From Internet to Information Superhighway

The Internet: A Network of Networks

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

Accessing the Internet

- The Internet can be accessed in the following ways:
  - Dial-up access on regular phone lines
  - Digital Subscriber Line (DSL)
  - Cable and satellite access
  - LAN access

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

The Internet 1996

The Internet 1997 20Mill
Internet Users

- Increasing Exponentially
- How many online users
- Who are the users
  - Government, Education, Research
  - Commercial companies
  - Organizations
  - Individuals

Internet Protocols

The language at the heart of the Internet is TCP/IP…

Transmission Control Protocol/Internet Protocol
... that allows cross-network communication

Internet Protocols

- TCP breaks messages into packets
  - Each packet has all the information needed to travel from network to network
  - Host systems called Routers determine how to route transmissions

Internet Protocols

- IP is the address for the packets
  - Each Internet host computer has a unique IP Address
  - Each address is comprised of four sets of numbers separated by periods, such as
    123.23.168.22

Internet Access Options

Direct Connection attached to a LAN
Dial-up Connections using a modem and POTS
Broadband Connections
  - DSL (Digital Subscriber line) voice and data
  - Cable modem, satellite

Internet Access Options

Internet Service Providers (ISPs)
  - local ISPs provide connections through local telephone lines
  - UNCA Bulldog
  - National-AOL, Earthlink, ATT, Juno
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

Top level domains (the last part of the
address) include:
- .edu - educational sites
- .com - commercial sites
- .gov - government sites
- .mil - military sites
- .net - network administration sites
- .org - nonprofit organizations

New Top Level Domain Names

- .aero  Air-Transport Industry
- .biz  Business
- .coop  Non-profit cooperatives
- .info  unrestricted use
- .museum  duh...
- .name  individuals
- .pro  accountants, lawyers, physicians...

Top Level Domain Names

Internet Corp. for Assigned Names and Numbers
ICANN
- A non-profit, international association founded in
  1998 and incorporated in the U.S.
- manages Internet addresses, domain names port
  numbers, router protocols, multicast addresses
- provides a list of accredited registrars in
  addition to Network Solutions that accept
  domain registrations.

Domain Names

- Domain Names are pseudonyms for IP addresses
- URL may be HTTP://www.google.com
- IP numerical address is 216.239.37.99
- Domain names can be bought if it is available
- Cost of Domain Names
- Buy/sell domain names if your choice is taken

Fetching & Opening
Web Pages

- Web browsers ask for pages by their
  URLs
- Uniform Resource Locator
  http://www.cs.unca.edu/~massey/csci107/schedule.html
  protocol  Server  path  resource
Internet Growth

- June 1999 there were 8.1 Million registered Domain Names. Currently 2.4 BILLION
- Internet2 (next generation) will reduce the load in the current Internet2 currently about 207 Universities
- Will have a higher bandwidth (maybe 2.5gpa)
- Small number of users
- Current member of NCREN
- NC Research and Education Network

207 Internet 2 Members for 2005

A few Corporate Members

- 3Com
- AT&T
- Cisco Systems
- Intel
- IBM
- Lucent
- Microsoft
- Nortel
- WorldCom
- Compaq
- Ford
- Novell
- Sun Microsystems
- Bell South
- Apple

Main Uses of Internet

E-mail - electronic mail
Telnet - makes remote login possible
FTP - (file transfer protocol) - uploaded and downloaded files from remote computers
WWW - access HTML web pages

What is the World Wide Web?

- WWW is only a part of the Internet
- Created by Tim Berners-Lee in 1989, 20 years after the beginnings of the internet.
- Before WWW in 60's-80's
  - Used for disseminating physics and scientific research
  - Any kind of data could be transferred between nodes
  - Only text could be shown on the monitors
  - Any other kind of data to be visualized had to have the same application on both ends to view the data.

Browsing the Web

Web site Jargon:

- Web pages are made up of text and images
- A Web site is a collection of web pages
- A Home page is the main entry to a Web site
- A Web browser translates the HTML codes to display the web pages.
- Netscape, Internet Explorer, Compuserve
More on Browsing the Web

More Web site Jargon
- URL - (Uniform Resource Locator)
- Links - allow you to locate information without knowing its exact location
- Bookmarks (or Favorites) can be set up to mark your favorite Web locations

Searching the Web

Ways to search the Web
- Search engines
  - produce a list of pages that match a keyword
  - they are built around a database that catalogs Web locations based on content
- Directory or Subject Tree
  - A hierarchical catalog of Web sites
- Natural Language Search Engines
  - Allows users to ask for what they want

Search Engines: Google

Search Engines

Search engines help find information when you type a query using keywords.
Search Engines

Ask questions in a Natural Language Search Engine

Search Engines

Searching on the Web

• robot-assisted databases
  - automated collection of URLs based on keyword analyses
  - spiders, knowbots examine titles, text, and index material for keywords
  - example: Yahoo, Alta Vista

• human-selected databases
  - people examine and classify pages according to chosen categories
  - organizing references by topic
  - example: Google

Searching on the Web

• metasearch engines
  - automated systems that consult a variety of databases for cross-referenced materials
  - example: Dogpile, Ask Jeeves

Portals

Portals offer quick and easy access to a variety of services such as e-mail, chat, maps, news, shopping, etc.

• Examples of consumer portals include
  - Yahoo!, Excite, Lycos, Alta Vista, Netscape

• Specialized portals target specific industries and economic sectors

From Hypertext to Multimedia

Typical Web pages can contain:

• Tables
• Frames
• Forms
• Downloadable audio and video
• Streaming audio and video
• Real-time live audio or video
• 3-D environments

From Hypertext to Multimedia

Plug-Ins are software extensions that add new features. Examples include:

• QuickTime
• Shockwave/Flash
• RealPlayer
• Acrobat
Beyond HTML

- **DHTML**: Dynamic HTML
- **XML**: Will replace HTML plus provide additional features and extensions
- **Java**: A full-featured, cross platform, object-oriented programming language
- **JavaScript**: Simple subset in HTML code
- **Java applets**: Small Java programs that can be automatically downloaded onto your client computer and can run on any platform

How is the Internet Used?

- Information Sharing
- Global Collaboration
- Distance Education
- Software Distribution
- Scientific Research
- Product Development
- Public Services
- Marketing
- Sales
- Customer Support
- Professional Development
- Correspondence
- Entertainment

Company Internet Misuse

- 1/3 time online us non-work related
- $85 Billion/year in lost productivity
- 80% said employees abused internet privileges
- 75% said hacking was from employees
- 45% of downloads from Kazza contained malicious code
- 73% of movie searches were for pornography
- 1/3 detected spyware on their network

Internet Issues

- **Ethical and Political Dilemmas**
  - Filtering software can prevent unwanted and inappropriate content
  - Political and cultural filtering (China, Afghanistan, Iraq)
  - Ethical and Moral filtering
  - Universal access is a problem

Blocking Software

- 1996-Pres. Clinton signed Communications Decency Act
- 1997-US Supreme Court over ruled
  - Said Constitution allowed freedom of expression
- Blocking Software
  - NetNanny, CyberSiter, Cyber Patrol, AOL

Need for Evaluating Content on the Web

- lack of review mechanisms
- anonymity of sources
- lack of safeguards for published materials
- timeliness of published materials on the Web
  - the "shelf life" is shorter
  - the pressure to publish quickly can backfire
- Much is inappropriate in the opinion of many people
<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>• accuracy— (how reliable?) look for and verify sources</td>
</tr>
<tr>
<td>• authority— (how reputable?) what are the authors' qualifications?</td>
</tr>
<tr>
<td>• objectivity— (any biases?) identify motivations or agenda of the publishers</td>
</tr>
<tr>
<td>• currency—(is up-to-date?) when was the page posted? modified?</td>
</tr>
<tr>
<td>• coverage— (depth? breadth?) consider source and purposes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Different Types of Web Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• news (news agencies, newspapers, newsmagazines, etc.)</td>
</tr>
<tr>
<td>• information/reference (dictionaries, encyclopedia, thesauri, etc.)</td>
</tr>
<tr>
<td>• business/marketing (corporate, business, and commercial pages)</td>
</tr>
<tr>
<td>• advocacy (individuals, groups, and organizations attempting to influence public opinion)</td>
</tr>
<tr>
<td>• personal (individuals)</td>
</tr>
</tbody>
</table>