# UC Berkeley Embroiled in Computer Software Lawsuit

For 20 years, the computer science department at the University of California (UC), Berkeley, enjoyed a close relationship with the communications giant AT&T. Berkeley researchers made key improvements to a widely used software package known as UNIX, which was developed at AT&T's Bell Laboratories, making the program better for researchers and companies to use. And those improvements, in turn, contributed to AT&T's bottom line. But last year, this fruitful relationship deteriorated into something resembling a messy divorce that is about to end up in court, with a bitter fight over money and custody.

The breakup was caused when a startup company called Berkeley Software Design Inc. (BSDI), whose board members include several UC researchers, planned to market a new software package that is a direct competitor to UNIX. The BSDI program is potentially worth hundreds of millions of dollars because it can run on some types of personal computers—unlike current versions of UNIX, which can be used only on sophisticated workstations. That's not what AT&T had in mind when it let Berkeley researchers tinker with UNIX, and the writs started flying. An AT&T offshoot called UNIX Systems Laboratories (USL), which holds the rights to UNIX, accused the small company and UC of stealing parts of UNIX for their software, and it has filed a series of suits against both BSDI and the university to block sales of the new program. BSDI and UC officials deny the allegations.

This public feud has attracted enormous interest in the academic computer science community. One reason is that the fight is over a program that is perhaps the most widely used in research: As a so-called operating system, UNIX handles the routine functions for many of the computers and workstations used by scientists ranging from astronomers to biologists. It's also rare to see a university so directly involved in the bitter battles over proprietary rights that have wracked the computer industry in recent years. But there is more at stake in this fight than a few hundred million dollars. It could help clarify the limits to which software can be copyrighted. And—

if the claims of some computer scientists are to be believed—USL's suit, if successful, could put a damper on operating systems research in general. The reason: Some researchers have speculated that if USL wins, companies may be leery of hiring computer scientists who have an intimate knowledge of the workings of UNIX. Indeed, USL's suit seeks to prevent
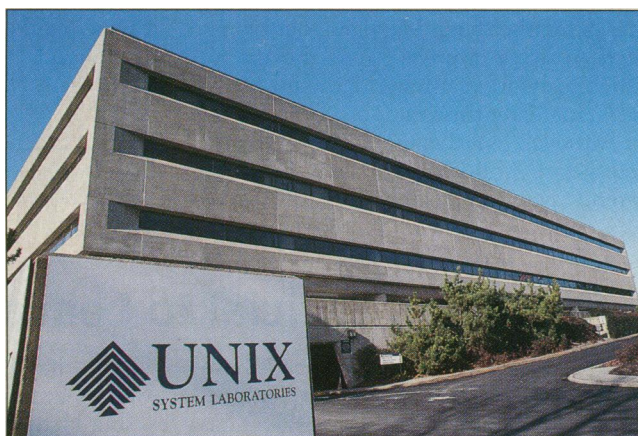
Heading to court. UNIX Systems Laboratories is a combatant in the lawsuit over the rights to an important software package.

BSDI from hiring such researchers.

Such fears—which USL roundly disputes—have sent shock waves through the community. Last October, when Berkeley officials were on the verge of deciding not to fight the USL suit, Keith Bostic of the university's Computer Science Research Group and a BSDI stockholder, sent out an urgent computer message to a few friends, asking for letters urging UC not to let the matter drop. Within days, Bostic's letter had appeared on terminals all over the country and hundreds of electronic mail messages flooded into Berkeley. Leading figures in the computer science fraternity, such as MIT's Marvin Minsky, Mitch Kapor of Electronic Frontiers Foundation, and Richard Stallman of the Free Software Foundation, began pledging money for a legal defense fund. "I sent e-mail to about five people and it just exploded," recalls Bostic. "The response was overwhelming." And convincing, it seems, as the university did not concede the suit and just last week filed its official response to USL's allegations.

USL, for its part, dismisses the researchers' claims as gross overreaction. The company is simply protecting its commercial interests by pursuing a case of copyright infringement and has no desire to stymie research, says Larry Lytle, USL's director of corporate relations. The contention that

the suit threatens academia is merely a smoke screen thrown up to distract from the real issue, he maintains: BSDI is "using the university to hide behind. It's in their best interests to keep this an academic issue and not a commercial issue."

Like many marriages that end up on the rocks, Berkeley and AT&T got along just fine for many years. After AT&T released UNIX in 1969, the computer community began to work with the operating system's source code—the basic instructions that tell the computer what to do—making changes that improved the speed and power of UNIX considerably. Berkeley's Computer Science Research Group was a leader in these efforts, releasing its modifications to the public at large for free beginning in the late 1970s. AT&T derived great benefit from the unintended partnership, since anyone using the Berkeley-enhanced UNIX still had to pay a licensing fee to the phone company.

The seeds of the divorce were sown in the 1980s when AT&T began pushing up the price of UNIX. For a company to license UNIX and its source code today, the price tag can run up to $100,000—more than 10 times what it was when the software was first released. (Educational institutions only pay around $5,000, however.) Those price increases prompted the Computer Science Research Group to initiate an effort to rewrite completely UNIX's source code and develop a compatible operating system over which AT&T had no control. "For about 15 years, there's been this holy grail of a license-free UNIX," says Brian Bershad, a computer scientist at Carnegie-Mellon University.

In 1990, the effort bore fruit when Berkeley unveiled Networking Release 2 (NET2), a collection of programs written at the university and elsewhere that the school claimed was free of AT&T code. NET2 was not a complete operating system, but other programmers could fill in the missing pieces. BSDI researchers did just that, producing a UNIX-compatible operating system that would work on many of today's personal computers—one of the few markets, potentially worth hundreds of millions of dollars, where UNIX has made few inroads.

Last year, when BSDI was on the verge of marketing its NET2-derived operating system, USL took action. On 20 April 1992, the company filed a lawsuit, claiming trademark infringement, false advertising, and unfair competition. It followed that up with a second suit on 24 July charging that BSDI and the Berkeley computer science group had been part of an "illicit scheme" to violate USL's proprietary rights to UNIX. USL also claimed that university researchers involved with BSDI may have violated university conflict of interest guidelines during the development of their competing software program.

"We have done a very thorough analysis

of the [NET2] source code and found very direct copying...," says Lytle. Specifically, USL now claims that more than 100 files, out of the more than 8000 in NET2, have code stolen from UNIX. "I think it will be obvious to the court that they copied our kernel [the core of an operating system]," says Sanford Tannebaum, a vice president for USL. The suit seeks unspecified monetary compensation from both the university and BSDI for damage to USL's business and also asks the court to bar BSDI from selling any software based on NET2.

Tannebaum's optimism, however, faces a tough test. The issue of what actually constitutes copyright infringement of computer software codes is far from clear, and is likely to be the central issue in this suit. Copyright law, as defined by earlier software cases, would appear to permit limited direct copying of source code that cannot be written in any other way—much as chemical formulae can only be expressed in a unique way. University counsel Mary MacDonald says that the school went to great lengths to ensure that NET2 was AT&T-code free, even asking AT&T to review sections (which it declined to do). "Any literal copying is in areas where there is no choice," she maintains. How the court views this argument could set a precedent for future fights over software copy-

right, says intellectual property lawyer Richard Miller.

Berkeley also plans to contest whether AT&T ever obtained a valid copyright on UNIX, since it was not originally distributed in the 1970s with a copyright symbol nor registered with the U.S. copyright office. In response, USL contends that early distribution of UNIX constituted only a "limited publication," which means legally that they could still maintain a legitimate copyright.

Even before these issues reach the court, the combatants have taken their case to the public. In a press release this summer, for example, BSDI went as far as to suggest that AT&T may "threaten to review or withdraw research grants made to any university or research institution using or distributing software based on NET2...." Those kinds of allegations may account for the tremendous outrage the suit has prompted among computer scientists. Some are even boycotting AT&T's long-distance service and sporting buttons that read "NET2 Live AT&T-free or die!" But officials at Berkeley and Carnegie-Mellon, which has also created software incorporating NET2, told Science that AT&T has made no such threats. And it's not likely to in the future: AT&T agreed in December to sell USL to Novell Inc., so it no longer has a direct stake in the UNIX suit. Still, the suit has

prompted defensive action by universities. Berkeley has voluntarily withdrawn its NET2 package until the case is resolved, and computer scientists at Carnegie-Mellon have done the same for their software that uses NET2.

A preliminary hearing scheduled for late January should clear up many of the questions surrounding the case and, perhaps, indicate whether USL's suit is simply a business battle or something with much broader implications for software research. No one involved in the dispute, however, believes that this court date will be the last word on the matter. Indeed, most expect the case to drag through the legal system for years. And if USL can obtain a permanent injunction against the commercial release of BSDI software until the case is resolved, the small company may not survive the ordeal. Nevertheless, since neither side is willing to budge from its stance, there appears little chance for an out-of-court settlement. "In many aspects, this is like a religious or political issue. You can present your opinion, but if people don't agree, they just ignore it," says Lytle. "It's really hard to find anyone even slightly objective. [The case] has really polarized the community," comments Bostic. That, it seems, is about the only thing the opposing sides can agree upon.

–John Travis

FEDERAL SCIENCE FUNDING

Wake-Up Call for Sleep Research

Most people assume the Exxon Valdez oil spill of 1989 was directly related to the captain's alcohol problem. Not so, says a report from the National Commission on Sleep Disorders Research. The real problem was the "severe fatigue" of the ship's third mate—who was in charge at the time—which led to the disastrous grounding. And the enormous cost of cleaning up the oil spill is only a tiny fraction of the full toll sleeplessness takes on our society. To combat this "silent epidemic," the commission last week called for establishing a new sleep research institute as part of the National Institutes of Health (NIH), and a doubling of the amount the government spends on sleep research.

At a Capitol Hill press conference, members of the commission, set up by Congress in 1988, said sleep problems cost society about $50 billion a year. Chairman William Dement, the head of Stanford University's Sleep Disorders Center, whose advocacy was in large part responsible for the commission's creation, called sleep the nation's "largest biomedical orphan." Nearly 40 million Americans have chronic sleep problems, says the report. Perhaps 250,000 suffer from narcolepsy, an irresistible urge to sleep that cripples daily functioning. About 15 million suffer from sleep apnea, which often means waking

hundreds of times a night. Another 25 million have persistent sleep problems, many because of illness or psychiatric disorders.

Medical problems aside, almost no one in America is getting enough sleep, said commission member Mary Carskadon, professor of psychiatry and human behavior at Brown University. She said most adults need 8 hours a night—but 50% get less, and 25% get less than 7. Teenagers now average about 2 hours less sleep a night than they did 80 years ago and are using school as the place to recoup. "America has a sleep debt and in our opinion it's every bit as important as the national debt," said commission member James Walsh, director of the Sleep Disorders Research Center at Deaconess Hospital in St. Louis.

The consequences are wide-ranging: damage to physical and mental health, impaired mental functioning, interpersonal problems, on-the-job injuries, and catastrophic accidents. Drowsy drivers cause more fatalities per accident than drunk drivers, says the report. And every nuclear accident, such as Chernobyl, has occurred in the early morning hours, a "down" period for the body no matter when a person usually goes to bed.

The commission's report offers a list of proposals starting with a new National Center

for Research and Education on Sleep and Sleep Disorders (with a $16 million annual budget) and an "immediate" infusion of $55.8 million a year for research, especially basic research, on top of the $44.6 million now spent within the Public Health Service.

Other recommendations include:
• More money for research training. There are "alarmingly few" up-and-coming investigators—the commission counted only 16 postdocs in the country who are getting specialized training in basic sleep research.
• Education of health professionals. Dement said that 95% of cases of sleep disorders are going undiagnosed—"A river of patients are flowing past the unseeing eyes of doctors."
• An education campaign to attack what Dement calls the public's "pervasive, stupefying ignorance about sleep."

The commission seeks nothing less than "a radical change in the way society deals with sleep." Senator Mark Hatfield (R–OR), for one, agrees. He and colleagues have written Senator Edward Kennedy (D–MA), chair of the Labor and Human Resources Committee, urging inclusion of a sleep research center in the NIH authorization bill, and Hatfield plans to introduce a bill to that effect in the next Congress.

–Constance Holden