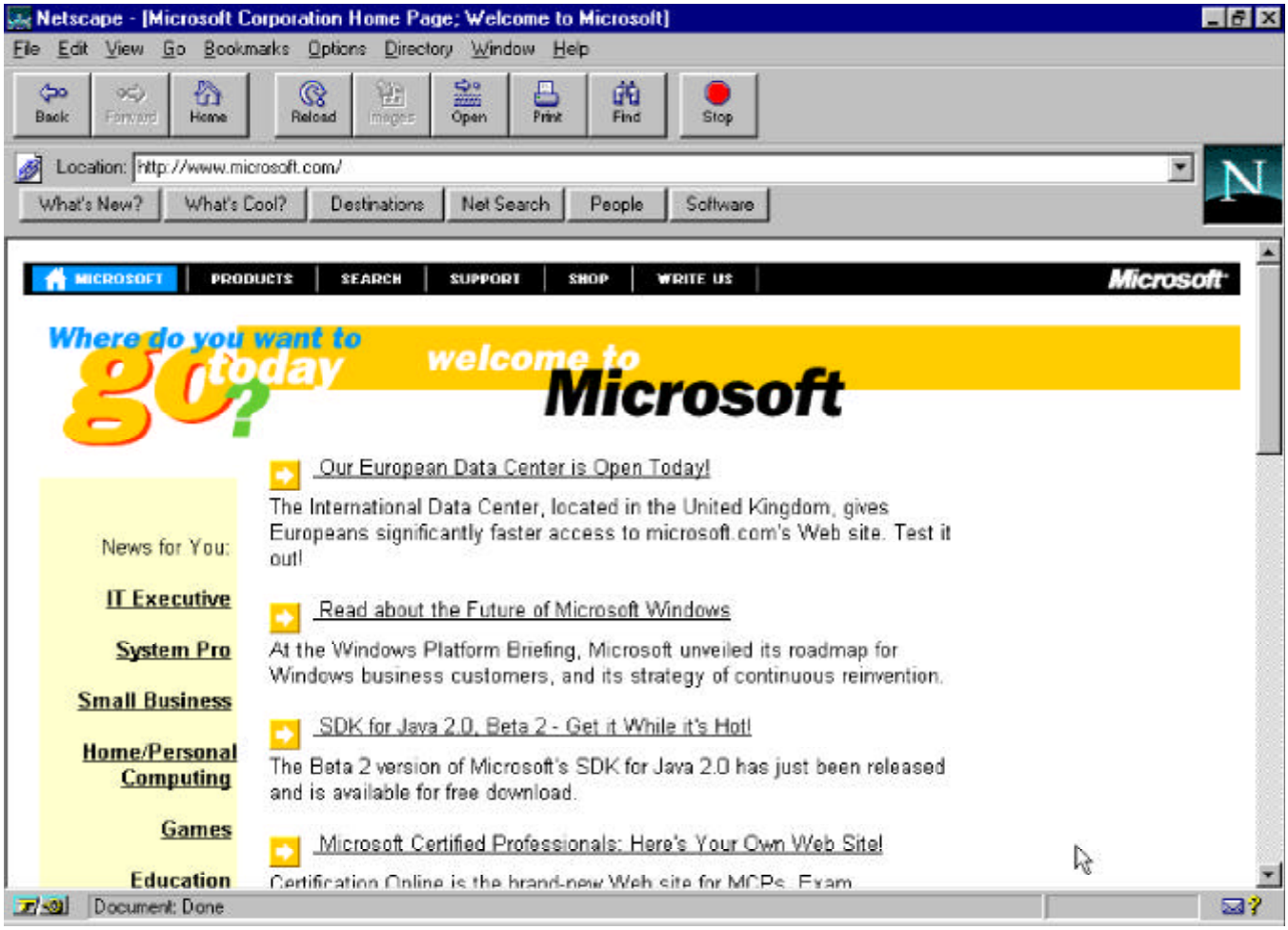


Figure 3-3. Netscape browser window displaying Microsoft's default home page.

Figure 3-3 above shows the default home page for Microsoft's URL [http://www.microsoft.com]. Hundreds of other Web documents are stored on Microsoft's Web server. The default Web page is the Web document that the Web server is set up to send your browser when the organization's main Web address is used.

It is possible to "quess" a companies URL. Try quessing Sonys URL.

Ans.http://www.sony.com

Who Can Put Information On the Web?
Any person or organization with an Internet connection can place documents on the Web by learning a few HTML tags, creating a Web file, and storing that file on an Internet **host**. All students at CSU, Chico that have a UNIX account can create and publish a web page. For further information see [http://www.ecst.csuchico.edu/docs/export.html].

Learning to Search Efficiently
The unstructured and unmanaged nature of the Internet creates a useful and not so useful array of available information. A great deal of "garbage" documents exist on the Internet. Often Internet searches result in a list of documents that are outdated or cannot be found. Web searches can yield massive amounts of questionable information. It is worth investing time in learning the skills necessary to search the Web efficiently and productively. An enormous amount of valuable information can be found by knowing how and where to look for documents on the Internet. Refer to Unit 11: Evaluating Information for more specific guidance on determining what is "good" information.

Who Organizes the Internet?
Both public and private attempts to categorize the Web are happening daily. Web sites, such as YAHOO, Lycos, Excite, and Magellan, are dedicated to categorizing information by subject. Several of these "search sites" also rate the quality of the web sites information. Just about all of these search sites have "search engines" that you can enter in **keywords** and locate web sites that contain the keywords in your search. You will need to learn how to evaluate the integrity of all information you obtain from the World Wide Web.

Using a Web Browser
Navigating the World Wide Web requires a Web browser. The browser installed on the workstations in the University Academics Computer lab is Netscape. Using your web browser, you request documents by entering a URL in the Location box, or by clicking on graphical or textual links in your browser's window.

Identifying Links
Links are generally identified by being a separate color from the rest of the text on a page. As you move your mouse around the screen in your browser window you will notice that the cursor changes shape from an arrow to a hand with a pointing finger when placed over a link. Clicking on the link instructs the browser to request a specific file from somewhere on the Internet or to jump to a specific place in your current document.

Types of Media Available on the Web
Media is used to describe the different forms that data can be saved as. In a personal computer the most common formats are text, images, video, and sound. The Web supports all of these file formats making it a rich and robust information system. In a purely text based system you would use words only to describe a picture. In a graphical system the actual image can be viewed. With the right computer hardware and software installed in your system you can listen to audio recordings, play video clips, and view images while surfing the World Wide Web. This is one of the reasons the Web is so popular. The Encyclopedia Britannica Web site not only has all of the text information from A to Z, it also includes actual video clips and sound files. You can be reading about the space shuttle and click on a hypermedia link to see an actual video clip of a space shuttle launch. In addition, other Web sites of interest to your pursuit of information about space exploration are hyperlinked for you making it easy to find other sources that are not part of Encyclopedia Britannica's Web site. As a student at CSU, Chico you may use Encyclopedia Britannica's Web site for free as part of the services provided by the Meriam Library.

Common File Formats for Images, Sound and Video

Format	Typical File Name	Origin of Name
GIF	filename.gif	Graphics Interchange Format (Compuserve)
JPEG	filename.jpg	Joint Photographic Experts Group
AU	filename.au	Audio file (Sun)
WAV	filename.wav	Waveform data (Microsoft)
Quicktime	filename.qt	Quicktime (Apple)
Quicktime	filename.mov	Quicktime [Movie] (Apple)
AVI	filename.avi	Audio / Visual Interleaved data (Microsoft)
MPEG	filename.mpg	Motion Picture Experts Group

The file formats listed above are the more common file formats used on the Internet. Most Web browsers will have built-in viewers for GIF and JPEG. Later releases of Netscape also have built-in sound file capabilities. To enjoy all of these different file formats your system will need to be set up for them to run.

Figure 3-4. Sony's Web Site.

Message instructs user that they will need Quicktime drivers installed to view the video clips.

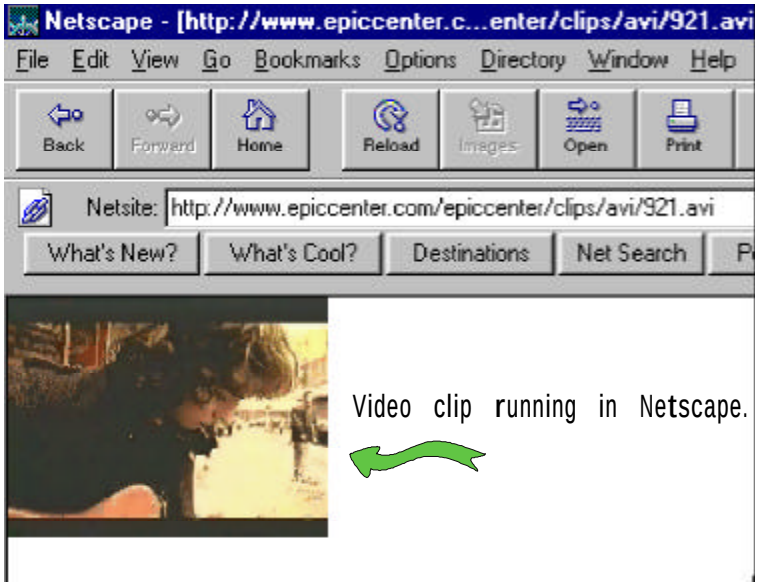
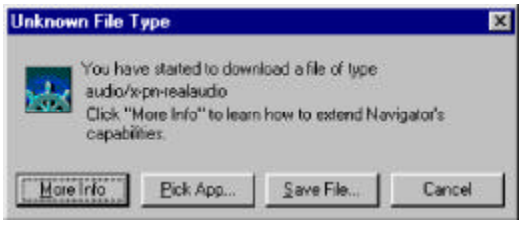


Figure 3-5. Video clip (.avi) playing in Netscape. Music can also be heard.

What Happens if I Don't Have The Right Software Components Installed?

Most browsers will display a message indicating that the file format you are trying to view is not supported. The message box shown below popped up when this user tried to listen to an audio file before properly configuring Netscape.



Example of a Typical Web Surfing Experience

In Figure 3-6 we start at Brittannica's Web site searching for information on the space shuttle. From there we click on a hypertext link that takes us to a Web page on a NASA Web server, from NASA we could click on other hyperlinks that take us elsewhere on the Internet. Each of these different resources may include text files, images, sounds, or video clips. What is available to us at each of the different Web sites is up to the individual Web sites *Webmaster (*the person responsible for maintaining the Web site*)*.

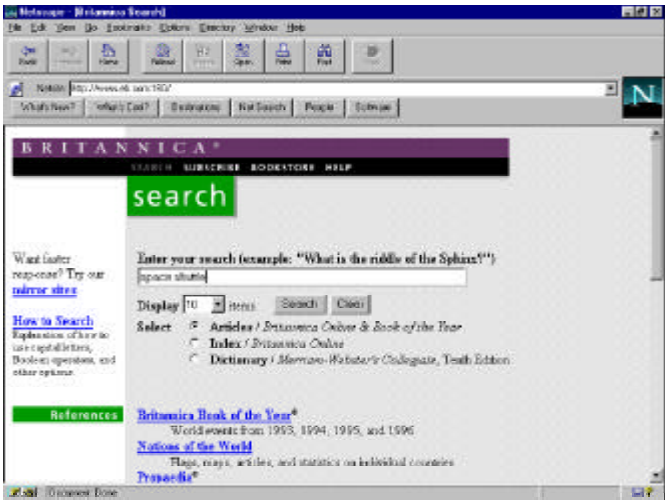
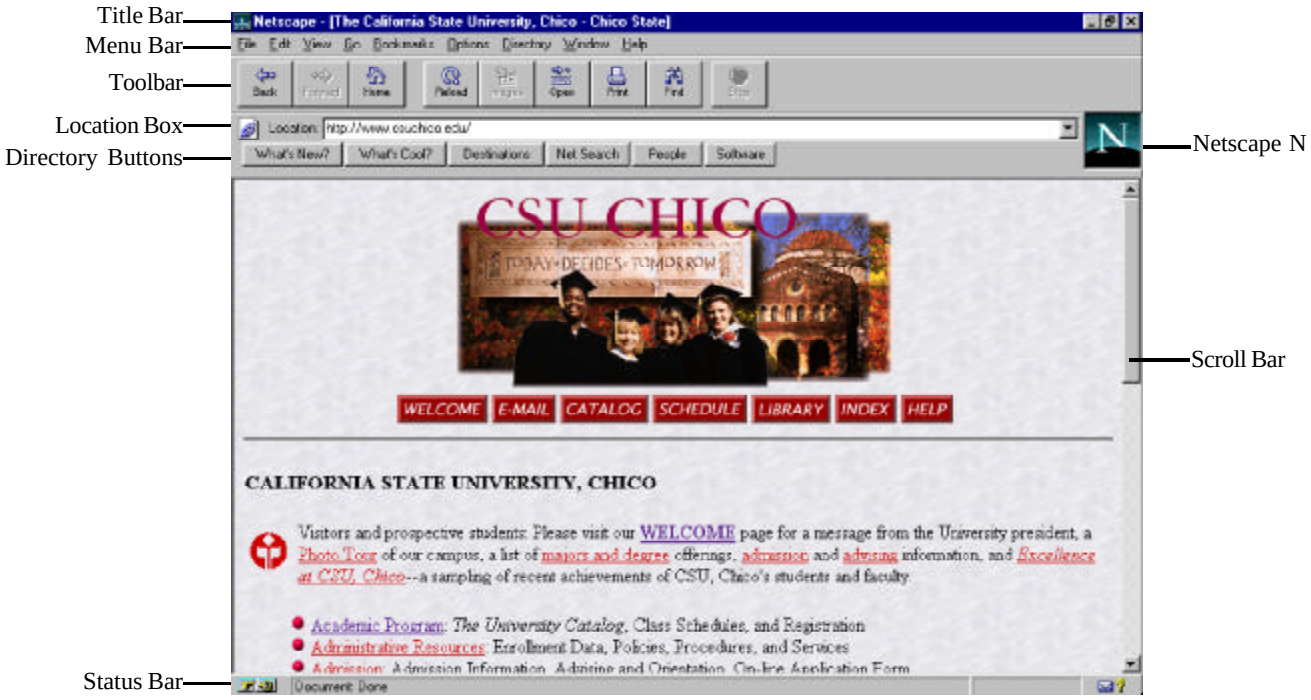


Figure 3-6. Brittannica's Web site.

Figure 3-7. Brittannica article search on "Space Shuttle" results in additional links to related Internet resources.

Figure 3-8. Result of clicking on the related Internet site, Space Shuttle missions, shown in Figure 3-7.

Netscape Navigator Window Elements



Netscape Window Elements Explained

Title Bar

The title bar displays the name of the application window and the title of the currently loaded document.

Menu Bar

The menu bar contains drop-down menus that are activated by clicking on a menu with the left mouse button.