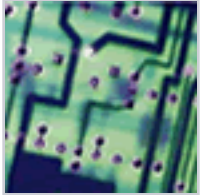


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Region Focus

Region Focus: Winter 2000



The Center of Cyberspace ... and More

By Charles Gerena

Forty years ago, Uncle Sam was the biggest consumer of technology. A few large manufacturers employed some form of automation to boost productivity, but most businesses viewed computers as cumbersome and expensive. Now computers with Internet access provide a major network linking citizens with government, business, and education. Virginia played a major role in the development of the Internet and is home to three of the largest Internet-access providers -- America Online Inc., PSINet Inc., and UUNET Technologies Inc. Pioneering Web address registrar, Network Solutions Inc., and Intel Corp. also call it home. Today, the creative and entrepreneurial wave reaches throughout the Commonwealth.

During a conversation about 19th century cattle drives, Vinton Cerf decided to find out more about the subject. Rather than flip open the Encyclopaedia Britannica, his first thought was to flip on a computer.

"Often in social dialogue I find myself turning to the Internet for information," says Cerf, senior vice president for Internet architecture and technology at MCI WorldCom's Reston, Va., office. "I also use the Net to track my personal investments, carry out banking tasks, and communicate with family members. It's hard to imagine what life would be like without it."

Cerf's online connection dates to the early 1970s. As a computer scientist at the Advanced Research Projects Agency in Arlington, Va., he helped link three separate networks used by federal government researchers. Gradually other networks worldwide connected to each other, creating the massive information reservoir known as the Internet.

Thirty years later, Cerf and other Internet groundbreakers still work in Arlington, Reston, Dulles, Fairfax, Vienna, and other northern Virginia cities. Network Solutions Inc., the pioneering Web address registrar, continues to assign ".com" addresses from its Herndon headquarters. Internet backbones pepper the landscape, routing half of the world's e-mails to grandparents, downloads of Martha Stewart recipes, and other bytes traveling the information superhighway.

This concentration of expertise and infrastructure have brought the nation's three largest Internet access providers — America Online Inc. (AOL), UUNET Technologies Inc., PSINet Inc. — and other Internet businesses to northern Virginia. "The invention of the Internet and the technologies that came out of it created a center of mass," says Howard Frank, a technology expert and dean of the Robert H. Smith School of Business at the University of Maryland.

Today, northern Virginia has one of the largest concentrations of information technology, systems integration, and

telecommunications firms in the country. Roger Stough, professor of public policy and associate director of The Institute of Public Policy at George Mason University (GMU), led a 1997 survey of Virginia technology companies. The survey showed that 2,100 high-tech companies are located less than 10 miles away from Washington, D.C. Another 1,300 are located throughout the state, according to the survey. Together, these companies employ more than 300,000 people.

Why the Old Dominion?

With high-tech powerhouses like Intel Corp., Oracle Corp., and AOL, Virginia is at the center of cyberspace. (At presstime, AOL was negotiating a merger with Time Warner Inc., the world's largest media company.)

"Virginia is quickly attaining the kind of critical mass that will increasingly attract industry suppliers, competitors, and consultants to the state," explains economist Mark Bock of Dismal Sciences Inc., a West Chester, Pa.,-based provider of economic data and analysis. "If the demand for computer components stays at high levels over the next 10 years, this agglomeration could propel Virginia into the top tier of states in terms of job growth early in the next century."

Bock points out several factors that are building this critical mass. State and local governments aggressively recruit industry, offering a variety of financial incentives and business assistance programs. Virginia is a relatively cheap place to do business. "The state's tax burden [of about one percent] is one of the lowest in the nation," says Bock. "Energy costs are also low and will get lower as the state deregulates the electric utility industry."

And, adds Bock, the state benefits from its proximity to the nation's capital. "In addition to providing funding for technology research, the federal government is an important customer for high-tech industry."

Selling to Uncle Sam

Forty years ago, Uncle Sam was the biggest consumer of technology. A few large manufacturers employed some form of automation to boost productivity, but most businesses viewed computers as cumbersome and expensive.

The federal government — primarily the Department of Defense — considered the benefits of automation worth the investment of time and effort. "Beltway bandits" like CACI International Inc., Computer Sciences Corp., and BDM International (acquired by TRW Inc. in 1997) flocked to northern Virginia to fill the demand for technical support.

Even small firms captured federal contracts under the U.S. Small Business Administration's 8(a) Business Development Program, which assists disadvantaged companies. "Contracts were often awarded to a company with nothing more than two smart guys, a typewriter, and access to a computer center," says Jack London, chairman and CEO of Arlington-based CACI. "Many companies came into northern Virginia and expanded."

Some came for better access to regulators. MCI Communications (now MCI WorldCom Corp.) moved to Washington, D.C., in 1968 primarily to be near the Federal Communications Commission. AT&T, Sprint, and Bell Atlantic followed MCI's lead.

But a dependence on government business proved to be a double-edged sword, says Stough. "It was an advantage because it created a huge economic base that offered some protection during recessions," he notes. "However, it was also a problem because the region didn't have a very strong commercial sector."

That changed during the desktop computing revolution of the '70s and '80s. The power of information technology (IT) was placed in the hands of federal contractors. IT became a business in its own right says

Philip Odeen, former president of BDM, and executive vice president and general manager of TRW Systems & Information Technology Group in Fairfax.

"Companies went from being defense-oriented to having a broader customer base as non-defense agencies like the IRS needed information technology," recalls Odeen. "They also diversified into state and local government markets, and took on some international and commercial business to a lesser extent."

When the National Science Foundation in Arlington privatized the operation of the Internet in 1995, it created an

even bigger opportunity for technology executives in northern Virginia. They leveraged the region's early involvement in the Internet and its wealth of IT, systems integration, and telecommunications talent to bring the world of cyberspace to every businessperson's desktop.

"When the Internet went public, that changed everything," says Donald Upson, Virginia's secretary of technology and a 20-year IT industry veteran. "Suddenly, northern Virginia found itself home to one of the highest concentrations of workers that were needed for this explosive new medium. Three years later, we realized that we were an industry sector and people started paying attention to us."

Making a Connection

Using the Internet-related businesses in the north as a foundation, Gov. Jim Gilmore has worked to connect all parts of the state to the technology world during his first two years in office.

In May 1998, Gilmore created the Office of the Secretary of Technology — the first state office of its kind — and merged its economic development efforts with Virginia's Center for Innovative Technology. He also recruited 36 government officials and businesspeople, including AOL's Stephen Case and MCI WorldCom's John Sidgmore, to study high-tech issues as part of his Commission on Information Technology.

In December 1998, the commission drafted the country's first comprehensive blueprint for Internet-related state legislation. The blueprint evolved into seven laws that deal with issues like junk e-mail and criminal use of encryption technology. Three months later, the General Assembly passed the group of laws, collectively known as the Virginia Internet Policy Act.

The state government isn't alone in spreading the growth of technology. Organizations like the Hampton Roads Technology Incubator promote technology transfer from federal research facilities like NASA Langley Research Center in Hampton. These facilities spend \$1.7 billion annually in Virginia despite declining budgets.

Academic institutions also play a major role. An engineering school built in 1998 by Virginia Commonwealth University in Richmond provides a skilled work force for the area's fledgling semiconductor sector. The genetic engineering program at Virginia Polytechnic Institute and State University in Blacksburg attracted two of the world's top producers of pharmaceuticals in animals' milk — Pharming Healthcare Inc. and PPL Therapeutics — to sleepy southwest Virginia. Process engineering and biotechnology companies spin off from the University of Virginia in Charlottesville, a city where innovation dates back to the intellectual pursuits of the university's founder, Thomas Jefferson.

The Next Level

David Martin believes collaboration is the key to future growth in Virginia's technology industry. Entrepreneurs should share resources and ideas, not compete for limited capital, says the president and CEO of M-CAM Inc. The Charlottesville firm developed an automated credit scoring system that enables start-up companies to use their intellectual property as collateral.

Start-ups still have difficulties finding money in Virginia. The state lured about \$96 million in venture capital from private investors during the second quarter of 1999. Another \$611.5 million was raised during the first nine months of 1999 through initial public offerings on the stock market. However, northern Virginia's established companies were often the benefactors.

"As more companies go public and create paper millionaires, these people will be a source of early-stage capital," suggests Maxine Lunn, managing director of technology company assistance at Virginia's Center for Innovative Technology. A state tax credit for investments in high-tech firms, new investor networks forming throughout Virginia, and new local venture funds should create additional capital sources.

Skilled labor is also in limited supply. Efforts to retool Virginia's work force for the technology industry may not meet the growth demands on companies like AeroTech Research (USA) Inc. "If you are a small company, when you need somebody you need them now," says Paul Robinson, president of AeroTech, a computer simulation and modeling firm in Hampton.

A September 1999 report by the Governor's Commission on Information Technology found that 75 percent of high-tech job openings have experience requirements that are unmet. Gov. Gilmore's response is a state program to help firms hire and train 5,000 high school and college interns. Gilmore designated \$3.8 million for the three-year program in his proposed 2000-2002 budget.

"We can be a leader in the information age, but we have to develop the technology talents of all Virginians," says Gilmore. "Being left behind now will mean being left out of the greatest promise of equality and opportunity we have ever seen."

Another way that Virginia could be left behind is if the tax and regulatory structures of the state and its localities aren't updated for the information age. This is according to the Commission on Information Technology's final report released in December 1999. The report recommends reducing regulatory burdens on telecommunications firms, reducing or eliminating taxes on telecom services, and encouraging growth in the technology industry with tax incentives. By 2002, Virginia's high-tech companies could employ 390,000 workers earning \$24.6 billion. This compares to 352,000 people earning \$16.7 billion in 1997.

"Virginia is one of the great emerging technology regions of the world," says the University of Maryland's Frank. "It's not going to be Silicon Valley, but it is focused on where the economy is going — the convergence of information technology and new ways of doing business."



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