**LESSON 1: The History of the Internet**

**The History of the Internet**

Most people think of the Internet as being a fairly new phenomenon.  However, on December 6, 1967, the United States Defense Department issued a $19,800 contract for the purpose of studying the “design and specification of a computer network.” By 1969, the Department of Defense (DOD) created a network called the ARPANET (Advanced Research Projects Agency Network). The ARPANET provided DOD research agencies with access to hardware and software the average agencies could not afford. An additional goal was to create a network that could still send and receive data if a part of it had been disabled.  There were fears of a nuclear war and the United States wanted to have the ability to communicate in cyberspace if most of the U.S. military stations were destroyed by bombs.

During the 1970s, other networks, having nothing to do with ARPANET, came into being. These included BITNET, USENET, and the UUCP. These major networks were a cross section of public (funded by the U.S. government) and private organizations. The 1980s saw the creation of the NSFNET, the National Science Foundation Network. The NSFNET linked its supercomputers to research agencies and universities using a state-of-the-art system that permitted any computer on the system to make contact with any other computer on the system.

By 1990, some of the pioneering networks had shut down, and all of the formerly independent remaining networks jumped on the NSFNET. They were joined by additional networks that wanted to be connected to the quickly growing web of networking that is now the Internet. The diagram below illustrates a typical small network. A collection of these networks results in the Internet.  A collection of computers in a small area that communicate with each other is know as a LAN (Local Area Network).  A collection of these LANs make up a WAN (Wide Area Network).  This is the backbone of the Internet.



Once the sole domain of government institutions, the military, research agencies, and universities, the Internet now is available to whoever wants to use it.

Here is a brief timeline of major events for the Internet:

**1969** ARPANET is established

**1972** First email is sent

**1976** Apple Computer is founded by Steve Jobs and Steve Wozniak.

**1982** Internet Protocol (IP) becomes the standard for network communication and the Internet is born.

**1988** Internet Chat is created

**1989** The World Wide Web project is proposed at CERN

**1992** Internet hosts (capable of websites) reach 1 million in number.

**1993** Mosaic, the first browser is released.

Growth rate of the Web reaches 350,000% per year.

**1994** Yahoo! is created.

**1995** Netscape, RealAudio and Java are created.

**1998** Google is born and is worth $2 billion by 2004.

**2008**  There are over 1.5 billion Internet users and 1 billion email accounts.

How many are there today?

**What is the Internet?**

The Internet is an interlinking of thousands of different sizes and types of networks from all over the globe. Even though “Internet” is a singular noun, it implies a plural: the Internet is not one network; it is a coordinated multitude of networks.

*How are data and messages sent and received?*

The Internet is a packet-switching network. That is, the software that makes the Internet function is made up of two components: the TCP and the IP. TCP stands for Transmission Control Protocol. TCP breaks data that is to be transmitted into packets, or units of information. The IP, or Internet Protocol, is responsible for routing, or moving, the packets.  Think of a family of two parents and four children. The father (the server) can give information to his son by talking to him using several long sentences (the packets).   TCP would be the process of talking and the IP would be the process of receiving the instructions in a series of sentences and understanding it.  If there are for example, instructions to be completed in four steps (four packets), but step two is spoken in only a whisper or very slowly, or even cut off, the son (client), will not get the entire information. This will lead to incomplete instructions and cause a malfunction in communication. Sometimes, browsers like Internet Explorer and Firefox, or operating systems like Linux and Windows, have a difficult time understanding information among themselves. This would be the equivalent of the father speaking Japanese to his English-speaking son. The language may be correct but the communication is lost in translation, or lack of it!

*What does "being on the Internet" mean?*

Your most likely direct link to the Internet will be at a networked PC at school, work, or a computer that uses a modem at home. Internet Service Providers (ISPs) are commercial organizations that link directly to the Internet. In Manitoba, MTS and Shaw are examples of ISPs. These companies use a network modem using phone lines to connect to the provider. The terminal server uses one of two protocols: SLIP (Serial Line Internet Protocol) or PPP (Point-to-Point Protocol). PPP and SLIP are methods of connecting a computer to the Internet. There is no need to go into technological detail at this point about this but a protocol is a standard of how something is understood. For example, it will be protocol for the teacher to speak to the class in English if it is an English class. Your PC becomes a peer computer on the Internet, with its own unique Internet address. Speeds have increased dramatically in only the last decade. High-speed Internet refers to having the Internet “on” all the time and at high speeds. Canada has one of the highest levels of high-speed Internet in the world, usually placing second to Korea.  Many people in Canada today have high-speed wireless Internet at home. This results in a very fast connection along with the flexibility of using a computer or laptop without the issue of cables. This is accomplished through the use of a wireless modem as shown below.



**Addressing on the Internet**

Some system must exist to keep track of the millions of users, their addresses, and the countless message and file transferring that occurs 24 hours each day. In fact, there are a couple of systems that do this.

The first is the Internet Protocol addressing system. The IP addressing system uses two forms of addressing--letters and numbers. The letter and number address point to a single computer, called a host.

The letter address is a series of words or word abbreviations separated by periods, called dots. For example, *canada.gc.ca* is the IP address for the Canadian government.

Note the last two letters--ca, at the far right part of this IP address. These letters tell what kind of organization or country owns that IP address. IP addressing schemes feature a handful of organizational types. The major ones are:

* edu: educational, university, college
* mil: military
* gov: government
* net: network
* com: commercial
* org: organization

Country codes use two letters: ca for Canada, us for the USA, and so forth. Some of the larger Internet countries include:

* au: Australia
* de: Germany
* jp: Japan
* uk: United Kingdom
* fr: France
* mb.ca:  Manitoba, Canada

This lettering system is called the domain name system (DNS).

Another website, for example, is the University of Michigan Weather Underground and its numeric IP address is 141.212.196.197. This combination of four numbers is called a dotted quad. The dotted quad address is actually more specific than the lettered IP address. However, humans can remember sequences of words or abbreviations more easily than sequences of numbers, so the lettered IP address system is used more extensively than the dotted quad system.

Network Solutions, Inc. maintains the master list of all IP addresses. Occasionally, the dotted quad address will change and a new dotted quad sequence will be associated with the lettered address. However, these changes are rarely publicized, so always use the lettered sequence.

Note the use of lower case in addressing. While certainly unique-looking, lower case addressing is not necessary. Some systems use upper case as their default mode of lettering.

**The World Wide Web**

*“During my service in the United States Congress, I took the initiative in creating the Internet.”*

-Al Gore, former U.S. Vice-President and climate change guru, describing his 1986 legislation to interconnect five supercomputer centers (17 years after the Internet/ARPANET began)

*“The Internet is a great way to get on the Net.”*

-Bob Dole, former U.S. Presidential candidate

Contrary to these statements, Al Gore did not invent the Internet! The Internet is often synonymously called the “Net” or the “Web.” Although they have the same meaning, the Net is what people usually refer to as the WWW or the World Wide Web.

The WWW *is* the Internet for most people. It is very graphical and interactive. The WWW uses a powerful query technique called hypertext. Hypertext documents contain highlighted key words called a hyperlink. When you select a hyperlink, the hypertext system moves you to another document or media file that hopefully describes that particular word. In that secondary document, there will be more hypertext words. Selecting one of those will take you to a third document, and so on. Sometimes the result is unexpected!

The most popular part of the Internet is the World Wide Web, which is also a network of interconnected computers designed to transport both text and graphics across the Net.

The Web was developed at the European Particle Physics Laboratory at CERN, Switzerland in 1990, by scientists searching for a way to transport multimedia documents across the Net.

The first webpage was created on November 13th,1990. In 1993, Lycos, a university project, created a search engine so that pages could be organized. There were 800,000 pages at the time. A decade later, Google, another search engine had eight billion pages. A year after that, Yahoo! announced that it possessed 20 billion documents and images on its search engine and index.

The Web's popularity stems from its ability to displaytext, graphics, and media on the same page, as well as allowing for sound and video objects incorporated within text. A major advantage of the Web is that it supports other forms of information that have already existed on the Net for some time (e.g. Gopher, FTP, Archie, etc.).

To access the Web, you need a client software program called a browser (e.g.  Internet Explorer, Firefox, Lynx, Opera ). The browser client makes contact with Web servers, and retrieves the document (called a “page”) written in a language called HTML (Hyper Text Markup Language). The HTML file is a text file that contains codes describing document structure, hyperlinks, and pointers to other media. The browser interprets the codes and then displays the Web page.

You may be familiar with several browsers but the one that is mostly likely to be used in your school (and for this course) will be Internet Explorer. Most screenshots will be taken with IE and this browser will work best with Blackboard. Can you see how different browsers could affect the layout or delivery for this course?

Locations for information or data on the Web are called Uniform Resource Locators (URL).  An URL contains information that tells a browser how to connect to a certain site. For example:

[http://www.google.ca](http://www.google.ca/)



An URL will most often take you to a home page. A home page is the Web page that loads when you start your browser. Generally though, it is the entry point or page of someone's website. You can also access other Internet services through a browser and the WWW such as FTP (File Transfer Protocol).