UNIX* Computer Operating System: A Legal History†

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Abstract

UNIX is one of today's most extensively used computer operating systems worldwide. Although it was developed by AT&T Bell Laboratories beginning in the late 1969s, the sharp rise of legal activity around UNIX did not start until the late 1980s. This activity culminated in the lawsuit that UNIX System Laboratories ("USL"), then an AT&T's majority owned subsidiary, filed against a Virginia startup company, Berkeley Software Design, Inc. ("BSDI") in April 1992.

This paper examines the circumstances that led to the *USL* v. *BSDI* lawsuit in the view of recent developments in the area of computer software protection. It is shown, on AT&T's example, how modern companies exploit fuzzy and ill-defined areas of intellectual property protection laws to gain strategic advantage in today's fiercely competitive marketplace.

Although UNIX is, perhaps, the only major software product existing today that is nearly as old as the software industry (and the legal framework it inspired) itself, no one, to the best of the author's knowledge, has looked at this operating system in the historical perspective of the changing software protection legal framework that UNIX, and AT&T at large, influenced considerably.

Finally, the evolution of AT&T Corp.'s attitudes toward software protection is examined, and an attempt is made to analyze and explain the recent AT&T/USL UNIX copyright and trade secret enforcement policy changes in historical perspective. The paper is concluded by considering the reasons behind and the possible consequences of the recent acquisition of the USL and all UNIX-related intellectual property by Novell, Inc.‡

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Contents

1 Historical Background

1.1 Introduction

Best known as the largest supplier of telephone services to the United States in the twentieth century, AT&T has always been a major participant in the development of communications, computers, and computer software technologies. As the owner of Bell Laboratories, the source of the key developments in computer, communications, and related fields since the early 1900s, AT&T has had, perhaps, the most lasting impact of any other company on the fundamental technologies (both hardware and software) on which the modern computer industry is based.

Bell Labs' first important foray into what would become the world of computers dates back to the mid 1920s, when George Stibitz, a Bell Labs mathematician, conceived, designed, and built what become known as relay computers. The first such device, the *Complex Number Calculator* that could add, subtract, multiply and divide, became operational in 1940, and was kept in use until 1949.[1] In 1943–45, Bell Labs scientists upgraded their Relay Calculator for the war effort, enabling it to calculate ballistic trajectories to perform automatic aiming for antiaircraft guns. This work culminated in 1946 with creating of General Purpose Relay Calculator (a.k.a. Model V).[2]

By that time, Bell Labs had firmly established itself as the authority in the computer-related projects. It provided consultation to J. Presper Eckert and John W. Mauchly when they were building the ENIAC, the world's first fully operational large-scale electronic digital computer, during the 1940s, and later to other major projects throughout the late 1940s.[3] But the truly revolutionary event that forever changed the course of computing, as well as of uncountable other industries, was the invention of the transistor in 1948 that brought Nobel Prizes to three members of Bell Laboratories. Compared to vacuum tubes, transistors were faster, less expensive, and more efficient, and thus made possible the existence of larger computers with greater computing capacity and higher reliability. In the early 1950s AT&T had its own transistor-based time-sharing computer system in operation, and, in 1954, it announced TRADIC, a general-purpose digital computer utilizing the new transistor technology. In the same year, Carl J. Frosch and L. Derick of Bell Labs completed

[1] *See, generally,* JAMES W. CORTADA, HISTORICAL DICTIONARY OF DATA PROCESSING: ORGANIZATIONS (Greenwood Press, 1987), p. 77ff. In September 1940, the Complex Number Calculator worked on a remote basis when Stibitz submitted tasks to it from Dartmouth College over a telephone line. The device returned responses via the same phone lines – the first known case of remote job entry. One of those who witnessed the event, John Mauchly, went on to help build the ENIAC in the mid-1940s, the world's first digital computer, while another, Norbert Weiner of M.I.T., who invented the term *cybernetics* in the late 1940s, became one of the founders of Artificial Intelligence.

[2] *Id., passim.* One final relay computer, Model VI, was constructed shortly thereafter, but its use was limited to Bell Labs' internal needs.

[3] *See, generally,* JAMES W. CORTADA, HISTORICAL DICTIONARY OF DATA PROCESSING: TECHNOLOGY (Greenwood Press, 1987). EDVAC (1951), BINAC (1949), EDSAC (1949, UK), and finally the UNIVAC (1951), the first computer to be widely accepted for commercial use, were all descendants of Eckert and Mauchly's ENIAC developed at the University of Pennsylvania's Moore School of Electrical Engineering, with the help of Bell Labs and others. All of these early computers were based on the vacuum tube technology.

work which culminated in the integrated circuit becoming a practical reality.[4]

It can be seen that the early efforts in computer technologies, from the first relay computers to integrated circuits, where largely driven by the ever-increasing need for better communication (particularly, switching) gear. With demand for telephone and other communication services rising in both civilian and military applications, AT&T became the major beneficiary of this trend, and was all set up to become a giant of the computer industry. However, in 1956, AT&T had to sign a consent decree with the U.S. Justice Department in which it agreed not to sell computers and computer equipment (e.g. transistors and, later, computer software) on the open market.[5] As a result of the decree, AT&T was forced to license transistor and any other computer-related technologies it developed to its competitors, which weakened considerably the incentive for AT&T to develop such technologies, except in cases when they had direct relevance to telephony, AT&T's core business. This explains why AT&T was largely absent from the computer arena until the mid-1980s, when it made a number of unsuccessful efforts to re-enter the computer market, by then dominated by such giants as IBM, DEC, and HP.[6]

1.2 What is UNIX?

Although impaired by the 1956 consent decree prohibition against selling computer equipment to the outsiders, AT&T had enough internal computer needs to drive a rather strong, albeit narrowly focused, progress in computer hardware and software, as the phone switches were rapidly turning into huge special-purpose computers. To program these increasingly sophisticated computers, Bell Laboratories embarked on extensive research in computer operating systems and other software.

During 1965–1969,[7] AT&T's Bell Laboratories participated with General Electric (later Honeywell) and Project MAC[8] at the Massachusetts Institute of Technol-

[4] The idea of putting an integrated circuit on a silicon chip was explored in the late 1950s by William Shockley (one of the inventors of transistor who had left Bell Labs in 1954 to establish his own microelectronics firm) and Jack S. Kilby (of Texas Instruments). [J. CORTADA, *supra* note 1, at 80.]

[5] This consent decree was a the result of an antitrust suit filed by the U.S. government against AT&T in 1949, in which the Justice Department sought to divest AT&T of its manufacturing arm called Western Electric. While barring AT&T from selling on the open market most of the equipment it manufactures, the consent decree of 1956 allowed the company to retain possession of Western Electric.

[6] Having given up on cracking the computer market on its own, AT&T acquired NCR, Inc., then the country's fifth largest computer company, in 1991. Renamed into *AT&T Global Information Solutions* and integrated with other AT&T business units, it has now become the company's main computer manufacturing arm.

[7] One of the more prominent results of pre-1965 software research at Bell Labs was development of SNOBOL, one of the first string and list processing languages, in 1962–69. Widely used in Bell Laboratories and at many American universities throughout the 1960s and 1970s, it has since been almost entirely superseded by LISP, an algebraic list-processing language developed at M.I.T. in the late 1950s. LISP is still in use today, primarily by scientists and programmers working in the field of artificial intelligence. [J. CORTADA, *supra* note 3 at 250 and 345.]

[8] R. M. Fano, Project MAC, in ENCYCLOPEDIA OF COMPUTER SCIENCE AND TECHNOLOGY (Marcel Dekker, New York, 1979); J. CORTADA, *supra* note 3 at 319–321. Project MAC represented a logical outgrowth of a successful earlier program at M.I.T. called the Compatible Time-Sharing

ogy in the development of the Multics[9] operating system.[10] Originally designed to run on the powerful GE-645 mainframe, Multics was a large and complex system. It was a general-purpose computer utility built to service the diverse needs of large user communities.[11] In 1969, when Multics had been essentially completed, some members of Bell Labs research staff began working on a far less ambitious system called UNIX.[12] The group, led by Bell Labs staff member Ken Thompson, sought to create a computing environment for facilitating programming research and development. By 1972, UNIX was implemented in C, a highly portable computer programming language developed at Bell Labs by Dennis Ritchie,[13] which enabled easy adaption (portability) of UNIX[14] to many computers. In 1973, Western Electric agreed to license the system to nonprofit organizations, such as educational institutions, and by 1975, UNIX had become very popular in the universities throughout the country.[15]

Today, UNIX is widely used by the universities, firms, and government agencies worldwide. It has become the operating environment of choice for academic, engineering, and networked computing. Various versions of UNIX for personal computers (PCs) have been available for some time. In the *USL* v. *BSDI* court papers,[16] USL emphasized universality of UNIX by pointing out that

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System (CTSS), which provided time-sharing computing capabilities across the entire campus while developing new technologies. In 1975, the much expanded Project was designated as the M.I.T. Laboratory for Computer Science (now located in bldg. NE43), while the campus-wide computing system pioneered by CTSS has given birth to the M.I.T. Project Athena.

[9] E. I. Organick, The Multics System (M.I.T. Press, Cambridge, Mass, 1972). Multucs stands for Multiplexed Information and Computing Service.

[10] A computer operating system is a software program that controls computer processing; allocates internal and external resources; communicates with external devices such as disk drives, keyboards and printers; and provides the interface to and controls the processing of programs designed to perform specific tasks (called "application programs").

[11] H. M. Deitel, An Introduction to Operating Systems, (Addison-Wesley, 1982), chapter 18, *passim*.

[12] By that time, Bell Labs had withdrawn from the Multics effort. All early UNIX work had been done entirely by Bell Labs researchers. UNIX's M.I.T. heritage is widely acknowledged, however. Ritchie, for example, states that "a good case can be made that [UNIX] is in essence a modern implementation of M.I.T.'s CTSS system." [D. M. Ritchie, UNIX Time-Sharing System: A Retrospective, The Bell System Technical Journal, vol. 57, no. 6 (July-August 1978)].

[13] B. W. Kernighan and D. M. Ritchie, The C Programming Language, (Prentice-Hall, 1978).

[14] In addition to the basic functions common to all computer operating systems (see *supra* note 10), the UNIX operating system contains a host of utilities to assist users, administrators and programmers of UNIX operating system installations. Functionally, the UNIX operating system is a highly sophisticated multi-user system (i.e., it allocates the computer's resources among multiple users at the same time) and multi-tasking system (i.e., it can perform more than one task at a time for each user). On May 6, 1986, AT&T's UNIX trademark was placed on the Principal Register of the United States Patent and Trademark Office for computer programs, under Registration No. 1,392,203. *See also* section 3.2.

[15] UNIX was first disclosed to the outside world almost five years after its inception, in D. M. Ritchie and K. Thompson, *The UNIX Time-Sharing System*, 17 Communications of the ACM 7 at 365–375 (July 1974).

[16] The *USL* v. *BSDI* lawsuit is discussed in detail in Chapter 3. All documents pertaining to the case are available via Internet, a publicly accessible computer network, for anonymous retrieval from **ftp.uu.net:/vendor/bsdi/usl** (a UUNET Technologies' public archive site), as well as through the World Wide Web (WWW) from **http://www.bsdi.com/info/lawsuit/historical.html** (a site maintained by the BSDI, Inc.)

the UNIX® system has been described as "the only major operating system available today that covers almost the entire spectrum of computer classes ... including microcomputers, minicomputers, mainframes, RISC systems, fault-tolerant computers, and parallel processors."[17]

1.3 UNIX Wars

Initially, UNIX was being developed by Bell Labs for AT&T internal use. However, starting in the late 70s, as the interest in multi-user time-sharing operating systems rose sharply, AT&T found itself on the forefront of computer technology and started offering licenses for the outside use of UNIX. At first, AT&T marketing strategy was to keep licensing fees low while UNIX gained acceptance: AT&T charged only $60 to $170 per license in royalty fees. However, as AT&T was becoming increasingly more aggressive after the divestiture,[18] it started seeing UNIX as an important software product with substantial money-making potential. In accordance with one of AT&T's early decentralization plans, AT&T Data Systems Group was formed in 1984 to supervise UNIX external licensing, but it lost $3 million in the next five years.[19]

Early in 1989, AT&T spun off UNIX into a new division, UNIX Software Operation, with the mission to finally turn UNIX into a money-making product for the company. Within a year, licensing fees increased dramatically, to a maximum of $10,000. Starting in 1990, AT&T began seeing substantial profit from its UNIX sales.[20]

In answer, other major computer companies (IBM, Digital Equipment Corp., Hewlett Packard, and others) formed a non-profit Open Software Foundation (Cambridge, MA) in order to develop an alternative UNIX standard, called OSF/1, containing no AT&T-licensed code. This started the infamous "UNIX war."

To be sure, it was not just AT&T and OSF who participated in this "war." Various proprietary UNIX-like operating systems had existed for years: IBM's AIX, DEC's ULTRIX, Microsoft's XENIX, Sun Microsystems' SunOS/Solaris, Silicon Graphics' Irix, HP's HP/UX, Apple's A/UX, etc.[21] OSF's, however, was supposed to be the first commercial UNIX-like OS not requiring an AT&T license because, supposedly, it was to be created from scratch and not to use any of AT&T source code.

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[17] U.S. Dist. Court, Newark, N.J. *Civil Action No. 92-1667 (DRD),* First Amended Complaint, §20. [I would like to find out someday where this quote is coming from originally.]

[18] In 1974, the U.S. Justice Department again sued AT&T and again wanted the company to divest itself of Western Electric. In a 1982 consent decree, AT&T agreed instead to pull out of the local telephone business by transferring its local operations to newly formed seven Regional Bell Operating Companies (RBOCs).

[19] This was also the time that marked the beginning of a sharp increase in legal activity around UNIX. Realizing that, American Bar Association's Section of Economics of Law Practice (Computer Division) started a quarterly publication, *ABA/Unix/group Newsletter,* in the Spring of 1987.

[20] Norm Alster, *Payday for Johnny Appleseed: UNIX software paying off for AT&T,* 144 FORBES 10 at 218 (Oct 1989).

[21] Thanks to George Schmitt, **schmitt@cmf.nrl.navy.mil**, for help in compiling this list of assorted proprietary UNIXes and GUIs and for discussing their various aspects with me.

In addition to the AT&T UNIX, proprietary UNIXes, and OSF/1, all of which were commercial operating systems, a different, non-commercial group of UNIX systems has been in existence for a long time.

In 1973, AT&T licensed its UNIX source code to the Regents of the University of California, "under license agreements that limit the use of such software solely for authorized administrative and educational purposes."[22] In addition,

> ...the Regents have been authorized to distribute to third parties works that are derived from UNIX® system software. However, the agreements permit distribution of such derivative work only to persons who have acquired a UNIX® system source code license from AT&T or USL.[23]

This move by AT&T had two important consequences for UNIX development. First, UNIX got instant and broad access into the world of academic computing, with its extensive research facilities and dedicated customer base. In particular, Berkeley's Computer Science Research Group of the University of California ("CSRG") was very well positioned to further develop and refine UNIX. On the other hand, however, by letting CSRG modify and re-distribute its code, AT&T inadvertently created another very strong competitor, and an active participant in the "UNIX war."

Under the agreement with AT&T, CSRG has developed[24] and distributed derivative UNIX versions, which are generally known as "Berkeley Software Distributions" (BSD), to licensees of AT&T and USL.[25] Due, in part, to a number of popular features that CSRG added to AT&T UNIX, BSD distributions became very widespread in the academic community.[26]

The "UNIX war" among AT&T, OSF, and Berkeley was, essentially, the fight over the UNIX standard.[27] The standard was necessary to make sure that, as the

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[22] U.S. Dist. Court, Newark, N.J. ***92-1667 (DRD),*** First Amended Complaint, §29.

[23] *Id.*, §31.

[24] This work was funded by the U.S. Department of Defense. See Maryfran Johnson, ***USL suit raises Berkeley Unix hacklers,*** 26 COMPUTERWORLD 33 at 45 (Aug 1992).

[25] Berkeley's BSD later became the cornerstone of the ***USL*** v. ***BSDI*** lawsuit (see Chapter 3.)

[26] e.g. a large number of workstation at M.I.T. Project Athena are running Berkeley's 4.3BSD derivative of UNIX

[27] Another highly visible and influential personality on the UNIX scene is Richard Stallman (**rms@ai.mit.edu**) and his Free Software Foundation (FSF) of Cambridge, MA. FSF is developing UNIX-compatible software utilities to be distributed "for free to everyone who can use them." The ultimate goal of the project is to create a complete UNIX-compatible operating system called GNU (stands for **G**NU's **N**ot **U**NIX.) This project is based on Stallman's philosophy (which is shared by some other software developers, principally found in the academia) that, essentially, all software must be free for computer users to share. To propagate his philosophy, Stallman founded The League for Programming Freedom, a rather influential group whose agenda includes a struggle against software patents [The League for Programming Freedom, ***Against software patents,*** 35 Communications of the ACM 1 at 17 (Jan 1992)] and user interface copyrights [The League for Programming Freedom, ***Against user interface copyrights*** (Feb 1991)]. All GNU documents, including the so-called "GNU Manifesto" and Stallman's interview with BYTE magazine [David Betz and Jon Edwards, ***GNU's Not UNIX: Richard Stallman discusses his public-domain UNIX-compatible software system with BYTE editors,*** BYTE (July 1986)] are available on line via Internet from **prep.ai.mit.edu:/pub/gnu**, GNU project's home base at the M.I.T. Artificial Intelligence Laboratory (GNU is *not* affiliated with M.I.T., though.)] Although GNU software is extremely popular

number of UNIX users kept increasing, they were able to communicate with each other as efficiently and as effortlessly as possible. The Institute of Electrical and Electronic Engineers (IEEE) and the U.S. Government and military were among those pushing for a widely accepted and universally followed UNIX standard. As a result of these efforts, X-Open Co Ltd. and UNIX International were formed to define a worldwide UNIX standard.[28]

1.4 UNIX GUI Struggle

The UNIX war went into flames with realization that the only way for UNIX to penetrate the newly emerging and highly profitable mass market of personal computers (by then, dominated by Microsoft Corp.'s DOS and Windows) was to make the operating system easier to use by developing some sort of a front end, or *graphical user interface* (GUI). Several companies were developing GUIs for UNIX engineering workstations starting in mid-80s, and the question was which one was to become standard — for both workstations and personal computers (PCs). On this front, AT&T teamed up with Sun Microsystems Inc. who developed SunView GUI, whereas OSF created the OSF/Motif GUI based on the X Window System developed by the M.I.T. Project Athena[29] that already had a dominant presence in the high-end engineering workstations market. NeXT Inc.'s NeXTStep was another contender for a UNIX windowing standard.[30]

By the middle of 1990, it was evident that OSF's Motif based on M.I.T.'s X System was rapidly becoming the standard for UNIX GUI.[31] Ironically, the standard for UNIX itself was still to evolve.

1.5 Creation of USL

Recognizing that the future of one of its major software products was now at stake, AT&T moved swiftly to re-assert its role as a UNIX standard-setter. In 1990, AT&T formed a subsidiary, Unix System Laboratories Inc. (USL), and eventually sold a 35% stake in it to a group of outside multinational investors.[32] The purpose of USL was to further develop and market UNIX system and related software products and services worldwide. In May 1990, AT&T assigned to USL all its rights to the UNIX operating system, "including the UNIX trademark, its accompanying goodwill and its copyrights and other intellectual property rights in the software and related documentation sold and licensed thereunder."[33]

Having apparently received a mandate to use all the means necessary to ensure AT&T's continued dominance of the UNIX market, USL concentrated its efforts on

in academic community, its present influence on the UNIX market is quite limited, for the project is not likely to be completed any time soon.

[28] Tom Manuel, ***A single standard emerges from the UNIX tug-of-war,*** 62 ELECTRONICS 1 at 141 (Jan 1989).

[29] Dick Puntain, ***The X Window System,*** 14 BYTE 1 at 353 (Jan 1989).

[30] Ross M. Greenberg, ***Faces of UNIX,*** 8 PC MAGAZINE 15 at 143 (Sept 1989).

[31] John Blackford, ***Resolving a nasty little war,*** 14 PERSONAL COMPUTING 4 at 43 (Apr 1990).

[32] See ***AT&T Fact Book,*** a publication of AT&T Public Relations department.

[33] U.S. Dist. Court, Newark, N.J. ***92-1667 (DRD),*** First Amended Complaint, §21.

achieving the following basic goals:

- making sure that AT&T/USL UNIX brand ends up being accepted as the international standard
- minimizing damage due to the lost battle (to OSF) over UNIX GUI
- competing with Microsoft and IBM on the PC operating systems market
- forming alliances across the board to keep third-party developers with UNIX.

The concrete steps USL took in each of these directions are briefly described below.

1.5.1 UNIX Standard

The first thing the newly created USL did was to introduce a new improved version of AT&T UNIX, System V release 4.0, and to collaborate with Sun Microsystems, the largest producer of UNIX workstations in the world, to ensure that this new AT&T/USL UNIX runs best on Sun's machines. This way USL secured enough of the UNIX market that by October 1990, when OSF announced its alternative to UNIX (OSF/1), few customers wished to switch their operating systems. Most customers, including the founding members of OSF, announced that they would only employ OSF/1 on a very limited basis, and would continue to use USL's UNIX System V or their own proprietary versions of UNIX.[34]

USL did not stop there, and announced that by 1991, USL's UNIX would feature whatever abilities OSF/1 had that USL's system had not had. AT&T/USL had also incorporated many results of Berkeley's CSRG research in its code.[35] Increasingly, USL's UNIX System V Release 4 (SVR4) was emerging as a UNIX standard.

1.5.2 UNIX GUI

Having lost the battle for UNIX GUI to OSF's M.I.T. X Windows-based OSF/Motif GUI, AT&T/USL team found a way to try to get its share of the profits anyway. It produced an old (1985) patent by Robert Pike, a Bell Laboratories researcher, that seemed to cover an important feature of the X Window System and, therefore, any GUI based on it, such as OSF/Motif.[36] AT&T demanded royalty payments from all X Windows users.

1.5.3 PC Market

By the late 80s, it was evident that the personal computers (PCs) market was about to explode. This caused USL to seek alliance with Santa Cruz Operation Inc. (SCO), a small California software company and the market leader in UNIX

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[34] Gary McWilliams and Evan I. Schwartz, *Will this $150 million brainchild be an orphan?* BUSINESS WEEK 3185 at 98 (Oct 1990).

[35] e.g., Berkeley's `vi` visual text editor

[36] Pike's patent and its implications are discussed in more detail in Section 2.4.

for PCs at that time.[37] In December 1990, USL joined with Intel (the dominant manufacturer of microprocessor for PCs) and other UNIX firms to develop a binary compatibility standard for UNIX for personal computers based on SCO's UNIX System V/386. The idea was to standardize the interfaces between the UNIX kernel and the applications, making applications portable from one UNIX/386 system to the next, just like they are in Microsoft's MS-DOS.[38] Of course, this would enable UNIX to compete with DOS who at that time held the virtual monopoly for PC operating systems.

Next, it was realized that mere binary compatibility was not enough. For UNIX to be really successful, a common UNIX GUI had to be introduced. (Microsoft realized this first, and grabbed a huge share of the market again, when it introduced and started aggressively promote a GUI for its MS-DOS called "MS-Windows.")

Since a UNIX GUI standard had already been unofficially established, USL started developing a UNIX for PCs with this GUI, OSF/Motif, built in.[39] The result of this project, initially code-named "Destiny", was UNIX System V Release 4.2, or SVR4.2. USL introduced it in June 1992 to the computer software critics' rave reviews.

One more barrier UNIX had to overcome before it could attempt its takeover of the PC world was its inappropriate networking capabilities. This is ironic because, traditionally, networking was one UNIX's strongest aspects. However, the networking standards UNIX supports when used in the mainframe, minicomputer, and engineering workstation worlds (Ethernet and TCP/IP) are not the ones required (historically) in the networking world of personal computers dominated by Novell Inc.

In order to break this last barrier, USL formed a joint venture with Novell, called Univel Inc. In the Fall 1992, Univel started shipping its first product called UnixWare, that combines USL's UNIX SVR4.2 with Novell's popular NetWare 3.x networking functions.[40] Thus, the new version of UNIX provided PCs with UNIX performance, OSF/Motif-style GUI, and extensive networking capabilities.[41]

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[37] Richard Brandt. *Can this small fry put UNIX in a million desktops?* BUSINESS WEEK 3097 at 116 (March 1989).

[38] Philip J. Gill, *Finally, a binary UNIX PC standard,* 36 DATAMATION 24 at 59 (Dec 1990).

[39] To make everyone happy, USL later decided to include an alternative GUI package, called Open Look, with its offering as well.

[40] Vance McCarthy and Cate Corcoran, *Univel targets UnixWare release for early fall; latest System V release to include NetWare features,* 14 INFOWORLD 19 at 1 (May 1992).

[41] Whereas a popular free UNIX-compatible operating system for engineering and scientific computing does not exist yet (project GNU developers are working on it, as was pointed out earlier), a free UNIX for PCs does exist (although it is still in a beta-testing stage), and has a rather large following. It is called "Linux", and its worshippers can be found on **comp.os.linux**, a USENET computer newsgroup, as well as on private mailing lists and Bulletin Board Systems (BBSs) throughout the world. The system is available for free to anyone via Internet from its Finish home in **nic.funet.fi:/pub/OS/linux**, as well as from other sites and BBSs worldwide. It is important to note that, unlike other PC UNIX versions (which are based on AT&T code), Linux has been written from scratch and, therefore, does not require an AT&T license. Other UNIX-like PC operating systems include Coherent, NextStep 486, Minix, Hurd, Solaris, 386-BSD, and BSD386 (BSD386 is being sold by BSDI, and is the subject of the *USL* v. *BSDI* lawsuit discussed in the Chapter 3).

1.5.4 Alliances Across the Board

Another characteristic aspect of USL's UNIX strategy was forming alliances with its former, as well as present, rivals. The same day USL introduced its UNIX SVR4.2, it also announced an agreement with the OSF, its longtime competitor, whereby USL embraced OSF's Distributed Computing Environment (DCE) and Distributed Management Environment (DME).[42] Keeping in mind other USL alliances, such the ones with Santa Cruz Operations and Novell, one realizes that these alliances were designed to keep third-party developers with UNIX, rather than defecting to Microsoft's Windows NT.[43]

1.6 Acquisition of USL by Novell

On December 21, 1992, AT&T and Novell announced the plan for Novell to acquire USL in a common stock swap worth about $333 million.[44] The acquisition was completed on June 14, 1993. Being one of the biggest and most profitable software companies in the world, Novell is particularly well positioned to advance UNIX as an attractive alternative to Microsoft's operating systems (e.g. Windows NT) currently dominating the high-end personal computing market. The main obstacle for achieving this is the fragmentation of the UNIX industry (see section 1.3 above). Novell, therefore, considers uniting the UNIX industry as one of its foremost priorities.[45] While the jury is still out on whether its efforts have paid off, it is clear that in the past two years since the UNIX acquisition, Novell has been steadily making considerable progress toward this goal.

1.7 Post-UNIX OS Developments at AT&T

As the USL/Novell continues pushing its UNIX against the rival systems, a new operating system is already in the works at AT&T Bell Laboratories. Reports have been appearing in press that AT&T is working on a new generation of OSs that "will be easier to administer and use than UNIX and will be better suited for keeping pace with rapidly evolving computer technologies":

> Software scientists at Bell Labs ... who helped develop the original UNIX operating system are working on ... the two-year-old Plan 9 project [that] aims to develop a time-sharing, file-based, portable operating system—in these characteristics it is much like UNIX. But Plan 9 rejects the trend in the UNIX world toward an extended system architecture in favor of a more rigid network architecture....[46]

[42] Maryfran Johnson, *Desktop UNIX brings USL, OSF closer,* 26 COMPUTERWORLD 25 at 14 (June 1992).

[43] Jonathan Cassell, *USL to provide technology to fight Microsoft Windows NT,* 38 ELECTRONIC NEWS 1928 at 22 (Sept 1992).

[44] M. Wagner and P. Kapustka, *Novell to Buy UNIX*, OPEN SYSTEMS TODAY 114 at 1 (Jan 4, 1993).

[45] *Can Novell Knit Together A New Era? – Interview with Novell's Chairman and CEO Ray Noorda*, OPEN SYSTEMS TODAY 128 at 26 (July 19, 1993).

[46] Jeff Moad. *UNIX gurus develop a new system,* 37 DATAMATION 1 at 69 (Jan 1991).

It remains to be seen if the new AT&T's operating system will have the dramatic influence on the future computer industry of the magnitude that UNIX has had on the past and present.

2 Patent Protection of the UNIX System

Thanks to its vast resources before the divestiture, AT&T, through its venerable Bell Laboratories, has been consistently producing a great number of inventions. (Though somewhat streamlined by AT&T and considerably downsized, Bell Labs is still a very respectable scientific and engineering institution.) The more famous Bell Labs' discoveries and research developments include transistor, the solar cell, lasers, synthetic crystals, high fidelity stereo recording, sound motion pictures, radio astronomy, negative feedback, magnetic tape, microwave radio and TV relay systems, superconductors and other novel materials, etc.[47] Naturally, AT&T has always been very careful to guard its intellectual property, which it increasingly recognized as one of its major assets.

2.1 Early Algorithm Patents by AT&T

It was as far back as the 50s, long before the era of digital computers, that AT&T started making attempts to patent such non-statutory, from the patent regulations point of view, things as mathematical algorithms. While AT&T was granted patents for some of such inventions, in most cases, since these inventions were typically made use of in AT&T core telephone business, the company was prohibited from charging license fees on the policy grounds. For example, the U.S. Patent 2,552,629 "covered Hamming codes for error correction as implemented in electric switching circuits; the Bell System was forced to make it available for royalty free licensing in 1956 as a result of an antitrust case."[48]

Shortly after Bell Labs built the world's first electrical digital computer, AT&T recognized that computers and software were rapidly becoming increasingly important for telecommunications, AT&T's core business. Thus, AT&T reasoned, software and the algorithms on which it was based needed to be protected in the same manner that AT&T protected its other inventions: through the patent system.

We now know that this approach has proven to be so controversial that it still generates heated debates. But back in the early 60s, when the relevant case law had not yet been developed, the Patent Office was flooded with software patent applications as the companies, following the AT&T lead, started exploiting the new opportunities. The four-year backlog this created by 1964 caused the PTO to start denying the patentability of computer programs, characterizing them as "creations in the area of thought." In 1965, The President's Commission on the Patent System stated that "The Patent Office now cannot examine applications for

[47] Dave Barry, *Won't it be just great owning our own phones?*

[48] Carl Oppedahl, an intellectual property lawyer with Brumbaugh, Graves, Donohue & Raymond, 30 Rockefeller Plaza, New York, NY 10112-0228, `0001811496@mcimail.com`, private correspondence.

programs because of the lack of a classification technique..."[49] In 1968, the PTO published guidelines based on the legal doctrine of "mental steps" in which it stated that computer programs, however claimed, were not patentable unless combined with an apparatus which caused the physical transformation of matter. But in 1968 and 1969, the Court of Customs and Patent Appeals (C.C.P.A.) decided *In re Prater, In re Abrams, In re Yuan,* etc. stating that "patent protection ... is not precluded by mere fact that the process could ... be carried out by mental steps,"[50] prompting PTO to withdraw its "mental steps" guidelines.

2.2 *Gottschalk* v. *Benson*

Finally, one of the more typical AT&T algorithm patent cases was considered by the U.S. Supreme Court in the landmark *Gottschalk* v. *Benson* case.[51] Gottschalk was the Commissioner of Patents who sought Supreme Court review of an appellate court ruling[52] which had overturned the patent office's decision to deny Benson, an employee of Bell Laboratories, a patent on his new algorithm, for converting binary-coded decimals to pure binary form.[53] The court stated that the operations described in the patent application could be "performed without a computer," and that the "claims were not limited ... to any particular apparatus."[54] The Court characterized the Benson method as a "mathematical formula" and went on to rule that processes are not patentable if they only claim or "preempt" a mathematical formula.[55] In short, the Court ruled that a computer program algorithm is by its nature unpatentable. Nevertheless, the court stated specifically[56] that it did not hold that there could be no patents for any program servicing a computer.[57]

[49][U.S. Congress, Office of Technology Assessment, Finding a Balance: Computer Software, Intellectual Property, and the Challenge of Technological Change, OTA-TCT-527, U.S. Government Printing Office, Washington, DC (May 1992)], citing Nelson Moskowitz, "The Metamorphosis of Software-Related Invention Patentability," Computer Law Journal, vol. III, 1982, p. 281.

[50]*In re Yuan,* 188 F.2d 377 (C.C.P.A. 1951)

[51]*Gottschalk* v. *Benson*, 409 U.S. 63 (1972).

[52]*In re Benson,* 441 F.2d 682 (C.C.P.A. 1971)

[53]Pamella Samuelson, *Should program algorithms be patented?* 33 Communications of the ACM 8 at 23 (Aug 1990).

[54]*Gottschalk* v. *Benson*, 409 U.S. at 64 (1972).

[55]*Id.*, at 71.

[56]*Id.*, at 72.

[57]Despite this uncertain regulatory environment, the companies kept applying for patents involving software, and, in some cases, even kept receiving them, thanks to the appellate court's interpretation of *Benson* as applying only to claims drafted in *process* (or method) form, and not to claims drafted in *machine* (or apparatus) form, although a patent lawyer could, through minor wording changes, easily draft the claims in either form [Pamella Samuelson, *Should program algorithms be patented?*]. In *Parker* v. *Flook*, 437 U.S. 584 (1978), Supreme Court indicated that this interpretation was indeed inconsistent with its ruling in *Benson.* The Court reversed the C.C.P.A., holding that a method for updating "alarm limits" during a catalytic conversion process, in which the only novel feature was the use of a particular mathematical formula, was not patentable under section 101. The Court stated that the only difference between the claimed invention and conventional method of changing alarm limits was that the applicant provided a mathematical algorithm or formula, which are not patentable under *Benson.* The Supreme Court left open the possibility of patenting computer programs, and recognized that "a process is not unpatentable simply because

2.3 UNIX patents

Apart from the fact that, strictly speaking, software *per se* does not constitute a patentable subject matter[58] it would be impossible to patent the entire operating system, no matter how innovative, even if it did. However, certain novel parts of an OS, such as innovative implementations, algorithms, or application programs, may be patentable under the current law if they are the parts of some novel, useful and non-obvious method and/or apparatus.[59]

In the 70s and early 80s, when AT&T had not yet fully recognized UNIX as one of its major revenue-producing product, its attitude toward applying for and enforcing UNIX-related patents can be characterized as rather relaxed. AT&T would usually disclose its UNIX-related research in scientific publications and never bother to try to patent whatever new ideas[60] it would come up with.

It appears that the first UNIX-related patent issued to AT&T[61] was the so-called "`setuid` patent" for protection of data file content.[62] AT&T's treatment of

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it contains a law of nature or mathematical algorithm." However, a patent must not preempt a law of nature or a mathematical algorithm.

[58] 35 U.S.C. §101; reaffirmed in *Gottschalk* v. *Benson*.

[59] 35 U.S.C. §§101–103; see also *Diamond* v. *Diehr*, U.S. 175, 177 (1981). The application in *Diehr* recited a process of curing synthetic rubber. The process included use of a known mathematical formula to determine the time for curing, and a programmed digital computer to determine the proper length of time for curing the product and automatically opening the mold. The claims were rejected by the PTO as nonstatutory subject matter. The Court of Customs and Patent Appeals reversed. The Supreme Court decided in a 5 to 4 decision that the process was patentable under section 101. The claims were not disqualified from patentability because of use of a mathematical equation and programmed digital computer. [U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, COMPUTER SOFTWARE AND INTELLECTUAL PROPERTY, OTA-BP-CIT-61, U.S. Government Printing Office, Washington, DC (1990), pp. 51–52.] The Supreme Court characterized a mathematical formula or an algorithm to be "like a law of nature, which cannot be the subject of a patent." The Court asserted that a claim drawn to otherwise statutory subject matter is not rendered nonstatutory simply because it involves a mathematical formula, computer program, or digital computer:

> [W]hen a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of section 101.

In spite of this holding by the Supreme Court, it is still believed that the *Diehr* decision does not conclusively determine whether a computer program, standing alone, may be patented. However, *Deihr* indicates that at least some subject matter involving software may be patented, and that algorithms may be included as part of patentable subject matter.

[60] turned, of course, into "processes, machines, manufactured items..." as required by 35 U.S.C., Sect. 101 [TOBEY B. MARZOUK, PROTECTING YOUR PROPRIETARY RIGHTS IN THE COMPUTER AND HIGH TECHNOLOGY INDUSTRIES, Computer Society Press, IEEE (1988)].

[61] A publicly accessible "Partial List of Software Patents" is maintained by Michael Ernst (**mernst@theory.lcs.mit.edu**) of M.I.T. Laboratory for Computer Science, and can be obtained anonymously via Internet from various League for Programming Freedom's archive sites, such as, for example, **mintaka.lcs.mit.edu:/mitlpf/ai/patent-list**.

[62] U.S. Patent 4,135,240; filed 7/9/73; granted 7/16/79; inventor: Dennis Ritchie; assignee: AT&T. Note that the patent was granted shortly after *Parker* v. *Flook*, 437 U.S. 584 (1978) in the era of renewed hostility toward software patents. As was mentioned earlier, *Flook* reasserted the Supreme Court's view on software patents expressed earlier in *Gottschalk* v. *Benson*.

this patent is very characteristic for the general attitude of the company towards software patents at that time of low UNIX license fees:

> AT&T distributed Unix with the understanding that a license fee would be collected if and when the `setuid` patent issued. When the event finally occurred, the logistical problems of retroactively collecting small fees from hundreds of licensees did not seem worth the effort, so the patent was placed in the public domain.[63]

Another area of controversy is the so-called LZW data compression algorithm used to implement one of the UNIX utilities, `compress`. This patent was secured by Unisys Corp.[64] and AT&T,[65] and a similar algorithm was suggested in an IB-M's patent later.[66] After years of being freely used in various operating systems, including UNIX, LZW algorithm was declared to require a license from Unisys a short time ago. This move by Unisys sent waves of extreme displeasure throughout the community of UNIX users. For that, they were immediately called "naive tech weenies ready to form a lynch mob" by one industry-sympathetic newsletter.[67]

2.4 Pike's "Backing Store" patent

In a modern corporation with a huge R&D budget, such as AT&T, applying for and enforcing a patent is viewed increasingly as a business decision. It is too expensive to try to patent each and every new patentable invention that comes along. Writes an AT&T attorney:

> AT&T hires researchers because it hopes that [they] will make money for the company. (The projected time frame for this varies, of course.) This can happen in lots of ways. One, of course, is a new and patentable invention that AT&T will build and sell. Another is a patent that the company will license others to use. Another is a patent that can be cross-licensed with some other companies,[68] to obtain access to technology that AT&T needs. But there are also other ways of making money that don't involve anything resembling a patent.[69]

63 AT&T's Doug McIlroy, `doug@research.att.com`, personal correspondence.

64 then Sperry Corporation

65 See U.S. Patents 4,464,650 *(Apparatus and method for compressing data signals and restoring the compressed data signals)* and 4,558,302 *(High speed data compression and decompression apparatus and method.)*

66 See U.S. Patent 4,814,746.

67 Maugreen O'Gara, publisher of *Unigram X*, unigram#403. This episode amply illustrates the high level of emotions observed in the UNIX debates today.

68 AT&T has such cross-licensing agreements with a great number of companies. For example, such an agreement with IBM gives AT&T access to the many IBM software patents that are later used in AT&T's own software products, including UNIX. See, for instance, U.S. Patent 4,742,447 issued to IBM that is being used in AT&T/USL UNIX SVR4. *–bp*

69 From an article by an AT&T attorney Steven Bellovin, `smb@ulysses.att.com`, posted to one of the "netnews" (a collection of public forums on Internet) newsgroups, `comp.patents`, in June 1992. `comp.patents` is archived on `ftp.uu.net:/doc/patents`, a UUNET Technologies' public archive site.

In the resent years, starting collecting fees for an old patent became a common method of enhancing bottom line in software industry. One example is, of course, the Unisys LZW patent mentioned above. Another recent case is the infamous Robert Pike's so-called "backing store" patent.

As was mentioned earlier, AT&T, having lost its UNIX GUI bet to the OSF, tried to get its share of the market anyway by declaring that an obscure feature of the M.I.T. X Window System on which the OSF/Motif GUI is based infringed on an AT&T old patent. In February 1991, AT&T sent a letter to all members of the M.I.T. X Consortium demanding licensing fees for the "backing store" patent[70] from all X Window System vendors.

> The "backing store" functionality available in the X Windows System is an implementation of this patented invention, therefore, your company/institution needs a license from AT&T for the use of this patent,

AT&T wrote in the letter.[71]

Naturally, this action by AT&T created a new wave of outrage among UNIX and X Windows users. For example, The League for Programming Freedom (Cambridge, MA) is fond of using this case in its fight against software patents. Writes Richard Stallman, the League's president:

> Sometimes it is possible to patent a technique that is not new precisely because it is obvious—so obvious that no one would have published a paper about it. ...
>
> The technique of backing store was used at M.I.T. [Artificial Intelligence Laboratory] in the Lisp Machine System before AT&T applied for a patent. ... The Lisp Machine developers published nothing about backing store at the time, considering it too obvious. It was mentioned when a programmers' manual explained how to turn it on and off.
>
> But this manual was published one week after the AT&T patent application—too late to count as prior art to defeat the patent. So the AT&T patent may stand, and M.I.T. may be forbidden to continue using a method that M.I.T. used before AT&T.
>
> The result is that the dozens of companies and hundreds of thousands of users who accepted the software from M.I.T. on the understanding that it was free are now faced with possible lawsuits. ... The X Window System project was intended to develop a window system that all developers could use freely. This public service goal seems to have been thwarted by patents.[72]

Of course, many disagreed with this somewhat simplistic argument, as the subsequent discussion in the computer press had shown.[73]

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[70] U.S. Patent 4,555,775 *(Dynamic generation and overlaying of graphic windows for multiple active program storage areas);* filed 10/7/82; granted 11/26/85; inventor Robert C. Pike (one of UNIX pioneers); owner AT&T.

[71] This letter is available on line for anonymous retrieval via Internet from **`jupiter.ee.pitt.edu:/pub/patent/backing-store-letter`**.

[72] The League for Programming Freedom, *Against software patents.*

[73] *ACM Forum.,* 35 COMMUNICATIONS OF THE ACM 6 at 13–16 (June 1992).

Note that this move by AT&T coincided with its formation of USL and its apparent realization of importance of graphical user interfaces for its business and for the industry as a whole. Indeed, it was then when USL was about to unveil its first shrink-wrapped GUI-based UNIX system, SVR4.2.[74]

3 *USL* v. *BSDI* Lawsuit

3.1 Background

As the AT&T/USL team was coming closer to its ultimate goal of securing a UNIX standard in the engineering workstation market and, at the same time, dominating the UNIX PC market with a solid binary compatible standard UNIX system with a popular GUI that would be able to compete head-to-head with Microsoft's Windows NT and IBM's OS/2, USL made a sudden and unexpected move: it filed a massive trademark and copyright infringement lawsuit against a tiny Virginia startup software company, Berkeley Software Design, Inc. (BSDI),[75] who had just started selling a version of UNIX that it said was free of any AT&T code and thus required no license from USL.

The shock that USL's decision to sue BSDI sent throughout the UNIX community was described by a reporter for the *UNIX Review* magazine:

> Roel Pieper, president of UNIX System Laboratories (USL), has made a concerted (and unprecedented) effort to bring together the traditionally warring factions that have so long been part of the UNIX scene: AT&T, Open Software Foundation (OSF), and Berkeley. This effort has met with success, as most recently seen in the release of SVR4.2. In this context, the suit filed in June 1992 by USL against Berkeley Software Design, Inc. (BSDI) and UC Berkeley seems oddly out of place.[76]

At issue were the kind of trademark, copyright and licensing issues that corporate users are increasingly attentive to, but that UNIX followers have seldom had to worry about.[77]

3.2 Trademark Issue

What sparked the action, according to USL's senior corporate counsel Theodore Weitz,[78] was BSDI's use of a telephone number, 1-800-ITS-UNIX, to sell its

[74] One other controversial patent assigned to AT&T that has not been discussed is U.S. Patent 4,744,028, *Method and Apparatus for Efficient Resource Allocation,* granted in 1988 to Narendra K. Karmarkar of Bell Labs. This patent covers an industrial application (airline scheduling) of Karmarkar's linear programming algorithm. This does not appear consistent with the tree Supreme Court decisions on the subject *(Gottschalk* v. *Benson, Parker* v. *Flook, Diamond* v. *Diehr)* in the view of the Court's statement that merely limiting the field of applications for the algorithm does not make it patentable.

[75] BSDI is a closely held company formed May 21, 1991, by several persons including employees at CSRG who were involved in the development of Berkeley's BSD UNIX versions.

[76] Cheryl Gerber, *USL vs. Berkeley,* 10 UNIX REVIEW 11 at 32–36 (1992).

[77] Maryfran Johnson, *USL suit raises Berkeley Unix hacklers,* supra *note 24.*

[78] Cheryl Gerber, *USL vs. Berkeley, supra* note 76.

BSD/386 source code for $995, at a fraction of AT&T cost. In the court papers AT&T stated that

> ...on May 6, 1986, AT&T's UNIX trademark was placed on the Principal Register of the United States Patent and Trademark Office for computer programs, under Registration No. 1,392,203. ... This registration is valid, subsisting, in full force and effect, and is now incontestable pursuant to 15 U.S.C. Section 1065.[79]

And later:

> The trademark UNIX is widely known as identifying the products of AT&T and its successor, USL.[80] ... BSDI's use of its "ITS-UNIX" telephone number is intended to and likely to cause confusion, or to cause mistake, or to deceive in that BSD/386 is not a "UNIX" product nor is BSDI authorized or licensed to use the UNIX trademark in connection with any of its products or services.[81]

Part of the initial lawsuit was settled when BSDI withdrew the telephone number, replacing it with 1-800-800-4BSD.

USL then filed an amended lawsuit charging both BSDI and the University of California at Berkeley (through its Computer Systems Research Group, CSRG) with copyright infringement, breach of contract, and misappropriation of trade secrets.

3.3 Breach of Contract Issues

As was mentioned earlier that AT&T licensed UNIX source code to the University of California in 1973 to be used "solely for authorized administrative and educational purposes," and to be distributed (upon incorporating CSRG improvements) "only to persons who have acquired a UNIX® system source code license from AT&T or USL."[82] Referring to that agreement, USL charged UC Berkeley with breach of contract, citing a sentence written by Berkeley's CSRG announcing the release of its new UNIX release, *Networking Release 2* [Net2], in June 1991:[83] the software is copyrighted by the university but "may be freely distributed," CSRG wrote. The announcement also says that Net2 "is available to anyone and requires no previous license, either from AT&T or The Regents..."[84] USL asserted that this was not so, for the university had only an educational license for UNIX source code expressly prohibiting commercial use.

In addition, USL charged that BSDI (who based its BSD/386 PC UNIX clone on Berkeley's Net2) "intentionally and unjustifiably induced the Regents" of the University of California to breach their contract with AT&T by prompting them to release Net2 with the copyright notice requiring no AT&T license.

[79] U.S. Dist. Court, Newark, N.J. *92-1667 (DRD)*, Complaint, §7.

[80] *Id.*, §10.

[81] *Id.*, §18.

[82] See Section 1.3.

[83] Note: this announcement immediately followed the formation of BSDI in May 1991.

[84] U.S. Dist. Court, Newark, N.J. *92-1667 (DRD)*, First Amended Complaint, §39.

3.4 False Advertising Issues

USL invoked the Lanham Trademark Act[85] accusing BSDI and the Regents of "false or misleading representation of fact" claiming that both Berkeley's Net2 and BSDI's BSD/386 were "substantially copied from, based upon, or derived from" AT&T's source code,[86] contrary to the defendants' claim that their respective systems contained no AT&T code. This, USL claimed, caused it "to sustain damage to its business."

3.5 Misappropriation of Trade Secret Issues

Since the USL claimed to have "treated the UNIX operating system software and the methods and concepts used therein as trade secrets," it charged that, by giving away the Net2 source code, Berkeley misappropriated AT&T/USL trade secrets.

3.6 Copyright Infringement Issues

In addition, USL claimed, Net2 was "substantially copied, based upon or derived from the UNIX® system source code." Since "BSDI, in turn, has used the [Net2] software as a primary source for the development of a commercial computer system, known as *BSD/386 Source,* which it has been publicly distributing,"[87] BSDI's code too infringed on USL's copyright in violation of the federal Copyright Act.[88]

Berkeley countered that USL had no valid copyright at all. "AT&T published UNIX without copyright notice and did not register UNIX with the copyright office within five years of its first publication," said Mary MacDonald, counsel for the University of California. Indeed, one cannot sue for copyright infringement if the material in question had not been registered within five years of first publication. USL countered that its UNIX releases constituted a *limited* publication, which is a rather questionable assertion given that AT&T UNIX is "licensed to anyone worldwide who is willing to pay the license fee."

Even if USL proved that it had a valid copyright, it would then have to prove the infringement by pointing to the similarities in the code and proving that those similarities resulted from *intentional* copying.

3.7 Employment Restrictions Issue

One issue that especially upset BSDI's followers[89] was a part of the lawsuit seeking to prevent BSDI from hiring anyone with extensive knowledge of Berkeley UNIX source code. (According to the court papers, BSDI apparently hired some CSRG

[85] 15 U.S.C. Sec. 43(a).
[86] U.S. Dist. Court, Newark, N.J. *92-1667 (DRD),* First Amended Complaint, §68–96.
[87] *Id.*, §4–5.
[88] 17 U.S.C. §101 *et seq.*
[89] In particular, the activists of a USENET forum called **alt.suit.att-bsdi**, most of whom are computer-related professionals who have a vested interest in this issue, devoted much attention to the topic, going as far as to start boycotting AT&T and its products.

programmers directly involved in the development of Berkeley's BSD and Net2 releases.) This was considered chilling portent for future code-sharing and UNIX development.[90]

3.8 Secrecy at Trial Issue

USL asserted repeatedly that it had all the evidence necessary to substantiate its copyright infringement allegations against BSDI. "The similarities are not what you would find if someone were developing software independently. It is obvious if you examine their code and our code," said Sanford Tannenbaum, USL executive vice president and general counsel. Countered BSDI's counsel, Leslie Fithan, "To the extent there is a similarity, it has to be substantial and it has to be in protectable aspects of the code. Copyright protects expressions, but it doesn't protect functionality."[91]

Despite a lot of rhetoric from both sides, no substantial copyright infringement evidence had been produced by the USL. USL tried to win an approval to keep all its evidence confidential, to be shown only to the attorneys and outside experts, thus attempting to litigate a trade secret without losing the ability to claim it as a trade secret after the litigation is over.[92] Obviously, disclosure of its alleged trade secrets

[90] IBM had a remarkably similar experience a short time ago that also generated a lot of negative publicity for the company.

Early in 1992, IBM filed a lawsuit against Seagate Technology Corp. (for "misappropriation of IBM trade secrets") that yielded injunction that was preventing Seagate from pursuing its development of some key computer hard disk technology and employing Dr. Peter I. Bonyhard, a former IBM employee and an expert at that same technology. Just like USL, IBM claimed that it was protecting its 20-year multi-million-dollar investment.

Seagate countersued alleging that IBM was intimidating its employees, preventing them from leaving the company to work with competing companies [*Seagate countersues IBM,* 38 ELECTRONIC NEWS 1900 at 8 (Feb 1992)].

In June 1992, IBM filed an amended complaint, charging that Seagate specifically targeted IBM personnel for recruitment in order to obtain access to IBM trade secrets. Specifically, IBM was alleging that Dr. Brendab Hegarty, formerly an IBM technology manager and now a Seagate senior vice president and the firm's chief technical officer, was one of the individuals so targeted, and that Hagerty had disclosed unspecified but highly secret IBM information to a range of Seagate engineers [Gerry Khermouch, *IBM raises stakes in Seagate suit,* 38 ELECTRONIC NEWS 1916 at 1 (June 1992)]. (I do not recall what the final outcome of the case was, but I'll find out when I have more time. *-bp*)

Although no AT&T/USL employees were involved in the *USL* v. *BSDI* suit, many BSDI employees, allegedly, worked at Berkeley's CSRG where they had unrestricted access to AT&T technology (source code).

[91] Cheryl Gerber, *USL vs. Berkeley, supra* note 76.

[92] While it is very common for companies to request confidential hearings in trade secret cases, such motions are not granted very often. Upjohn Co. is an example of a company that has had to wrestle with such issues on a fairly regular basis. As Upjohn has been sued repeatedly in the U.S. and other countries in the recent years by people claiming that Upjohn's "Halcion" (triazolam) sleeping pill caused them to exhibit violent behavior (with sometimes tragic consequences) as a side effect, the question frequently arises in court whether Upjohn must release its copyright- and trade-secret-protected documents pertaining to the drug in question.

Plaintiffs in one such case, *(Grundberg* v. *Upjohn,* Utah Dist. Court, Aug 21, 1991), sought to have lifted a confidentiality order on 8,000 pages of documents and to overturn Upjohn's right over 90,000 pages. On January 2, 1991, Upjohn had filed a copyright infringement action and sought would be too high a price to pay for the prosecution of a small software vendor such as BSDI.

3.9 Possible Lawsuit Motives

Given the evidence presented in the *USL* v. *BSDI* court papers, BSDI's intention to commercialize Berkeley's Net2 UNIX is beyond doubt. BSDI was formed in June 1991 by (supposedly) Berkeley's CSRG employees who participated in the development of BSD UNIX. Only one month later, CSRG announced its new BSD UNIX release, Net2, stating that "it does not require AT&T license." Shortly thereafter, BSDI started distributing its BSD/386 (based on Net2 and thus requiring no AT&T license, according to a BSDI brochure) to some 300 beta-test sites.

Indeed the most important question then was whether the Net2 distribution really contained any copyrighted AT&T/USL code, as USL had claimed. Both the plaintiff and the defendant provided expert witnesses who, upon thorough examination of USL and BSDI source code, testified that there was indeed some overlap between the two UNIX implementations. The two parties interpreted this overlap very differently, however. Berkeley and BSDI claimed that there was only one, unique, way to express all contested portions of source code such that they comply with the relevant standards and conventions, whereas AT&T presented the source code overlap as the evidence for copyright infringement by Berkeley and BSDI.

Leaving aside the issue of whether Net2 and, therefore, BSD/386 *did*, in fact, contain some AT&T code, one might ask if it was worth the effort of a giant company

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an injunction to prevent dissemination of the documents because of alleged imminent copyright infringement [Diana Brahams, ***Drug-company data and the public interest,*** 338 The Lancet 8765 at 502 (Aug 24 1991)]. Judge J. Thomas Greene heard the case on June 14, 1991, and found overwhelmingly in favor of Grundberg. "Upjohn intended to use the copyright laws to thwart accessibility to the public of information contained in documents which may be offered and admitted into evidence in court proceedings," Judge Greene wrote. [Julie Gannon Shoop, ***Halcion nightmare: lawsuits question safety of popular sleep aid,*** 28 Trial at 12 (March 1992).]

However, this unsuccessful "unorthodox attempt to use federal copyright laws to block publication of company documents" [A. S. Hayes and W. Lambert, ***Upjohn loses unorthodox effort to block publication of its data,*** The Wall Street J. p. B3 (June 19 1991)] did not stop Upjohn from trying the same strategy in the future cases. In addition, according to British medical magazine, The Lancet, the laws outside the U.S. (e.g., in the U.K.) dictate that "the right to keep as confidential information belonging or pertaining to an individual person or company may be weighed against the competing public interest in having that information disclosed." [Diana Brahams, ***Confidentiality of Upjohn's triazolam documents,*** 338 The Lancet 8761 at 243 (July 27 1991).]

A year later, the courts' mood suddenly started turning more favorable for Upjohn. In July 1992, a state judge in Missouri dissolved his own earlier order sealing internal Upjohn's records on Halcion, which were used as part of the defense in a murder trial. The defendant died shortly after her conviction but her lawyer argued that the records should be released.

In October 1992, an intermediate appeals court in Dallas ruled that Upjohn is entitled to a temporary order sealing the trial exhibits related to the Halcion from public examination. The appeals court overturned a prior denial by Texas trial judge John Marshall. Similarly to the USL arguments in the ***USL*** v. ***BSDI***, Upjohn contended that making such records public would expose its trade secrets to competitors.

Shortly thereafter, when this decision was appealed, the Texas Supreme Court ruled that Upjohn did indeed have the right to limit access to its internal records during trial. [***See*** assorted articles on the Upjohn's lawsuit, The Wall Street Journal (July 2, Oct 13, Oct 22 1992).]

like AT&T/USL to prosecute a tiny startup like BSDI, and alienating the community of UNIX users and developers in the process. Although the answer to this might have been negative even as recently as a few years ago, when no plans were present to push UNIX beyond its original market of scientists, engineers, and computer nerds, the situation has changed dramatically. By early 1990s, the USL was shifting its focus to the business market of PCs and microcomputers, for it apparently saw tremendous growth opportunities there. In this new context, USL claimed, this lawsuit was necessary to protect its corporate assets and to send a clear message that it would defend its intellectual property against infringers.[93] For USL's ambitious president, Roel Pieper, the matter was simple and clear:

> If it's for no commercial purpose, everything is available for free. But this [Berkeley-BSDI activity] is a clear example of trying to give away our assets, our intellectual property. We tried for five months to talk with BSDI and the university before suing. I have to do something now so it doesn't happen again.

From BSDI's point of view, however, this lawsuit was perceived as a harassment action intended to drive the small firm out of business. Academic community, for the most part, predictably, sided with BSDI, whereas analysts who follow the commercial UNIX market had little sympathy to spare for BSDI's role as David to the Goliath of USL and AT&T:

> The academic communities had free access to UNIX source code, and these guys from BSDI thought they could take it and build a business on it. Now USL is putting the nail in the coffin and right through their heads.[94]

Shortly after the USL had been acquired by Novell in 1993 (see Section 1.6), the *USL* v. *BSDI* lawsuit was settled out of court.[95]

[93] Indeed, if AT&T/USL had reasons to believe that there was AT&T code in Net2 or paraphrased routines, or program structures, it had the right and obligation to sue. Moreover, the word ***obligation*** should be taken literally here: if the officers of a company don't protect the assets of the company (e.g. computer code, trade secrets, and other intellectual property), the stockholders have the right to sue the officers to recover lost profits.

[94] Rilli Kirzner, a UNIX analyst at Dataquest Inc., as reported by [Maryfran Johnson, ***USL suit raises Berkeley Unix hacklers***, ***supra*** note 24.]

[95] From the USL/Novell and BSDI joint press release on February 4, 1994:

> UNIX System Laboratories, Inc./Novell Corporation ("Novell") and Berkeley Software Design, Inc. ("BSDI") announce the settlement of litigation based upon BSDI's distribution of its computer software product known as BSD/386.
>
> BSDI has agreed to substitute a port of the University of California's forthcoming new release to be known as 4.4 BSD(Lite) for BSD/386. For a limited period of time, BSDI may continue to distribute its BSD/386 product, although certain portions of the code may [only] be distributed in binary form.
>
> All other terms of the settlement are confidential.

4 Conclusions

Throughout its history, AT&T and its corporate offspring have been consistent in trying to guard their intellectual property against unauthorized use. However, this activity intensified noticeably after AT&T divestiture in 1982, and then decentralization (splitting into business units, starting in the late 80s), as the company increasingly found itself in a fiercely competitive marketplace rapidly replacing stagnating monopoly of the 70s and early 80s.

Under pressure to become leaner and more efficient, AT&T can no longer afford things it did in its monopolistic past, like giving away its patents (Sec. 2.1), or not enforcing its patents (Pike's "backing store", Sec. 2.4), or charging low licensing fees at a loss (Sec. 1.3), whether its competitors and the academic community like it or not.

As the legal history of UNIX shows, a big modern corporation such as AT&T or IBM, is likely to use whatever legal means it has at its disposal (e.g., patent, copyright, trade secret, trademark, and other intellectual property laws) to gain a competitive advantage. Regardless of the merit of *USL* v. *BSDI* lawsuit, the message USL was trying to get out was that it was not an auxiliary appendix of the slow bureaucratic MaBell anymore that could easily be taken advantage of, but an extremely competitive, sharply focused, and highly innovative firm aggressively protecting its intellectual property rights.