

Developments to

EDITED BY ADAM ASTON

CONNECTIONS THAT LEAVE BROADBAND IN THE DUST

BY CHANGING THE RULES, OR "protocols," that govern data transmission over the Internet, scientists have more than tripled the highest speed at which large blocks of information can be transported. In a recent test, the new protocol sustained transfer rates of 8,609 megabits per second of uncompressed data—about 6,000 times faster than a typical home broadband link.

Researchers who created the protocol at California Institute of Technology have dubbed it FAST transmission control protocol. (FAST is an acronym, but you don't want to know.) It uses complex algorithms to make more efficient use of existing bandwidth. Over a given Internet link, the current protocol tops out at 25% of maximum throughput. FAST is 95% efficient, says Steven Low, a computer scientist who leads the Caltech project. And it offers the same boost over any connection, be it a home DSL line or a T3 at the office.

FAST is being developed to help distribute scientific data and enhance "GRID" computing, in which big problems are parceled out to many computers running concurrently. The protocol is now being tested at several high-energy physics labs. These are home to the world's largest databases, measured in petabytes, or millions of gigabytes. In the latest tests, 21,000 gigabytes of data were shipped over shared networks in just six hours—a third the time it takes without FAST.

Hollywood could benefit next. Because FAST excels at sending big files over large distances, it's a natural for helping Tinseltown distribute its vast trove, says Low. Using FAST, it would take under five seconds to download a DVD-quality movie. ■



WILL POPEYE TRADE SPINACH FOR SPUDS?

WE LOVE OUR SPUDS. THE AVERAGE AMERICAN EATS MORE than 140 pounds of potatoes every year, making it by far the nation's most popular vegetable. Consequently, the U.S. Agricultural Research Service (ARS) is trying to boost the potato's calcium content, for the health of the consumer—and the potato.

It seems that potatoes are naturally deficient in calcium because they grow underground, and most of the calcium in the soil is drawn into the above-ground stems and leaves. The calcium deficiency leaves the plant vulnerable to defects that lower its yield. Staffers at the U.S. Potato Genebank in Sturgeon Bay, Wis., screened 21 varieties of wild spud for their ability to absorb calcium. After identifying two South American types with high calcium intake, geneticist John B. Bamberg and physiologist Jiwan Palta isolated the genes that control calcium retention. The wild tubers are not suitable for eating, but the researchers are cultivating hybrids with the calcium-friendly genes.

Catherine Arnst

DNA: PUT YOUR FINGER RIGHT ON THE BATCH YOU NEED

ANALYZING LARGE SETS OF DNA samples can be a bear. Say scientists want to study how various genes correlate with specific diseases. First, they must collect hundreds of DNA samples from research institutions. Then they have to store the DNA in huge freezers. If they need clinical information about a particular sample, such as the patient's family disease history, they might have to scan a separate database to find it.

GenVault has a plan to simplify the rigmarole. The startup developed a room-size machine that can automatically dry and store millions of DNA samples at room temperature. The technology, called the Dynamic Archive system, also links clinical data to each sample, and it uses robotics to retrieve the samples from storage quickly. "We hope to produce a two-day turnaround for a process that used to take weeks," says CEO Mitch Eggers. The company's first unit is located at GenVault's company headquarters in Carlsbad, Calif. Customers will be able to search it for archived DNA through the Internet, using GenVault's software.

In March, the company raised \$10 million in venture capital to build additional machines across the country. And the new technology could have applications beyond drug

development: GenVault is planning to offer its services to the law-enforcement community, which is scrambling to find better ways of managing its forensic data.

Arlene Weintraub

INNOVATIONS

■ Despite the continuing telecom funk, optoelectronics engineers have not stopped innovating. Xerox has just taken the wraps off a tiny silicon device that optimizes the routing of light signals on optical fiber. Measuring just 2 cm by 1.5 cm, the device is drastically smaller than existing optical routers, according to Xerox. It should also be cheaper to manufacture. The company aims to license the technology to companies that make optical switching equipment.

■ ForeScout Technologies in San Mateo, Calif., has developed a clever ruse to foil would-be hackers. Instead of passively waiting for an attack, ForeScout's system goes on the offensive. When it senses the first tentative proings of a potential hacker, it provides a variety of plausible but spurious infor-

mation, such as fake user names and passwords. ForeScout co-founder Hezy Yeshurun, a professor at Tel Aviv University, compares such data to marked bills. Any attempt to exploit the bogus material betrays the hacker's malicious intent. All further traffic from that Internet address can be blocked. Details of the hack including addresses and other identifying bits of code are shared with Fore-

Scout's entire customer base. "We now have 100 sources telling us in real time who the offenders are," says Yeshurun.

