KEEPING CURRENT

ELECTRICAL/ELECTRONIC ENGINEERING TECHNOLOGY REPORT

by Hugh Long, C.Tech

THE INFORMATION SUPERHIGHWAY SPEEDS UP AND BRANCHES OUT

THE WORLD WIDE WEB IS WITHOUT A DOUBT the most complex and fascinating network humankind has ever devised. Many of us have become dependent on the Web as a tool for work or research, and as a means of entertainment. Like many other services we rely on, it has become ubiquitous in our daily lives and is yet another complex entity that we really know little about. What exactly is the Web? Who built it? Where is it going to take us?

What is the World Wide Web?

The term Web is often used interchangeably with the Internet. It is nothing more than a collection of individual networks. The networks that form the Internet are scattered all over the face of the earth and are interconnected through high speed and low speed links. The Internet's nickname, the "information superhighway" (coined by U.S. Vice-President Al Gore), is appropriate. The channels that connect research and educational institutions are like high-speed freeways, while the connections that most of us have at home could be likened to minor dirt roads, perhaps roughly paved.

A Web-wise colleague of mine, Tom Stein, points out that although we are connected through this information superhighway, we never actually go anywhere on it! When we follow a link to another page, we are only sending a request to another server which responds by sending back a carefully prepared body of text. So all this Web surfing never really takes us anywhere!

Where did it originate?

The Internet originated as a network designed by the Advanced Research Projects Agency of the U.S. Department of Defense. In 1962, Paul Baran was commissioned by the U.S. Air Force to do a study on how it could maintain its command and control over its missiles and bombers in the event of a nuclear attack. This was to be a military research network that could survive a nuclear strike, decentralized so that if a U.S. city was attacked, the military would still have control of nuclear arms for a counterstrike. This was the premise behind the creation of the first packet switched network, ARPANET.

In 1968, more than six years after Paul Baran's study was commissioned, ARPANET became reality. Originally linking only four universities, the network's top speed was a tedious 50 kilo bits per second. Today's World Wide Web backbone is almost 3,000 times faster, reaching a top speed of 145 mega bits per second.

Originally linking only four universities, the network's top speed was a tedious 50 kilo bits per second.

Later, applications such as e-mail emerged, development began on protocols known as transmission control protocol/Internet protocol, and the term Internet was first used in a paper on transmission control protocol by Vint Cerf and Bob Kahn.

The fundamental tenet of this network was to enable communication. It did that through USENET, the original topical message centre where scientists and researchers would post questions and ideas for comment and discussion among colleagues around the globe. The USENET is now more popular than ever with thousands of discussion areas from apples to zinc.

Finally the great day came in 1992 when CERN, the European Laboratory for Particle Physics, released the World Wide Web. It had a backbone of 44.736 Mbps and 1 million hosts connected. The first graphical interface, Mosaic X, the original web browser emerged the year after the release of the Web. Today's Web has a host count topping 29 million.

Where is the Web taking us?

No longer is the Web used solely for discussing scientific research. On the contrary, today you are more apt to read commercials online, listen to live radio, shop or plan your vacation.

Today's World Wide Web has created a global village. Never have humans felt so connected to one another, yet in some ways, we are farther apart.

While it has enabled greater communication, some would argue that this remote connectivity has compromised our ability to deal with one another face to face. That is ultimately a debate that time will have to settle.

Appropriately, all research for this column was done online. Next time I will explore trends such as Internet2 and very high speed backbone network service (vBNS).

Hugh Long is a senior consultant at Cadence Design Systems, Inc. He can be reached at 613-726-8423 or hlong@cadence.com. Cadence is a supplier of software tools and professional services used to accelerate and manage the design of semiconductors, computer systems, networking and telecommunications equipment.