



## Random Fact 2.2

### The Evolution of the Internet

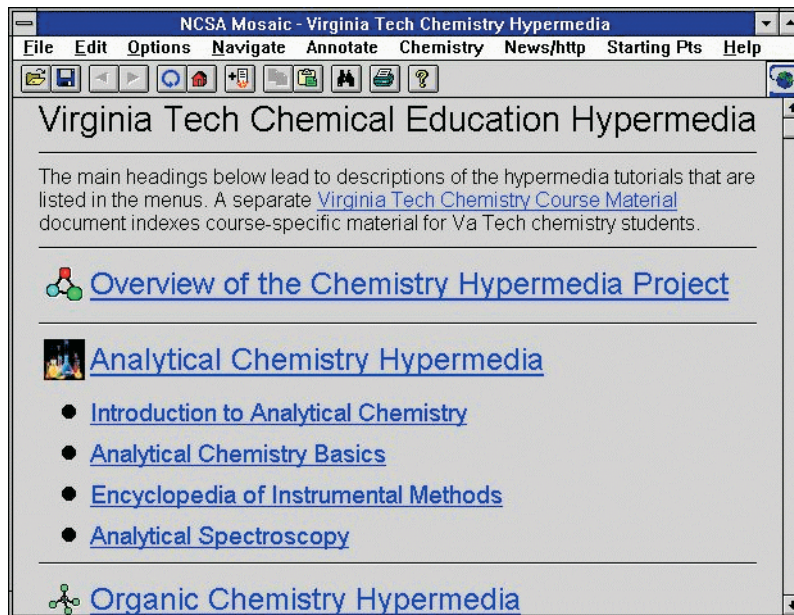
In 1962, J.C.R. Licklider was head of the first computer research program at DARPA, the Defense Advanced Research Projects Agency. He wrote a series of papers describing a “galactic network” through which computer users could access data and programs from other sites. This was well before computer networks were invented. By 1969, four computers—three in California and one in Utah—were connected to the ARPANET, the precursor of the Internet. The network grew quickly, linking computers at many universities and research organizations. It was originally thought that most network users wanted to run programs on remote computers. Using remote execution, a researcher at one institution would be able to access an underutilized computer at a different site. It quickly became apparent that remote execution was not what the network was actually used for. Instead, the “killer application” was electronic mail: the transfer of messages between computer users at different locations.

In 1972, Bob Kahn proposed to extend ARPANET into the *Internet*: a collection of interoperable networks. All networks on the Internet share common *protocols* for data transmission. Kahn and Vinton Cerf developed a protocol, now called TCP/IP (Transmission Control Protocol/Internet Protocol). On January 1, 1983, all hosts on the Internet simultaneously switched to the TCP/IP protocol (which is used to this day).

Over time, researchers, computer scientists, and hobbyists published increasing amounts of information on the Internet. For example, the GNU (GNU's Not UNIX) project is producing a free set of high-quality operating system utilities and program development tools ([www.gnu.org](http://www.gnu.org)). Project Gutenberg makes available the text of important classical books, whose copyright has expired, in computer-readable form ([www.gutenberg.org](http://www.gutenberg.org)). In 1989, Tim Berners-Lee started work on hyperlinked documents, allowing users to browse by following

links to related documents. This infrastructure is now known as the World Wide Web (WWW).

The first interfaces to retrieve this information were, by today's standards, unbelievably clumsy and hard to use. In March 1993, WWW traffic was 0.1% of all Internet traffic. All that changed when Marc Andreessen, then a graduate student working for NCSA (the National Center for Supercomputing Applications), released Mosaic. Mosaic displayed web pages in graphical form, using images, fonts, and colors (see the figure). Andreessen went on to fame and fortune at Netscape, and Microsoft licensed the Mosaic code to create Internet Explorer. By 1996, WWW traffic accounted for more than half of the data transported on the Internet.



The NCSA Mosaic Browser