Chapter 1.3
A History of Computer Networking Technology

Lawrence Harold Hardy
Denver Public Schools, USA

INTRODUCTION

The computer has influenced the very fabric of modern society. As a stand-alone machine, it has proven itself a practical and highly efficient tool for education, commerce, science, and medicine. When attached to a network—the Internet for example—it becomes the nexus of opportunity, transforming our lives in ways that are both problematic and astonishing. Computer networks are the source for vast amounts of knowledge, which can predict the weather, identify organ donors and recipients, or analyze the complexity of the human genome (Shindler, 2002).

The linking of ideas across an information highway satisfies a primordial hunger humans have to belong and to communicate. Early civilizations, to satisfy this desire, created information highways of carrier pigeons (Palmer, 2006). The history of computer networking begins in the 19th century with the invention of the telegraph, the telephone, and the radiotelegraph.

The first communications information highway satisfies a primordial hunger humans have to belong and to communicate. Early civilizations, to satisfy this desire, created information highways of carrier pigeons (Palmer, 2006). The history of computer networking begins in the 19th century with the invention of the telegraph, the telephone, and the radiotelegraph.

The first commercial telegraph was patented in Great Britain by Charles Wheatstone and William Cooke in 1837 (The Institution of Engineering and Technology, 2007). The Cooke-Wheatstone Telegraph required six wires and five magnetic needles. Messages were created when combinations of the needles were deflected left or right to indicate letters (Derfler & Freed, 2002).

Almost simultaneous to the Cooke-Wheatstone Telegraph was the Samuel F. B. Morse Telegraph in the United States in 1837 (Calvert, 2004). In comparison, the Morse Telegraph was decidedly different from its European counterpart. First, it was much simpler than the Cooke-Wheatstone Telegraph: to transmit messages, it used one wire instead of six. Second, it used a code and a sounder of the telegraph. The telegraph itself is no more than an electromagnet connected to a battery, connected to a switch, connected to wire (Derfler & Freed, 2002). The telegraph operates very straightforwardly. To send a message (electric current), the telegrapher rapidly opens and closes the telegraph switch. The receiving telegraph uses the electric current to create a magnetic field, which causes an observable mechanical event (Calvert, 2004).

The first commercial telegraph was patented in Great Britain by Charles Wheatstone and William Cooke in 1837 (The Institution of Engineering and Technology, 2007). The Cooke-Wheatstone Telegraph required six wires and five magnetic needles. Messages were created when combinations of the needles were deflected left or right to indicate letters (Derfler & Freed, 2002).

Almost simultaneous to the Cooke-Wheatstone Telegraph was the Samuel F. B. Morse Telegraph in the United States in 1837 (Calvert, 2004). In comparison, the Morse Telegraph was decidedly different from its European counterpart. First, it was much simpler than the Cooke-Wheatstone Telegraph: to transmit messages, it used one wire instead of six. Second, it used a code and a sounder

DOI: 10.4018/978-1-60566-014-1.ch082
to send and receive messages instead of deflected needles (Derfler & Freed, 2002). The simplicity of the Morse Telegraph made it the worldwide standard.

The next major change in telegraphy occurred because of the efforts of French inventor Emile Baudot. Baudot’s first innovation replaced the telegrapher’s key with a typewriter-like keyboard. His second innovation replaced the dots and dashes of Morse code with a five-unit or five-bit code—similar to American standard code for information interchange (ASCII) or extended binary coded decimal interchange code (EBCDIC)—he developed. Unlike Morse code, which relied upon a series of dots and dashes, each letter in the Baudot code contained a combination of five electrical pulses. Eventually, all major telegraph companies converted to Baudot code, which eliminated the need for a skilled Morse code telegrapher (Derfler & Freed, 2002). Finally, Baudot, in 1894, invented a distributor which allowed his printing telegraph to multiplex its signals; as many as eight machines could send simultaneous messages over one telegraph circuit (Britannica Concise Encyclopedia, 2006). The Baudot printing telegraph paved the way for the Teletype and Telex (Derfler & Freed, 2002).

The second forerunner of modern computer networking was the telephone. It was a significant advancement over the telegraph for it personalized telecommunications, bringing the voices and emotions of the sender to the receiver. Unlike its predecessor the telegraph, telephone networks created virtual circuit to connect telephones to one another (Shindler, 2002).

Legend credits Alexander Graham Bell as the inventor of the telephone in 1876. He was not. Bell was the first to patent the telephone. Historians credit Italian-American scientist Antonio Meucci as the inventor of the telephone. Meucci began working on his design for a talking telegraph in 1849 and filed a caveat for his design in 1871 but was unable to finance commercial development. In 2002, the United States House of Representatives passed a resolution recognizing his accomplishment to telecommunications (Library of Congress, 2007).

The telephone was a serendipitous discovery; it came about because of Bell’s failure at creating a harmonic telegraph (Library of Congress, 2000). Convention defines a telephone as an electronic device, which transforms sound into electronic signals for transmission then electronically converts the signals into sound for receiving.

Any recapping of the telegraph and telephone histories would be incomplete without recounting the contributions of Thomas Edison. Edison made major contributions to each science. For the telegraph Edison was able to, in 1873, create a printing telegraph that printed messages in plain text instead Morse code. Edison, in 1874, invented a multiplexing telegraph, which permitted simultaneous messages over one telegraphic circuit.

His improvement to the telephone proved just as important. First, Edison extended the distance to an almost limitless Bell transmitted and received voice signal (Microsoft Corporation, 2007). Second, Edison invented a carbon-based transmitter and receiver to capture voices electronically (Derfler & Freed, 2002). Carbon-based telephones are the staple of modern telephones (PBS, 2000).

The seminal foundation for wireless computer networks is the radiotelegraph, invented by Guglielmo Marconi of Italy in 1895. When the Italian government showed little interest in radio telegraphy, Marconi took his invention to Great Britain. In Great Britain, Marconi demonstrated the effectiveness of the radiotelegraph by sending messages first across the English Channel. Then in 1901, he successfully sent a message 2,100 miles across the Atlantic Ocean from Cornwall to Newfoundland. In 1932, Marconi demonstrated the world’s first cellular telephone at Vatican City (NobelPrize.Org, 2007).
5 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the product's webpage:

www.igi-global.com/chapter/history-computer-networking-technology/49728?camid=4v1


www.igi-global.com/e-resources/library-recommendation/?id=1

Related Content

Middleware Technologies for Ubiquitous Computing
Noha Ibrahim, Frédéric Le Mouël and Stéphane Frénot (2011). Next Generation Mobile Networks and Ubiquitous Computing (pp. 122-131).

www.igi-global.com/chapter/middleware-technologies-ubiquitous-computing/45265?camid=4v1a

Unpredicted Trajectories of an Automated Guided Vehicle with Chaos

www.igi-global.com/chapter/unpredicted-trajectories-automated-guided-vehicle/62819?camid=4v1a

Next-Generation Strategic Business Model for the U.S. Internet Service Providers: Rate-Based Internet Subscription

www.igi-global.com/chapter/next-generation-strategic-business-model/49839?camid=4v1a

The Vertical-Cavity Surface-Emitting Laser: A Key Component in Future Optical Access Networks
Angélique Rissons and Jean-Claude Mollier (2010). Optical Access Networks and Advanced Photonics: Technologies and Deployment Strategies (pp. 184-211).

www.igi-global.com/chapter/vertical-cavity-surface-emitteing-laser/36331?camid=4v1a