Impact

- Babyboomer after the WWII, generation X late 60s.
- I have the incline to call the last generation: generation Internet due to the impact on their lives.
- A teenager is buying his first CD on-line.
- A grandmother is e-mailing her friends around the world using her television.
- The Internet has a profound impact not only on the new generation, but on all people off all ages where ever they are.

Course Content

- Introduction
- Internet and WWW
- Protocols
- HTML and beyond
- Animation & WWW
- Java Script
- Dynamic Pages
- Perl
- Java Applets
- Databases & WWW
- SGML / XML
- Managing servers
- Search Engines
- Web Mining
- CORBA
- Security Issues
- Selected Topics
- Projects

Objectives of Lecture 2

Internet and WWW

- Get a brief overview of the history of the Internet and the different tools that exist on the Internet;
- Understand the distinction between the Internet and the World-Wide Web.
When Did It All Start?

• In 1945, Vannevar Bush wrote an article “As We May Think” describing a machine, Memex, containing human collective knowledge organized with “trails” linking materials of the same topic.
• The article revolutionized information technology before even the existence of modern computers.

Where is the memex?

• Memex is hypothetical machine.
• The information stored ought to be accessible.
• We haven’t fulfilled the dream yet.
• But much has been achieved in 50 years.

Outline of Lecture 2

• The Memex machine: the dream will come true
• Hypertext: linking new kinds of documents
• The Internet: infallible information exchange
• The World-Wide Web and the start of a new era
• Web-based applications
• Some terminology
Hypertext-Hyperlink-Hypermedia

- Following Memex idea, Ted Nelson developed the Xanadu project which aimed at placing the entire world’s literary corpus on-line.
- Ted Nelson coined the term hypertext in 1965.

A document is not contiguous but is a set of connected parts of documents. Hyperlinks are links that connect sub-documents. Hypermedia is a multimedia hypertext document.

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ARPAnet

- In the heart of the cold war, ARPA (Advanced Research Projects Agency) was created (1957). The purpose was to outrun the Russians in the race for mastering rocket launching.
- In 1969, it was decided to link sensitive computer centres by a network in order to withstand a possible nuclear attack. The idea was to allow centres to communicate even after a centre is destroyed. (Bob Taylor’s idea)
- It connected government labs, major research centres and universities.
- It existed until 1988 and was officially dismantled in 1990.
- Backbone Network speed: 64Kbits/second
- Major achievements:
  - TCP/IP, Domain Name Service, e-mail (SMTP), FTP, Telnet...

NSFnet

- DARPA, the Defense Advanced Research Projects Agency, still exists and the military have their own network but the original ARPAnet was integrated into the current Internet.
- The National Science Foundation in the USA funded the NSFnet which was created in 1985.
- Backbone Network speed: T1 (1.5mb/sec.) to T3 (45mb/sec.)
- It originally connected 5 major universities with supercomputer centres, but rapidly included other universities, research centres and private companies.
- Replaced ARPAnet as the backbone of Internet in 1990
What about the Internet?

- The Internet didn’t originate in the USA alone.
- Other networks existed in North America and Europe and other places in the world.
- BitNet, for instance, connected many research centres and universities.
- Bridges connected these networks to create a larger international network: the Internet.
- Late 90s: Internet2, funded by US universities, a sequel to NSFnet with new protocols.

### Internet Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Speed</th>
<th>USA equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1.5 mb/s</td>
<td>NSFnet</td>
</tr>
<tr>
<td>1997</td>
<td>155 Mb/s</td>
<td>Internet2</td>
</tr>
<tr>
<td>1999</td>
<td>2.5 Gb/s</td>
<td>Internet2, Abilene &amp; vBSN projects</td>
</tr>
</tbody>
</table>

Alberta also has a project for a high speed connection between Edmonton and Calgary.

Explosive Growth

Internet Timeline

- 1970
- 1975
- 1980
- 1985
- 1990
- 1995
- 2000
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Advent of the World-Wide Web

• In 1990, Tim Berners-Lee developed a on-line hypertext-based system to help researchers at CERN in Switzerland share information across a diverse computer network.
• He came up with first versions of HTML (based on SGML) and the HTTP protocol.
• HTTP and HTML catapulted the Internet to new heights.
• The WWW revolutionized the use of the Internet thanks to a multimedia user friendly interface: a web browser.
• Mosaic was developed in NCSA by students at the University of Illinois in 1993, among them Marc Andreessen who created Netscape in 1995.

The WWW is not alone

• There are other tools on the Internet. They could be classified as:
  – Command Line. Ex: FTP (1971)

Other Taxonomy of Internet Tools

• Communication services
  – E-mail, newsgroups (usenet), telnet, internet relay chat (IRC), …
• Information storage and exchange
  – FTP, Gopher, Alex, …
• Information Indexing
  – Archie, Veronica, Wais, UCSTRI, Whois, …
• Interactive Multimedia information delivery
  – WWW and its indexes.
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Client-Server Architecture

The World-Wide Web is an assortment of interconnected computers. In this context, computers provide data to other computers.

Client-Server Architecture

Request

URL

HTTP

Client

Response

HTML page

Server

Request + Data

HTTP

Browser

Response

HTTP server

Javascript and Java

Application

CGI + Servlets (Perl and Java)

DB
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Terms in the Glossary

- **Internet**: group of networks connected together. The Internet refers to the global connection of networks around the world.
- **LAN**: Local Area Network: a group of computers, usually all in the same room or building, connected for the purpose of sharing files, exchanging email, and collaboration.
- **Intranet**: internal company network. Internal use of web capabilities.
- **Extranet**: ability to securely connecting the intranet with defined external networks.
- **CGI**: Common Gateway Interface: means of developing application for the web on the server side.
- **Middleware**: a tier usually between a web application or a web server and a database or another application layer.