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Envisioning Copyright Law's Digital Future

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ENVISIONING COPYRIGHT LAW'S DIGITAL FUTURE

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"May you live in interesting times."[1]

Copyright initially developed in response to the printing press and gradually evolved to encompass other methods of mechanically storing and reproducing works of authorship, such as photography, motion pictures, and sound recordings. The advent of broadcasting — the ability to perform works at distant points — led to the expansion of copyright to encompass exploitation of creative expression in new markets. The digital revolution represents a third distinct wave of technological innovation that portends significant changes in copyright protection. By bringing about new modes of expression (such as computer programming and digital sampling of music) and empowering anyone with a computer and an Internet connection to flawlessly, inexpensively, and instantaneously reproduce and distribute works of authorship on a wide scale, digital technology represents possibly the most profound challenge to copyright law. This article divides the analysis of digital technology into two categories: (1) squeezing computer software within copyright's non-functionally oriented protection regime and (2) developing new rules and governance institutions to address the ease of reproduction and porosity of the digital platform. Part I of the article traces the two decades of evolution of copyright protection for computer software and demonstrates that copyright law has proven quite adaptable to this hybrid of expressive and utilitarian creativity. The courts have enabled copyright law to serve effectively as an anti-piracy regime without allowing it to intrude unduly into patent law's domain. This holding of the line has in fact moved the battles over legal protection for software into the patent and contract realms. Part II explores the implications of digital distribution of content for copyright's future. Content industries perceive grave threats to their continued existence (and the production of creative works) while technology companies and a growing array of consumer, programmer, and civil liberty organizations fear that further expansion of copyright protection jeopardizes technological innovation and basic civil liberties. A growing cadre of legal academics predict copyright's ultimate demise. As a basis for assessing these claims and understanding the implications of this new and rapidly improving digital platform, this article examines the technological changes taking place, industry structures, legal environment, and evolving social and political landscape. Although these forces remain in flux, the digital revolution can be seen increasingly to shift resources and pressure for reform toward copyright enforcement, standard setting (in an effort to develop effective

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1. Attributed to an ancient Chinese curse. *See* NOBLE (North of Boston Library Exchange), Reference File, *May You Live in Interesting Times*, *at* http://www.noblenet.org/reference/inter.htm (last visited Apr. 29, 2002).

controls on content distribution), antitrust regulation of standard setting processes, and a more general transformation of copyright law from a property rights orientation toward a regulatory regime.

Like the printing press and broadcast technology, the digital revolution represents a profound set of opportunities and challenges for those engaged in the creation and distribution of original works of authorship and the consumer products that allow these works to be perceived, reproduced, altered, and distributed. It also actuates lobbyists, legislators, jurists, and scholars to rethink the legal regimes governing these activities and industries. Digital technology has enabled new modes of expression (including computer programming, synthesized music, video games, multi-media works), dramatically reduced the costs for artists and authors to compose new works (for example, recording artists today can record and mix professional quality recordings using relatively inexpensive recording equipment and software), and opened up vast networks for the distribution of expressive works.

Copyright law has served as a principal means for protecting works of authorship for nearly three centuries. It would be a mistake, however, to view copyright as a static body of law. Its very contours have been shaped by advances in the technologies of creating, reproducing, and disseminating such works.[2] Copyright developed in response to the printing press and gradually evolved to encompass other methods of mechanically storing and reproducing works of authorship, such as photography, motion pictures, and sound recordings. The advent of broadcasting — the ability to perform works at distant points — led to the expansion of copyright to encompass exploitation of creative expression in new markets. The digital revolution represents a third distinct wave of technological innovation. By bringing about new modes of expression (such as computer programming) and empowering anyone with a computer and an Internet connection to flawlessly, inexpensively, and instantaneously reproduce and distribute works of authorship, it represents possibly the greatest set of challenges to the copyright law.

Although digital technology became a reality more than 50 years ago, the only adjustments made to copyright law to address this new technology until a decade ago consisted of the addition of a brief definition of "computer program" and authorization for those who lawfully acquire computer programs to run such programs on their computers and make a

2. *See* PAUL GOLDSTEIN, COPYRIGHT'S HIGHWAY: FROM GUTENBERG TO THE CELESTIAL JUKEBOX (1994); Jessica Litman, *Copyright Legislation and Technological Change*, 68 OR. L. REV. 275, 353-54 (1989).

backup copy.[3] The past decade, however, has witnessed rapid evolution of case law applying copyright law to the protection of computer programs and a deluge of new provisions driven by the threat of unauthorized reproduction and distribution of copyrighted works by means of computers and networks. More pages of copyright law have been added to the U.S. Code in the past decade than in the prior 200 years of the republic, dating back to the first U.S. Copyright Act adopted in 1790.

The explanation for this upheaval reflects two distinct ways in which digital technology "challenges" copyright law. The first concerns the copyrightability of computer software. As written expression intended to serve utilitarian purposes (instructing machines), computer software does not fit comfortably within the copyright scheme. Copyright law protects expression, but excludes function so as not to impinge upon patent law's more exacting threshold and shorter duration for protection of utilitarian works. Yet Congress' pragmatic decision to extend copyright protection to software (while at the same time reaffirming the exclusion of functionality) posed substantial challenges for the software industry and the courts. After some early struggles that threatened to afford software developers far-reaching control over basic features of computer technology through copyright law, the federal courts have, following the Second Circuit's lead in the *Altai* case, developed and implemented a practical test for distinguishing idea from expression in software programs that finessed the metaphysical dilemmas and avoided the creation of undue economic power in computer markets.[4] Copyright law provides a thin layer of protection for computer software, effectively prohibiting wholesale piracy of computer programs without affording control for interface specifications and other

3. The grand overhaul of copyright law enacted in 1976 paid scant attention to the novel issues and challenges posed by digital technology. The legislative history of the 1976 Act, however, acknowledged that "computer data bases, and computer programs, to the extent that they incorporate authorship in the programmer's expression of original ideas, as distinguished from the ideas themselves" fall within the definition of "literary works" covered by the Act. H.R. Rep. No. 94-1476, 54 (1976). Congress had, in 1974, referred the question of how best to protect computer software to the National Commission on New Technological Uses of Copyrighted Works (CONTU). Act of Dec. 31, 1974, Pub. L. No. 93-573, § 201, 88 Stat. 1873. In its 1979 report to Congress, CONTU concluded that the intellectual work embodied in computer software should be protected principally under copyright law. National Commission on New Technological Uses of Copyrighted Works, Final Report (1979). Congress adopted these recommendations a year later in the Computer Software Copyright Act of 1980, Pub. L. No. 96-517, 94 Stat. 3007, 3028 (codified at 17 U.S.C. §§ 101, 117). A 1990 amendment prohibited the rental of computer software. *See* Computer Software Rental Amendments of 1990, Pub. L. No. 101-650, 104 Stat. 5089, 5134-37 (1990) (codified at 17 U.S.C. § 109(b)).

4. *See* Peter S. Menell, *An Epitaph for Traditional Copyright Protection of Network Features of Computer Software*, 43 ANTITRUST BULL. 651 (1998).

essential elements of computer functionality. The courts have also allowed subsequent software developers some leeway to reverse engineer software programs in order to develop interoperable programs. As a result, there has not been significant legislative pressure to re-equilibrate this balance.

The threat to the copyright system posed by digital reproduction and distribution through computer networks has taken a bit longer to develop, but manifest it has with a vengeance unmatched in the annals of copyright history. The explanation for this delayed onset lies in the technology itself. Until the early 1980s, most copyrighted works, apart from computer software itself and text, were not available in digital form. The size of high quality digital files and the computer speed needed to perceive high fidelity sound recordings and high resolution video outstripped the memory capacity and processor speeds of all but the most advanced computers. Like early generations of phonographs and film projectors, digital content was beyond the reach of the consumer marketplace. Beginning with the compact disk technology in the early 1980s and the burgeoning microcomputer marketplace soon thereafter, rapid advances in digital technology have increasingly brought digital content to consumers. The World Wide Web, inaugurated in the early 1990s, opened up vast new pathways for content to flow and further innovations in computer storage capacity, processor speed, data compression, consumer electronic products (MP3 players, digital video recorders), network software (including peer-to-peer architectures), and bandwidth have transformed the distribution of content. The effects have been most strongly felt in the sound recording industry, but the film and television industries have also begun to experience the effects of the digital revolution.

Copyright's adaptation to the unauthorized reproduction and distribution of protected works through digital technology has proven much more wrenching and much less stable than its expansion to protect computer software. Notwithstanding the tremendous reach of copyright, the major content industries have come to believe that existing law may not be adequate to protect content in the digital age.[5] The rapid rise of peer-to-peer networks and the success of hackers in cracking and disseminating means of decrypting the DVD Content Scrambling System (and other technological protection measures) demonstrate the vulnerability of the current network architecture to widespread unauthorized distribution and

5. *See* Declan McCullagh, *Anti-Copy Bills D.C.* (Mar. 22, 2002), *at* http://www.wired.com/news/politics/0,1283,51245,00.html; Declan McCullagh, *The DMCA is the Toast of D.C.* (May 17, 2002) ("To Hollywood, the DMCA is just the first step: It only made most types of 'circumvention' illegal. Now movie studios want to require copy-protection technology in most software and hardware."), *at* http://www.wired.com/news/politics/0,1283,52602,00.html.

the limited capacity of existing legal protections to combat "digital piracy."[6] Moreover, the intrusive and chilling effects of copyright's most recent protections against digital piracy have aroused concerns about the freedom of technology companies to innovate, the "rights" of consumers to engage in fair use of protected works, the ability of computer programmers to study encryption techniques, the privacy of Internet users, and competition in content creation and distribution. Just about everyone with a computer, an Internet connection, and a desire to access content has become aware of the raging debate over copyright's proper role. As a result, the next chapter of copyright law is still on the drafting table with the outcome a mystery. We can expect frequent installments to follow.

This symposium celebrates Judge Newman's remarkable 30 years on the federal bench by exploring the future of bodies of law in which he took particular interest, copyright among them. Before turning to the particular challenges posed by digital technology, Judge Newman's larger body of copyright and related intellectual property jurisprudence deserves at least brief mention. Judge Newman has authored more than two dozen copyright opinions covering the gamut of doctrines and works of authorship.[7] His decisions have revealed coherence and clarity in a notoriously

6. *See* Melanie Warner, *Free Music: The New Napsters* (Aug. 12, 2002), *at* http://www.fortune.com/indext.jhtml?channel=print_article.jhtml&doc_id=208834.

7. Universal City Studios, Inc. v. Corley, 273 F.3d 429 (2d Cir. 2001); Itar-Tass Russian News v. Russian Kurier, 153 F.3d 82 (2d Cir. 1998); Samara Bros. v. Wal-Mart, 165 F.3d 120 (2d Cir. 1998) (dissent); Ringold v. Black Entertainment, 126 F.3d 70 (2d Cir. 1997); Beaudin v. Ben & Jerry's, 95 F.3d 1 (2d Cir. 1996); Merchant v. Levy, 92 F.3d 51 (2d Cir. 1996); Agee v. Paramount Communications, 59 F.3d 317 (2d Cir. 1994); Twin Peaks Productions, Inc. v. Publications Int'l, Ltd., 996 F.2d 1366 (2d Cir. 1993); United States v. Larracuente, 952 F.2d 672 (2d Cir. 1991); Childress v. Taylor, 945 F.2d 500 (2d Cir. 1991); Kregos v. Associated Press, 937 F.2d 700 (2d Cir. 1991); ASCAP v. Showtime/The Movie Channel, 912 F.2d 563 (2d Cir. 1990); New Era Publications Int'l v. Henry Holt Co., 884 F.2d 659 (2d Cir. 1989) (dissenting from denial of en banc rehearing); Silverman v. CBS Inc., 870 F.2d 40 (2d Cir. 1989); Gaste v. Kaiserman, 863 F.2d 1061 (2d Cir. 1988); Salinger v. Random House, 811 F.2d 90 (2d Cir. 1987); Financial Information, Inc. v. Moody's Investors Service, Inc., 751 F.2d 501 (2d Cir. 1984) (concurrence); Warner Bros. Inc. v. ABC, 720 F.2d 231 (2d Cir. 1983); RX Data Corp. v. Dep't of Soc. Serv., 684 F.2d 192 (2d Cir. 1982); Burroughs v. MGM, Inc., 683 F.2d 610 (2d Cir. 1982) (concurrence); Stern Electronics, Inc. v. Omni Video Games, Inc., 669 F.2d 852 (2d Cir. 1982); CBS v. ASCAP, 620 F.2d 930 (2d Cir. 1980); Chappell v. Pumpernickel Pub., 79 F.R.D. 531 (D. Conn. 1977).

Judge Newman has also contributed to academic scholarship on copyright law. *See* Jon O. Newman, *Academia and the Bench: "Toward a More Productive Dialogue" in Expanding the Boundaries of Intellectual Property* (Mar. 2001): Jon O. Newman, *New Lyrics for an Old Melody: The Idea/Expression Dichotomy in the Computer Age*, 17 CARDOZO ARTS & ENT. 691 (July 1999); Jon O. Newman, *Not the End of History: The Second Circuit Struggles with Fair Use*, 37 J. COPYRIGHT SOCIETY OF THE USA, No. 1 (Oct. 1989); Jon O. Newman, *Copyright Law and the Protection of Privacy*, 12 COLUM.-VLA J. L. & ARTS 459 (1988).

complex and subtle body of law. Soon after ascending to the Second Circuit in 1979, Judge Newman dealt with the tail end of a series of antitrust disputes facilitating the licensing of music to broadcasters, the legacy of copyright's adaptation to the second major technological era.[8] He has since authored numerous opinions applying copyright law's subtle and delicate balances across the gamut of works of authorship. On multiple occasions, Judge Newman has developed intellectual property doctrines that have been adopted widely across the circuit courts and embraced by the United States Supreme Court.[9]

Given Judge Newman's service on the Second Circuit, with its jurisdictional hub in one of the world's leading centers of the arts, finance, and industry, it is not surprising that he would be called upon to apply copyright law to challenges posed by digital technology. This article places these contributions within the larger fabric of copyright's adaptation to the digital age. Part I of this article examines how copyright law has been adapted to afford protection for computer software. Part II examines the larger structural challenges to copyright law posed by the development and diffusion of digital reproduction and distribution technologies.

I. Copyright Protection for Computer Software

Although computer technology became a reality more than 50 years ago, the evolution of copyright protection for computer software took some time to develop. Over the past two decades, software protection has become a significant part of copyright's landscape. This section first traces the origins of legal protection for computer software. It then focuses on the development of copyright protection and the principal challenges posed by according copyright protection to a form of expression inherently intertwined with the accomplishment of functional tasks. It concludes by examining the future role

8. Columbia Broad. System, Inc. v. Am. Soc'y of Composers, Authors and Publishers, 620 F.2d 930 (2d Cir. 1980).

9. Judge Newman's analysis of joint authorship in Childress v. Taylor, 945 F.2d 1227 (2d Cir. 1991) has been followed widely. *See, e.g.*, Aalmuhammed v. Lee, 202 F.3d 1227 (9th Cir. 2000); Erickson v. Trinity Theatre, Inc., 13 F.3d 1061 (7th Cir. 1994); *see also* Thomson v. Larson, 147 F.3d 195 (2d Cir. 1998). As another example, in Financial Information, Inc. v. Moody's Investors Service, Inc., 751 F.2d 501, 509 (2d Cir. 1984) (concurrence), Judge Newman questioned the view of some Second and Ninth Circuit decisions endorsing the so-called "sweat of the brow" rationale "that copyright protection should be extended solely because of laborious effort." Explaining that such effort "is no reason for us to disregard the statutory criteria that Congress articulated in 1976 when it enacted the current statute," Judge Newman foreshadowed the Supreme Court's later decision reinforcing this principle. *See* Feist Publications, Inc. v. Rural Tel. Service Co., Inc., 506 U.S. 984 (1991).

and importance of copyright protection for the computer software industry.

A. Evolution of Legal Protection for Computer Software in the Early Computer Industry

In order to place copyright protection for computer software in proper perspective, it is useful to trace the development of computer technology and the formation of the computer industry.

1. The Development of Computer Technology and the Computer Industry[10]

The Advent of Digital Computer Technology. In the mid-19th century, Charles Babbage envisioned mechanical devices (the Difference Engine and the Analytical Engine) to perform arithmetic operations. His designs, involving thousands of gears, proved impractical. One of his students, Lady Ada August Lovelace, proposed the use of punched cards to automate the operation of such devices.

Toward the end of the 19th century, a U.S. Census Bureau agent named Herman Hollerith developed a punched-card tabulating machine to automate the census. Drawing upon the use of "punched photography" by railroads (to encrypt passengers' hair and eye color on tickets), Hollerith proposed the encoding of census data for each person on a separate card which could be tabulated mechanically. After developing this technology for the Census Bureau, he formed the Tabulating Machine Company in 1896 to serve the growing demand for office machinery, such as typewriters, record-keeping systems, and adding machines. The company grew through the expansion of its business and merger with other office supply companies and in 1924, Thomas J. Watson, the company's general manager, changed the company's name to International Business Machines Corporation (IBM). By the late 1920's, IBM was the fourth largest office machine supplier in the world, behind Remington-Rand, National Cash Register (NCR), and Burroughs Adding Machine Company. IBM made numerous improvements to tabulating technology during the 1920s and 1930s, eventually developing a machine that could compare cards, a signifi-

10. The discussion that follows draws upon PAUL E. CERUZZI, A HISTORY OF MODERN COMPUTING (1998) and MARTIN CAMPBELL-KELLY & WILLIAM ASPRAY, COMPUTER: A HISTORY OF THE INFORMATION MACHINE (1996).

cant innovation which enabled machines to perform simple logic (if-then) operations.

The critical breakthrough defining modern computers was the harnessing of electrical impulses to process information. In 1939, Professor John Vincent Atanasoff, with the help of his graduate student Clifford Berry, developed the first electronic calculating machine. This computer could solve relatively complicated physics computations. They built a more sophisticated version, the ABC (Atanasoff Berry Computer), in 1942. Shortly thereafter, driven in part by wartime demand for computing technology, Professor Howard Aiken, funded in substantial part by IBM, developed a massive electromechanical computer (MARK I). This machine contained three-fourths of a million parts, hundreds of miles of wire, and was 51 feet long, 8 feet high and 2 feet deep. It could perform three additions per second and one multiplication every six seconds. Although it used an electric motor and a serial collection of electromechanical calculators, the MARK I was in many respects similar to the design of Babbage's analytical engine.

At about this same time, Dr. John Mauchly persuaded the U.S. Army to fund the development of a new computing device to compute trajectory tables to improve the targeting of ordnance. Mauchly envisioned using vacuum tubes rather than mechanical relays to store binary information. In collaboration with J. Presper Eckert, Jr., a young electrical engineer, Mauchly completed the Electronic Numerical Integrator and Computer (ENIAC) in 1946. This computer occupied 15,000 square feet, weighed 30 tons, and contained 18,000 vacuum tubes. It operated in decimal (rather than binary) code and therefore needed 10 vacuum tubes to represent a single digit. The ENIAC could perform over 80 additions or 8 multiplication operations per second.

Subsequent computers use a binary base. By setting electrical switches to "on" (electrical current is flowing) or "off" (current is not flowing), early computers could create a single "bit" of information. That piece of information is read as either a 1 ("on") or a 0 ("off"). By translating information into a series of such 1s and 0s, computers could perform mathematical operations.

The first computing machines did not utilize computer "programs" in a form that we would recognize today. These machines were in essence a series of hard-wired circuits constructed to perform one particular computational task. That is, the mathematical function performed by the computer was determined by the physical arrangement

and structure of the circuits. The computers had to be rewired in order to perform a different function. These machines were comprised solely of what we today call "hardware" — the physical circuits that make up the machine.

During the late 1940s, scientists developed the first machines that could store and use encoded instructions or programs. This set of innovations dramatically increased the flexibility and usefulness of computers. Users could perform a variety of computational tasks without having to rewire the basic hardware of the computer. Instead, they could simply direct the computer to perform one of the functions that it had stored in its memory. The actual computer in these programmable or "universal" machines is the central processing unit (CPU). The CPU has two principal components: an arithmetic logic unit which performs a basic set of "primitive functions" such as addition and multiplication and a control unit which directs the flow of electric signals within the computer. In essence, a computer processes data by performing controlled sequences of primitive functions.

First Generation of Programmable Computers (1951-59). The flexibility provided by programmability greatly enhanced the utility of computers. In the early 1950s, Mauchly and Eckert developed the first commercially viable electronic computer, the Universal Automatic Computer (UNIVAC I) for Remington-Rand Corporation. Limitations on electronic technology, however, constrained the computing power of the first generation of computers. These computers relied upon vacuum tubes, which were bulky, failed frequently, consumed large amounts of energy, and generated substantial heat. This first generation of computers was programmed in binary code (zeros and ones), which could be understood by only a few specialists. IBM introduced its first commercial computer, the IBM 650, in 1954. IBM made incremental improvements to this technology and emerged as the market leader.

Second Generation Computer Technology (1959-63). Because computers use binary electronic switches to store and process information, the great challenge for the computer industry was to reduce the size of these switches. The second generation of computers replaced vacuum tubes with transistors, which were smaller, required less power, and ran without generating significant heat. This and other innovations in data storage technology made computers smaller, faster, and more reliable. The first scientific computer using transistors was the IBM 7090. A second important innovation of this era was the development of

high-level computer languages, which enabled computer specialists to write programs using coded instructions that resemble human language. The IBM 705, introduced in 1959, used the FORTRAN language processor. This model became the standard machine for large scale data processing companies. Notwithstanding these innovations, computers of this generation remained complex and expensive because circuits had to be wired by hand.

Third Generation Computer Technology (1963-75). The development of integrated circuits enabled computer manufacturers to incorporate many transistors within the layers of semiconductor material. The greater computing power and efficiency of computers brought the cost of data processing services within the reach of an increasing number of businesses. Many businesses contracted with companies specializing in data processing services. A few acquired their own computers. IBM's 360 series of mainframe computers emerged during this period as the market leader. These machines used a single machine language. As businesses upgraded their equipment within the 360 series, they could continue to use the same computer programs. This increased the benefit of owning a computer (rather than out-sourcing data processing) and expanded the mainframe market. This larger market generated greater demand for computer programmers and spawned new companies to provide computer-related services. An independent software industry began to emerge. The third generation of computer technology also witnessed the implementation of time-sharing and telecommunication technologies, which enabled multiple users to access a computer from remote terminals. In addition, computers developed during this period could handle multiple tasks simultaneously (parallel processing and multiprogramming).

In 1965, the Digital Equipment Corporation introduced the first minicomputer, the PDP-8 (Programmed Data Processor). This machine was substantially smaller and about one-fourth the price of mainframe computers. Minicomputers substantially widened the market for computers and computer programmers. Domestic consumers purchased 260 minicomputers and 5,350 mainframes in 1965. It was at that time that Gordon Moore, one of the founders of Intel Corporation, noted that the number of transistors per square inch on integrated circuits had doubled every year since the integrated circuit was invented and he predicted, in what has come to be known as "Moore's Law," that this trend would continue for the foreseeable future. In sub-

sequent years, the pace slowed down a bit, but data density has doubled approximately every 18 months.

By the 1970s, computers incorporated "semiconductor chips" no larger than a human fingernail and containing more than 100,000 transistors. Minicomputer unit sales surpassed mainframe unit sales by 1974. As chip technology advanced, the size of computers decreased while their computing power increased. Semiconductor chips today can hold many millions of transistors.

Fourth Generation Computer Technology (1975-present). In the early 1970s, Intel Corporation developed the microprocessor, a chip that contains the entire control unit of a computer. Very large scale integration (VLSI) technology led to the development of the microcomputer. Originally oriented toward computer hobbyists, microcomputers came to dominate the computer industry by the mid-1980s. With its Apple II computer system, which included a keyboard, monitor, floppy disk drive, and operating system, Apple Computer vastly expanded the market for computers. Microcomputer unit sales surpassed minicomputer unit sales in 1976, their second year of production. By 1986, sales of microcomputers (costing less than $1000) reached approximately 4 million units and produced revenues of almost $12 billion, giving microcomputers the largest share of computer industry revenues.

2. Legal Protection for Computer Software

During the early stages of the computer industry (through 1965), most computer software was provided by computer manufacturers along with the hardware. By bundling software in this way, computer manufacturers could fully recoup their investments in developing computer programs. Computers were highly specialized machines that were not sold through retail channels of distribution and manufacturers could adequately protect their technology through contractual agreements and trade secrecy protections. There was little or no interest in protecting software technology separately because patent protection adequately protected innovations in these manufacturers' products.

As computers became more powerful and versatile, specialty software firms emerged to provide customized and general purpose software in direct competition with the mainframe manufacturers. The contract/trade secrecy model continued to meet the needs of most firms in the nascent industry. Programming continued to be a

highly specialized field in which programs were customized to the specific machine, customer, and tasks. A software company could tailor a contract to the specific customer and monitor and enforce the agreement.

As computer technology advanced, computers proliferated, and specific models emerged as market leaders, it became feasible for software companies to market systems and particular application programs to a wider market. The advent of minicomputers in the mid-1960s furthered this development. As a result, the market for software expanded from service and custom programming to the development and marketing of software products that could be installed with relatively little customization to the user's computer system. The unbundling of application software products from IBM hardware in 1970, as a result of antitrust pressures, further spurred the market for software products.

Trade secret provided the principal means of protecting computer software up until the early 1980s.[11] The marketing of computer software products, however, raised questions regarding whether trade secrecy protection could be maintained after products have been released in the open market. A line of cases quelled this concern by affirming that trade secrecy protection remained viable so long as the product was distributed in a form (such as object code) that made it difficult for others to decipher its secrets.[12] It is very difficult and time consuming to reverse engineer a computer program from its object code.[13]

Nonetheless, as software products supplanted custom programming and entered larger markets, software companies became increasingly concerned that trade secret protection would not provide sufficient protection for their products. While trade secret law pro-

11. *See* MacGrady, *Protection of Computer Software – An Update and Practical Synthesis*, 20 HOUS. L. REV. 1033, 1045 (1983).

12. *See* Q-Co Industries v. Hoffman, 625 F.Supp. 608, 617 (S.D.N.Y. 1985) (program secret where source code secret, even though object code disseminated); Telex Corp. v. IBM, 510 F.2d 894, 911, 928-30 (10th Cir.), *cert. dismissed*, 423 U.S. 802 (1975); Data General Corp. v. Digital Computer Controls, Inc., 297 A.2d 433 (Del. Ct. Chanc. 1971), *aff'd*, 297 A.2d 437 (Del. S.Ct. 1972); RESTATEMENT (THIRD) OF UNFAIR COMPETITION § 39 cmt. f, Reporter's Note ("[P]ublic sale of a product does not preclude continued protection against the improper acquisition of use of information that is difficult, costly, or time-consuming to extract through reverse engineering.")

13. *See* Andrew Johnson-Laird, *Software Reverse Engineering in the Real World*, 19 UNIV. DAYTON L. REV. 843 (1994).

vided rights against those in a direct contractual relationship with the software manufacturer, it did not provide adequate means of protecting against competition from third parties. In addition, the cost of maintaining trade secret protection for a product could be significant. Yet computer software, by its very nature as written work intended to serve utilitarian purposes, defied easy categorization within the existing modes of intellectual property protection: as written code, it could be analogized to literary expression, which is typically protected through copyright law; but as sets of instructions for performing tasks, software was more closely related to the functional works protected by patent law.

Patent protection for computer software, however, would not take off until the 1980s for a variety of reasons. In the 1960s, the major computer manufacturers generally opposed software patents. As the leading manufacturer of computer hardware (and relying upon a business model of bundling hardware with software which enabled it to appropriate ample return to its investment in software innovation), IBM opposed the patenting of software, which could pose a threat to its dominance of the computer market. Other computer manufacturers shared this view. A Presidential Commission, including executives from leading computer manufacturers, recommended against patent protection for computer software.[14] Nonetheless, the Patent and Trademark Office did issue some software patents during this period.[15] In 1968, the PTO instituted guidelines stating that "a computer programming process which produces no more than a numerical, statistical or other informational result is not directed to patentable subject matter."[16]

The Supreme Court's 1972 decision in *Gottschalk v. Benson*[17] proved a more significant impediment to the patenting of computer software. The Court of Customs and Patent Appeals, the predecessor to the Court of Appeals for the Federal Circuit, had found that a method of programming a general-purpose computer to convert bi-

14. Report of the President's Commission on the Patent System, *"To Promote the Progress of . . . Useful Arts" in an Age of Exploding Technology* (1966).

15. For example, Applied Data Research, Inc. received a patent on a sorting program in 1968. U.S. Patent No. 3,380,029 (1968).

16. 33 Fed. Reg. 15,609, 15, 610 (1968). The guidelines did, however, provide that a programmed computer could be claimed as a component of a patentable process if it was "combined in an unobvious manner with physical steps" that produced a physical result.

17. 409 U.S. 63 (1972).

nary-coded decimal numerals into pure binary form fell within the subject of the Patent Act.[18] The Supreme Court reversed on the ground that such a patent would effectively preempt an algorithm for converting one form of numerical representation to another. Although leaving open the door to software-related inventions — "We do not hold that no process patent [involving a computer] could ever qualify if it did not meet the requirements of our prior precedents"[19] — the Court's decision created uncertainty regarding the standards for obtaining patent protection for computer-related inventions and pushed the industry toward a copyright solution.

B. Squeezing Computer Software into the Copyright Mold

From rather inauspicious beginnings, copyright law emerged as a principal mode of legal protection for computer software by the early 1980s. A commentator in 1968 wrote that "the scope of copyright's protection may be so limited and uncertain in application that programmers would hesitate to seek copyright."[20] Although expressing doubt as to the copyrightability of computer programs, the Copyright Office decided to permit registration of programs so long as three conditions were met: (1) the work contained sufficient original authorship; (2) the work was published with a copyright notice; and (3) copies of the program submitted for registration were in human-readable form (i.e., source code, not object code).[21] From 1964 through January 1, 1977, only 1205 programs had been registered with the Copyright Office, of which 971 came from just two leading mainframe manufacturers, IBM and Burroughs.

Faced with the difficult challenge of fitting computer and other new information technologies under the existing umbrella of intellectual property protection, Congress in 1974 established the National Commission on New Technological Uses of Copyrighted Works (CONTU), to study the implications of the new technologies and recommend revisions to the federal intellectual property laws. After conducting hearings and receiving expert reports, a majority of the panel

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

19. *Gottschalk*, 409 U.S. at 71.

20. Note, *Computer Programs and Proposed Revisions of the Patent and Copyright Laws*, 81 HAR. L. REV. 1541, 1549 (1968).

21. *See* Announcements SML-47 from the Office of the Register of Copyrights (May 1964); Copyright Office Circular 31D (Jan. 1965); George D. Cary, *Copyright Registration and Computer Programs*, 11 BULL. COPYRIGHT SOC'Y 362 (1964).

of copyright authorities and interest group representatives concluded that "computer programs, to the extent that they embody an author's original creation, are proper subject matter of copyright."[22] CONTU was clear, however, that the fundamental limitation reflected in the idea/expression dichotomy that copyright law cannot protect "any idea, procedure, process, system, method of operation, concept, principle, or discovery"[23] should apply with equal force with regard to computer programs.[24]

Congress implemented CONTU's recommendations in 1980 by adding a definition of "computer program" to §101 of the Copyright Act and amending §117 of the Act to authorize the owner of a copy of a computer program to make another copy or adaptation of the program for the purpose of running the program on a computer.[25] Congress defined "computer program" as "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result."

The copying of literal program code and other aspects of computer programs, such as structural features of a program, operating elements (e.g., menu command systems), program outputs (e.g., screen displays), and user interfaces, quickly became the focus of numerous lawsuits and the courts were called upon to determine the scope of copyright protection for computer software. The first generation of cases involved literal copying of program code and the courts did not have much difficulty in finding that wholesale reproduction of a computer program, in whatever form the computer program was embodied,[26] was a violation of the Copyright Act. One of the very first

22. National Commission on New Technological Uses of Copyrighted Works, Final Report 1 (1979) (hereinafter CONTU Report).

23. 17 U.S.C. § 102(b).

24. *See* CONTU Report, *supra* note 22, at 20. "[C]opyright protection for programs does not threaten to block the use of ideas or program language previously developed by others when that use is necessary to achieve a certain result. When other language *is* available, programmers are free to read copyrighted programs and use the ideas embodied in them in preparing their own works." *Id.* (emphasis in original). "One is always free to make the machine do the same thing as it would if it had the copyrighted work placed in it, but only by one's own creative effort rather than by piracy." *Id.* at 21.

25. H.R. REP. NO. 96-1307, at 23, *reprinted in* 1980 U.S.C.C.A.N. 6460, 6482 (noting that the 1980 Amendments to the Copyright Act were intended to implement CONTU's recommendations).

26. *See* NEC v. Intel Corp., 1989 WL 67434, at *1 (N.D. Cal. 1989) (microcode); Apple Computer v. Franklin Computer Corp., 714 F.2d 1240, 1246-48 (3d Cir. 1983),

such cases, *Stern Electronics v. Kaufman*,[27] came before Judge Newman a few years after his accession to the Court of Appeals. This case raised a novel twist. The owner of rights in an arcade video game sued a competitor for infringing the copyright in the audiovisual work comprising the game. The competitor defended on the ground that it had not copied the underlying computer code, but rather had imitated the screen display images, which failed to satisfy the fixation and originality requirements of the Copyright Act.[28] Since the player of the game affects the displayed image through manipulation of the game controller, the owner of the copyright in the underlying code could not, in the view of the defendant, establish that the displayed image is "fixed" or "original." Judge Newman acknowledged this nuance, but noted that:

> many aspects of the sights and the sequence of their appearance remain constant during each play of the game. These include the appearance (shape, color, and size) of the player's spaceship, the enemy craft, the ground missile bases and fuel depots, and the terrain over which (and beneath which) the player's ship flies, as well as the sequence in which the missile bases, fuel depots, and terrain appears. Also constant are the sounds heard whenever the player successfully destroys an enemy craft or installation or fails to avoid an enemy missile or laser. It is true, as appellants contend, that some of these sights and sounds will not be seen and heard during each play of the game in the event that the player's spaceship is destroyed before the entire course is traversed. But the images remain fixed, capable of being seen and heard each time a player succeeds in keeping his spaceship aloft long enough to permit the appearances of all the images and sounds of a complete play of the game. The repetitive sequence of a substantial portion of the sights and sounds

cert. dismissed, 464 U.S. 1033 (1984) (program stored in ROM); Williams Electronics, Inc. v. Arctic Int'l, Inc., 685 F.2d 870 (3d Cir. 1982) (object code, program stored in ROM).

27. 669 F.2d 852 (2d Cir. 1982).

28. Copyright Act, 17 U.S.C. § 102 (a) provides that "[c]opyright protection subsists . . . in original works of authorship fixed in any tangible medium of expression, now known or later developed in which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. . . ."

> of the game qualifies for copyright protection as an audio-visual work.[29]

A more vexing issue for the courts proved to be the extent to which copyright protection extends to non-literal aspects of computer programs (such as their sequence, structure, and organization) and interface specifications. The language in some of the early cases, however, was uncritically expansive,[30] and some later courts[31] failed to apply doctrines limiting copyright protection for functional works in a manner that was faithful to §102(b) of the Copyright Act, its jurisprudential antecedents, and the definition of "computer program" in the Act. Over the past decade, the courts have largely overcome these early missteps and interpreted the copyright law in a way that minimizes incursion into the patent law's domain: the protection of utilitarian works. Four particular issues proved particularly challenging: (1) protection for those aspects of computer software that allow for interoperability, whether between computing machines, machines and software programs, or different software programs; (2) whether programmers can reverse engineer software programs; (3) the protection of menu command structures; and (4) protection for graphical user interfaces.[32]

1. Protectability of Interface Specifications

In the first major test of copyright protection for computer software, Franklin Computer Corporation copied nearly verbatim fourteen computer programs developed by Apple Computer Corporation for its Apple II line of products. Franklin sought to make its computer "compatible" with the Apple II, for which a large supply of independently developed application programs were available. Apple sued for copyright infringement. Franklin defended principally on the ground that operating system programs, as opposed to application programs, are not within the proper domain of copyright law. The lower court

29. *Stern Electronics*, 669 F.2d at 885.

30. *See, e.g.,* Apple Computer v. Franklin Computer Corp., 714 F.2d 1240, 1246-48 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984).

31. *See* Whelen Associates, Inc. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222 (3d Cir. 1986); Lotus Dev. Corp. v. Paperback Software, Int'l, 740 F.Supp. 37 (1990); Lotus Dev. Corp. v. Borland Int'l, 799 F.Supp. 203 (1992).

32. The discussion that follows draws upon Peter S. Menell, *An Epitaph for Traditional Copyright Protection of Network Features of Computer Software*, 43 ANTITRUST BULL. 651 (1998).

and the Third Circuit ruled in Apple's favor.[33] The defendant made no attempt to determine which elements of the program were protectable and which were not. Nonetheless, in addressing the issue of whether achieving interoperability would justify some limited copying, the court commented that:

> The idea which may merge with the expression, thus making the copyright unavailable, is the idea which is the subject of the expression. The idea of one of the operating system programs is, for example, how to translate source code into object code. If other methods of expressing that idea are not foreclosed as a practical matter, then there is no merger. *Franklin may wish to achieve total compatibility with independently developed application programs written for the Apple II, but that is a commercial and competitive objective which does not enter into the somewhat metaphysical issue of whether particular ideas and expressions have merged.*[34]

Since two entirely different programs may achieve the same "certain result[s]" (e.g., generate the same set of protocols needed for interoperability), the court was not justified in making such an expansive and uncritical statement about the scope of copyright protection for computer programs. CONTU was clear that "[o]ne is always free to make the machine do the same thing as it would if it had the copyrighted work placed in it, but only by one's own creative effort rather than by piracy."[35] In addition, applying the merger analysis at such a high level of abstraction (where the idea of the program is how to translate source code into object code) would essentially block the development of interoperable systems, creating a powerful property right through copyright protection.

A few years later the Third Circuit reinforced this misguided application of the merger doctrine in assessing copyright protection for application programs. In *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*,[36] the owner of a dental laboratory hired a custom software firm to develop a computer program that would organize the bookkeeping and administrative tasks of its business. Whelan, the principal programmer, interviewed employees about the operation of the laboratory and then developed a program to run on the laboratory's IBM

33. Apple Computer v. Franklin Computer Co., 545 F.Supp. 812 (E.D. Pa. 1982), *aff'd* 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984).

34. *Apple Computer*, 714 F.2d at 1253 (emphasis added).

35. *See* CONTU Report, *supra* note 22, at 21.

36. 797 F.2d 1222 (3d Cir. 1986), *cert. denied* 479 U.S. 1031 (1987).

Series One computer. Under the terms of an agreement, Whelan retained the copyright in the program and agreed to use its best efforts to improve the program while Jaslow Laboratory agreed to use its best efforts to market the program. Rand Jaslow, an officer and shareholder of the laboratory, set out to create a version of the program that would run on other computer systems. Whelan sued for copyright infringement. At trial, the evidence showed that the Jaslow program did not literally copy Whelan's code, but there were overall structural similarities between the two programs. As a means of distinguishing protectable expression from unprotectable idea, the court reasoned:

> *[T]he purpose or function of a utilitarian work would be the work's idea, and everything that is not necessary to that purpose or function would be part of the expression of the idea.* Where there are many means of achieving the desired purpose, then the particular means chosen is not necessary to the purpose; hence, there is expression, not idea.[37]

In applying this rule, the court defined the idea as "the efficient management of a dental laboratory," for which countless ways of expressing the idea would be possible.[38] Drawing the idea/expression dichotomy at such a high level of abstraction implies an expansive scope of copyright protection. Furthermore, the court's conflation of merger analysis and the idea/expression dichotomy implicitly allows the protection under copyright of procedures, processes, systems, and methods of operation, which are expressly excluded under §102(b). Although the case did not directly address copyright protection for computer code establishing interoperability protocols for computer systems, the court's mode of analysis dramatically expanded the scope of copyright protection for computer programs. If everything below the general purpose of the program was protectable under copyright, then it would follow that particular protocols were protectable because there would be other ways of serving the general purpose of the program. Such a result would effectively bar competitors from developing interoperable programs and computer systems.

The *Whelan* test was roundly criticized by commentators[39] and other courts began developing alternative approaches to the scope of

37. *Id.* at 1236 (emphasis in original, citations omitted).

38. *Id.*

39. *See, e.g.,* Stephen R. Englund, *Idea, Process, or Protected Expression?: Determining the Scope of Copyright Protection of the Structure of Computer Programs*, 88 MICH. L. REV. 866, 881 (1990); Menell, *infra* note 49, at 1074, 1084-85; Marc T. Kretschmer, *Copyright Protection For Software Architecture: Just Say No!*, 1988 COLUM. BUS. L. REV. 823, 837-39; Peter G. Spivack, *Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of*

copyright protection that better comported with the fundamental principles of copyright protection. A few months after the *Whelan* decision, the Fifth Circuit confronted a similar claim of copyright infringement based upon structural similarities between two programs designed to provide cotton growers with information regarding cotton prices and availability, accounting services, and a means for conducting cotton transactions electronically.[40] In declining to follow the *Whelan* approach, the court found that the similarities in the programs were dictated largely by standard practices in the cotton market (what the court called "externalities"), such as the "cotton recap sheet" for summarizing basic transaction information, which constitute unprotectable ideas.[41]

Five years later, the Second Circuit in *Computer Associates International v. Altai, Inc.*[42] expressly rejected the *Whelan* approach to determining the scope of copyright protection for computer programs. Computer Associates, a leading developer of mainframe software, had

Computer Software, 35 U.S.L.A. L. REV. 723, 747-55 (1988); Thomas M. Gage, *Whelan Associates v. Jaslow Dental Laboratories: Copyright Protection for Computer Software Structure – What's the Purpose?*, 1987 WIS. L. REV. 859, 860-61 (1987); 3 NIMMER ON COPYRIGHT § 13.03(F), at 13-62.34. The principal defenders of the Whelan approach were lawyers for software companies seeking broad protection under copyright law. *See* Arthur R. Miller, *Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since CONTU?*, 106 HARV. L. REV. 977 (1993) (counsel for Lotus Dev. Corp.); Jack E. Brown, *"Analytical Dissection" of Copyrighted Computer Software – Complicating the Simple and Confounding the Complex*, 25 ARIZ. ST. L. J. 801 (1993) (counsel for Apple Computer Corp.); Anthony L. Clapes, Patrick Lynch & Mark R. Steinberg, *Silicon Epics and Binary Bards: Determining the Proper Scope of Copyright Protection for Computer Programs*, 34 U.C.L.A. L. REV. 1493 (1987) (lawyers for IBM).

40. Plains Cotton Cooperative Assoc. v. Goodpasture Computer Service, Inc., 817 F.2d 1256 (5th Cir. 1987).

41. *Id.* at 1262. The court found persuasive the decision in Synercom Technology, inc. v. University Computing Co., 462 F.Supp. 1003 (N.D.Tex. 1978), in which Judge Higginbotham analogized the "input formats" of a computer program (the organization and configuration of information to be inputted into a computer) to the "figure-H" pattern of an automobile stick shift.

> Several different patterns may be imagined, some more convenient for the driver or easier to manufacture than others, but all representing possible configurations. . . . The pattern (analogous to the computer "format") may be expressed in several different ways: by a prose description in a driver's manual, through a diagram, photograph, or driver training film, or otherwise. Each of these expressions may presumably be protected through copyright. But copyright protects copying of the particular expressions of the patterns, and does not prohibit another manufacturer from marketing a car using the same pattern. Use of the same pattern might be socially desirable, as it would reduce the retraining of drivers.

Id. at 1013.

42. 982 F.2d 693 (2d Cir. 1992).

developed a program which could operate on different IBM mainframe computers (with different operating systems). With access to the Computer Associates' program, Altai developed a competing program serving a similar purpose which also operated on multiple IBM mainframes. Computer Associates sued for infringement. The District Court criticized *Whelan*'s "simplistic test" for determining similarity between computer programs,[43] rejecting the notion that there is but one idea per program and that as long as there were alternative ways of expressing that one idea, then any particular version was protectable under copyright law. Focusing on the various levels of the computer programs at issue, the court determined that the similarities between the programs were dictated by external factors — such as the interface specifications of the IBM operating system and the demands of functionality — and hence no protected code was infringed.[44]

On appeal, the Second Circuit fleshed out a detailed analytical framework for determining copyright infringement of computer program code:

> In ascertaining substantial similarity under this approach, a court would first break down the allegedly infringed program into its constituent structural parts. Then, by examining each of these parts for such things as incorporated ideas, expression that is necessarily incidental to those ideas, and elements that are taken from the public domain, a court would then be able to sift out all nonprotectable material. Left with a kernel, or perhaps kernels, of creative expression after following this process of elimination, the court's last step would be to compare this material with the structure of an allegedly infringing program.[45]

The court's abstraction-filtration-comparison test[46] recognized that ideas could exist at multiple levels of a computer program and not solely at the most abstract level. It also emphasized that the ultimate comparison is not between the programs as a whole but must focus solely on whether protectable elements of the program were copied. Of most importance with regard to fostering interoperability, the court

43. Computer Associates Int'l v. Altai, Inc., 775 F.Supp. 544, 558 (E.D.N.Y. 1991).

44. *Id.* at 561-62.

45. *Altai*, 982 F.2d at 706.

46. The court derived this formulation from 3 MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT §§ 13.03[F] (1991). *See also* David Nimmer, Richard L. Bernacchi & Gary N. Frischling, *A Structured Approach to Analyzing the Substantial Similarity of Computer Software in Copyright Infringement Cases*, 20 ARIZ. ST. L. J. 625 (1988).

held that copyright protection did not extend to those program elements where the programmer's "freedom to choose" is

> circumscribed by extrinsic considerations such as (1) mechanical specifications of the computer on which a particular program is intended to run; (2) compatibility requirements of other programs with which a program is designed to operate in conjunction; (3) computer manufacturers' design standards; (4) demands of the industry being serviced; and (5) widely accepted programming practices within the computer industry.[47]

Directly rejecting the dictum in *Apple v. Franklin*,[48] the Second Circuit held that external factors such as interface specifications, *de facto* industry standards, and accepted programming practices are not protectable under copyright law. The Second Circuit's test judges these external factors at the time of the allegedly infringing activities (i.e., *ex post*), not at the time that the first program is written.[49]

Commentators warmly embraced the *Altai* decision[50] and the abstraction-filtration-comparison approach has been universally adopted by the courts since 1992.[51] Although a few courts have misapplied the test in specific instances, the *Altai* test has supplanted the overbroad merger analysis set forth in *Whelan*. In the context of network technologies, this doctrinal shift has effectively excluded protocols from the scope of copyright protection. In *Gates Rubber v. Bando Chem. Indus., Ltd.*,[52] the Tenth Circuit expressly adopted the *Altai* approach and expanded the range of external factors to be used in filtering out unpro-

47. *Altai*, 982 F.2d at 709-10 (citing 3 NIMMER, at § 13.03[F][3]).

48. 982 F.2d 1246, 1253 (3d Cir. 1983).

49. The court emphasized that the first to write a program for a particular application should not be able to "'lock up' basic programming techniques as implemented in programs to perform particular tasks." 982 F.2d at 712 (quoting Peter S. Menell, *Analysis of the Scope of Copyright Protection for Application Programs*, 41 STAN. L. REV. 1045, 1087 (1989)).

50. *See* Bender, *Computer Associates v. Altai: Rationality Revails*, 8 THE COMPUTER LAWYER 1 (Aug. 1992); Peter S. Menell, *The Challenges of Reforming Intellectual Property Protection for Computer Software*, 94 COLUM. L. REV. 2644, 2652 (1994); Lemley, *Convergence in the Law of Software Copyright?*, 10 HIGH TECH. L.J. 1 (1995). The principal exceptions were lawyers for software companies that have advocated for a broad scope of copyright protection for their client's products. *See* Clapes & Daniels, *Revenge of the Luddites: A Closer Look at Computer Associates v. Altai*, 9 THE COMPUTER LAWYER 11 (Nov. 1992); Brown, *supra* note 39, at 816-18.

51. More than a dozen courts have expressly followed the *Altai* approach. *See, e.g.*, Baystate Tech., Inc. v. Bentley Systems, Inc., 947 F.Supp. 1079 (D.Mass. 1996).

52. 9 F.3d 823 (10th Cir. 1993).

tectable elements to include hardware standards and mechanical specifications, software standards and compatibility requirements, industry programming practices, and practices and demands of the industry being serviced.[53] The court also noted that processes used in designing a computer system, or components therein (e.g., modules, algorithms), must also be filtered out as unprotectable under §102(b).[54] While not ruling that interface specifications are uncopyrightable as a matter of law, the Eleventh Circuit's decision in *Bateman v. Mnemonics, Inc.*[55] joined other circuits following *Altai* in holding that "external considerations such as compatibility may negate a finding of infringement."[56] The court commented that "[i]t is particularly important to exclude methods of operation and processes from the scope of copyright in computer programs because much of the content of computer programs is patentable. Were we to permit an author to claim copyright protection for those elements of the work that should be the province of patent law, we would be undermining the competitive principles that are fundamental to the patent system."[57]

2. Permissibility of Reverse Engineering

A related issue bearing on the extent to which copyright protection may impede the development of interoperable computer systems concerns the extent to which competing manufacturers are able to reverse engineer a computer system to determine the codes governing interoperability.[58] Most computer software is distributed in object code form only, which is not directly readable by humans. If a software manufacturer is able to prevent competitors from learning the interface specifications necessary for interoperability because of more gen-

53. *Gates Rubber*, 9 F.3d at 836-43. *See also* Mitel v. Iqtel, 124 F.3d 1366, 1375 (10th Cir. 1997).

54. *Gates Rubber*, 9 F.3d at 836-37.

55. 79 F.3d 1532 (11th Cir. 1996).

56. *Bateman*, 79 F.3d at 1547. In an accompanying footnote, the court commented:

> Note that we use the word "may." Such a finding will depend on the particular facts of a case, and thus it would be unwise for us to try to formulate a bright-line rule to address this issue, given the importance of the factual nuances of each case. In no case, however, should copyright protection be extended to functional results obtained when program instructions are executed and such results are processes the type better left to patent and trade secret protection.

57. *Id.* at 1541 n.21.

58. *See generally* Pamela Samuelson & Suzanne Scotchmer, *The Law and Economics of Reverse Engineering*, 111 YALE L.J. 1575 (2002).

eral restrictions on the copying of program code containing the protocols, then the fact that the protocols are not protectable under copyright law would be nugatory since competitors would be precluded from learning the interoperability protocols. In some contexts, a computer program can be understood through input/output testing or other means (for example, physically and chemically peeling the layers of a chip and studying the design of the chip with a microscope) that do not require the making of copies of the computer code in which the protocols are embedded. In most circumstances, however, the only feasible means of deciphering the protocols governing interoperability is disassembly of the program, which involves translating the machine-readable binary object code into a form comprehensible by humans.[59] If the making of such copies (or translations) is an infringement, then the protocols would be effectively protected by copyright law.

In the 1980 amendments to the Copyright Act implementing the CONTU recommendations, Congress authorized the owner of a copy of a computer program to make another copy or adaptation of the program for the purpose of running the program on a computer.[60] In *Vault Corp. v. Quaid Software Ltd.*,[61] Vault, the manufacturer of a computer program designed to prevent unauthorized duplication of another program on the same diskette, alleged that Quaid had infringed its copyright in the copy protection program by loading it into its computer's memory for the purpose of reverse engineering the copy-protection device so as to circumvent it. Vault argued that §117 did not authorize such copying of the program because it was not for the "intended purpose" of running the program.[62] The court declined to construe §117 so narrowly on the ground that the statutory language did not contain any such restriction.[63]

Beyond the authorization to make copies of computer software as a means for utilizing the program within a computer (loading the pro-

59. *See generally* Johnson-Laird, *supra* note 13.

60. 17 U.S.C. § 117.

61. 847 F.2d 255 (5th Cir. 1988).

62. *Id* at 261.

63. *Id.* Where the company making the intermediate copies is not an "owner," then the authorization to make internal copies does not apply. *See* MAI Systems Corp. v. Peak Computer, Inc., 991 F.2d 511 (9th Cir. 1993), *cert. dismissed*, 501 U.S. 1033 (1994). It seems apparent, however, that licensees may properly invoke § 117. *See* David Nimmer, Elliot Brown & Gary N. Frischling, *The Metamorphosis of Contract into Expand*, 87 CAL. L. REV. 17 (1999).

gram into the internal memory of the computer), courts have afforded competitors substantial leeway to make copies and translations of object code for the purpose of studying how they operate and to develop interoperable products.[64] In *Atari Games v. Nintendo*,[65] Nintendo protected access to its video game console through proprietary interface specifications embedded in a computer program. After Atari Games deciphered the interface specifications and developed different (and non-infringing) computer code that enabled its games to run on Nintendo's game console, Nintendo sued for copyright infringement on the grounds that Atari Games copied protected elements of the Nintendo computer code in the process of decompilation. In assessing the appropriateness of making intermediate copies for the purpose of decompiling a competitor's computer program, the Court of Appeals for the Federal Circuit emphasized the principle that the fair use doctrine generally "permits an individual in rightful possession of a copy of a work to undertake necessary efforts to understand the work's ideas, processes, and methods of operation."[66] The court noted that "[a]n author cannot acquire patent-like protection by putting an idea, process, or method of operation in an unintelligible format and asserting copyright infringement against those who try to understand that idea, process, or method of operation."[67] Applying these principles, the court reasoned that "[w]hen the nature of a work requires intermediate copying to understand the ideas and processes in a copyrighted work, that nature supports a fair use for intermediate copying. Thus, reverse engineering object code to discern the unprotectable ideas in a computer program is a fair use."[68] The court placed the following limits on reverse engineering of object code: (1) "Any reproduction of protectable expression must be *strictly necessary* to ascertain the bounds of protected information within the work";[69] (2) Reverse engineering does not authorize commercial exploitation of "protected

64. *See* Julie E. Cohen, *Reverse Engineering and the Rise of Electronic Vigilantism: Intellectual Property Implications of "Lock-out" Programs*, 68 S. CAL. L. REV. 1091 (1995); Hayes, *The Legality of Disassembly of Computer Programs*, 12 COMPUTER/L.J. 1 (Oct. 1993); *LaST Frontier Conference Report on Copyright Protection of Computer Software*, 30 JURIMETRICS J. 15, 24-25 (1989) (hereinafter Consensus Statement).

65. 975 F.2d 832 (Fed. Cir. 1992).

66. *Id.* at 842. *See* Consensus Statement, *supra* note 64, at 23-25.

67. *Atari Games*, 975 F.2d at 842.

68. *Id.* at 843.

69. *Id.* (emphasis added).

expression";[70] and (3) "To invoke the fair use exception, an individual must possess *an authorized copy* of a literary work."[71]

A short time later, the Ninth Circuit adopted a similar interpretation of the fair use defense in *Sega Enterprises Ltd. v. Accolade, Inc.*[72] As in *Atari Games*, the maker of a video game console (Sega) sought to prevent unauthorized game manufacturers from developing games that could operate on their hardware. In the process of deciphering the interface specifications for the Sega system, Accolade made intermediate copies of the Sega software. Even though the final product did not infringe any protectable computer code, Sega sued on the ground that the intermediate copies infringed Sega's copyright in the console system software. On the basis of a thorough fair use analysis, the Ninth Circuit held that such intermediate copies were excused. Of particular note with regard to the network aspects of the technology, the court emphasized the strong public policy reasons for allowing a competitor to create interoperable works.[73] "If disassembly of copyrighted object code is *per se* an unfair use, the owner of the copyright gains a *de facto* monopoly over the functional aspects of his work."[74] The court concluded that "an attempt to monopolize the market [through copyright] by making it impossible for others to compete runs counter to the statutory purpose of promoting creative expression and cannot constitute a strong equitable basis for resisting the invocation of the fair use doctrine."[75]

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70. *Id.* at 844.

71. *Id.* at 843 (emphasis added). Since Atari Games had acquired a copy of Nintendo's source code under false pretenses – by misrepresenting to the Copyright Office that Atari Games was defending a copyright infringement action and that it would use the source code only in putting on its defense – the court refused to allow Atari Games use of the equitable defense of fair use. *Id.* at 841.

72. 977 F.2d 1510 (9th Cir. 1993).

73. *Id.* at 1526. Thus, the court rejected the dictum in *Apple v. Franklin*, 714 F.2d at 1253, stating that achieving compatibility "is a commercial and competitive objective which does not enter into the somewhat metaphysical issue of whether particular ideas and expressions have merged."

74. *Sega Enterprises*, 977 F.2d at 1526. *See also* Brief Amicus Curiae of Copyright Law Professor, Sega v. Accolade, 977 F.2d 1510 (9th Cir. 1992) (No. 92-15655), *reprinted in* 33 JURIMETRICS J. 147 (Fall 1992).

75. *Sega Enterprises*, 977 F.2d at 1524. *See* Cohen, *supra* note 64; Consensus Statement, *supra* note 64; CONTU Report, *supra* note 22, at 20 ("[C]opyright protection for programs does not threaten to block the use of ideas or program language previously developed by others when that use is necessary to achieve a certain result. When other language is available, programmers are free to read copyrighted programs and use the ideas embodied in them in preparing their own works."). The Ninth Circuit reinforced

Thus, the courts have determined that competitors may reverse engineer computer programs to understand the manner in which they operate and to determine interface specifications so to be able to develop interoperable programs.[76] Where necessary, such reverse engineering may properly involve the creation of intermediate copies of protected computer program code. Decompilation, however, can be laborious, time-consuming, and expensive.[77] In addition, prudent developers of interoperable products can significantly reduce their exposure to copyright liability by using "clean room" procedures, which add additional time and cost to the development process, but avoid the copying of protected computer code in their own products.[78] Nonetheless, as properly (and currently) applied by the courts, copyright law does not stand in the way of achieving interoperability at the level of hardware-hardware, hardware-software, or software-software interface specifications.

3. Protection for Menu Command Hierarchies

As noted earlier, Congress distinguished in its definition of "computer program" in §101 of the Copyright Act between the "set of statements or instructions to be used directly or indirectly in a computer" and the "certain result[s]" that they bring about. Thus, the language of the statute indicates that it is the program code itself that was brought within the scope of the Copyright Act in the 1980 Amendments and that the behavior of the program[79] (the "certain result[s]")

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and expanded this doctrine in Sony Computer Entertainment, Inc. v. Connectix Corp., 203 F.2d 596 (2000), *cert. denied*, 531 U.S. 871 (2000).

76. *See, e.g.*, Bateman v. Mnemonics, Inc., 79 F.3d 1532, 1540 (11th Cir. 1996) (following Sega v. Accolade); Computer Associates Int'l, Inc. v. Intel Corp., 982 F.2d 693, 700, 714-15 (2d Cir. 1992); NEC Corp. v. Intel Corp., 10 U.S.P.Q.2d 117 (N.D. Cal. 1989); E.F. Johnson Co. v. Uniden Corp. of America, 623 F.Supp. 1485, 1501 n.17 (D.C. Minn. 1985).

77. *See* Johnson-Laird, *supra* note 13.

78. A clean room procedure involves using two sets of computer engineers – one to decompile the target program to determine the interface specification and a second team that does not have access to the target program which develops the interoperable program solely on the basis of the interface specifications – to ensure that the final product does not contain any infringing code (and that the development team can prove that they independently developed their code). Copyright lawyers have developed detailed procedures for ensuring the integrity of this process. *See* Davis, *Scope of Protection of Computer-Based Works: Reverse Engineering, Clean Rooms and Decompilation*, 370 PLI/Pat 115, 151 (1993).

79. *See* Samuelson, et al., *infra* note 198, at 2316-26.

— such as the screen displays and menu command structures — are not covered by the copyright in the program.[80] These behaviors of the program are copyrightable, if at all, because they separately meet the requirements of the Copyright Act.[81]

The *Altai* court appreciated this distinction.[82] Although some courts have not clearly distinguished between copyright protection for the computer code and the "certain results" that they generate, they have nonetheless applied a sensible reading of §102(b) of the Act to limit protection of command systems governing the operation of a computer program.

The issue of the copyrightability of command systems for computer software arose most directly in litigation surrounding spreadsheet technology. Building upon the success of the Visicalc program developed for the Apple II computer, the Lotus Corporation marketed an enhanced and faster operating spreadsheet program incorporating many of Visicalc's features and commands into its 1-2-3 program for the IBM PC platform.[83] Lotus 1-2-3 quickly became the market leader for spreadsheets running on IBM and IBM-compatible machines and knowledge of the program became a valuable employment skill in the accounting and management fields. The 1-2-3 command hierarchy was particularly attractive because it provided a logical structuring of more than 200 commands and it enabled users to develop customized programs (called "macros") to automate particular accounting and business planning functions in their workplace. Businesses and users increasingly became "locked-in" to the 1-2-3 command structure as their human capital investments in learning the system and library of macros grew.[84] By the late 1980s, software developers seeking to enter the spreadsheet market could not ignore the large premium that many consumers placed on being able to use their investments in the 1-2-3

80. *See* Dennis S. Karjala & Peter S. Menell, *Applying Fundamental Copyright Principles to Lotus Development Corp. v. Borland Int'l, Inc.*, 10 HIGH TECH. L.J. 177 (1995).

81. To find otherwise would make little sense since different programs can produce the same behavior, as in interface specifications and screen displays.

82. [W]e note that our decision here does not control infringement actions regarding categorically distinct works, such as certain types of screen displays. These items represent products of computer programs, rather than the programs themselves, and fall under the copyright rubric of audiovisual works.

Altai, 982 F.2d at 703.

83. *See* Menell, *supra* note 50, at 1057.

84. *See* Neil Gandal, *Hedonic Price Indexes for Spreadsheets and an Empirical Test for Network Externalities*, 25 RAND. J. ECON. 160 (1994).

system in a new spreadsheet environment, even where a new spreadsheet product offered significant technical improvements over the Lotus spreadsheet.[85]

In the mid 1980s, Paperback Software International introduced a spreadsheet program (VP-Planner) that largely emulated the operation of the Lotus 1-2-3 product.[86] Paperback was careful to ensure that the program code did not copy the 1-2-3 code. Nonetheless, Lotus sued Paperback for copyright infringement, alleging that VP-Planner inappropriately copied the 1-2-3 menu structure, which included the choice of command terms, the structure and order of those terms, their presentation on the screen, and the long prompts. Relying upon the Third Circuit's merger test in *Whelan* and hence focusing simply upon whether such elements could be expressed in a variety of ways, Judge Keeton of the District Court of Massachusetts found for Lotus. Facing bankruptcy, Paperback agreed not to appeal the judgment as part of a settlement.[87]

After three years of intensive development efforts, Borland International, developer of several successful software products including Turbo Pascal and Sidekick, introduced Quattro Pro, its entry into the spreadsheet market. Unlike Paperback's VP-Planner spreadsheet which offered little beyond the 1-2-3 product, Quattro Pro made substantial design and operational improvements and earned accolades in the computer product review magazines.[88] Also unlike VP-Planner, Quattro Pro offered a new interface for its users which many purchas-

85. *See, e.g.,* Hogan, *Product Outlook: Fresh from the Spreadsheet Oven*, PC WORLD, Feb. 1998, at 100-02; Magis, *"Surpass" Spreadsheet Program Lives Up to Name, Beats Lotus 1-2-3*, WASH. POST, Apr. 25, 1998, at 26.

86. *See* Licklider, *Ten Years of Rows and Columns*, BYTE, Dec. 1989, at 324.

87. *See* Ould, *Legal Dispute Kept Paperback from Lotus Appeal*, PC WEEK, Jan. 21, 1991, at 138.

88. *See* Spreadsheet; *Borland International Inc.'s Quattro Pro for Windows and Quattro Pro 4.0 for DOS*, PC-COMPUTING, Dec. 1992, at 140 ("No doubt about it: Quattro Pro for DOS is the best DOS spreadsheet there is. Period."); *Borland's Quattro Pro Tops 2.5 Million Units Shipped*, BUSINESS WIRE, July 1, 1992 ("Since its introduction in October 1989, Quattro Pro has won an unprecedented 42 industry awards and honors worldwide from its users and product reviewers. Borland's Quattro Pro continues to outscore competing versions of Lotus 1-2-3 in key testing lab reviews. In two separate reviews, InfoWorld awarded Quattro Pro a spreadsheet report card score of 7.3 (INFOWORLD, Apr. 6, 1992), while Lotus 1-2-3 Release 2.4 received a 6.2 (INFOWORLD, June 1, 1992). Quattro Pro outscored Lotus 1-2-3 for DOS by significant margins in an independent study conducted by Usability Sciences Corp. Representative spreadsheet users determined Quattro Pro 4.0 to be easier to use, richer in features, more productive and the preferred spreadsheet over Lotus 1-2-3 for DOS."); Software Review, Quattro Pro 4.0; *Borland Inter-*

ers of spreadsheets preferred over the 1-2-3 interface. Nonetheless, because of the large number of users already familiar with the 1-2-3 command structure and those who had made substantial investments in developing macros to run on the 1-2-3 platform, Borland considered it essential to offer an operational mode based on the 1-2-3 command structure as well as macro compatibility.[89] Unlike VP-Planner, Borland's visual representation of the 1-2-3 command mode substantially differed from the 1-2-3 screen displays.

In order to clarify the legal status of its product, Borland brought a declaratory judgment action in California. Through astute jurisdictional maneuvering, Lotus was able to have the case consolidated with the *Paperback* case before Judge Keeton. After protracted litigation,[90] Judge Keeton found for Lotus using a somewhat refined version of the *Whelan* merger test to find that a menu command structure is protectable if there are many such structures theoretically available. He also found that Borland was not permitted to achieve macro compatibility with the 1-2-3 product, distinguishing the treatment of external constraints noted in the *Altai* decision on the ground that such constraints had to exist at the time that the first program was created — both the Altai and Computer Associates programs were designed to provide interoperability across IBM platforms. Thus, Judge Keeton effectively ruled that constraints governing the design of computer systems must be analyzed *ex ante* (based on technical considerations at the time the first program is written) and not *ex post* (after the market has operated to establish a *de facto* standard).

Borland appealed the judgment to the First Circuit.[91] By this point in time, the Second Circuit's *Altai* decision had received a

national Inc.'s Spreadsheet Software, COMPUTER SHOPPER, June 1992, at 536 ("Quattro Pro 4.0 simply shames other DOS-based spreadsheets, especially Lotus 1-2-3 r2.").

89. *See* Software Review: *Revamped Quattro Pro Closes in on Lotus 1-2-3*, PC COMPUTING, Nov. 1989, at 50 (favorable review noting that "Quattro Pro's compatibility with Lotus 1-2-3 Release 2.01 is as good as Lotus' own Release 3 – if not better. You can read or write 1A, 2.01, or 2.2 files, use a Lotus-compatible menu, and run 1-2-3 macros without conversion . . . . If you choose to avoid Windows, then Quattro is the leader in spreadsheet publishing and database integration. Its high degree of Lotus compatibility means that *1-2-3 retraining is minimal*, and its moderate hardware requirements (512 K of RAM and a hard disk) give is maximum flexibility." (emphasis added).

90. *See* Lotus Dev. Corp. v. Borland Int'l, Inc., 778 F.Supp. 78 (D. Mass. 1992); Lotus Dev. Corp v. Borland Int'l, Inc., 799 F.Supp. 203 (D. Mass 1992); Lotus Dev. Corp. v. Borland Int'l, Inc., 831 F.Supp. 202 (D. Mass. 1993); Lotus Dev. Corp. v. Borland Int'l, Inc., 831 F. Supp. 223 (D. Mass 1993).

91. Lotus Dev. Corp. v. Borland Int'l, Inc., 49 F.3d 807 (1st Cir. 1995).

favorable reception in the professional and academic journals and its approach had been adopted by a number of courts. The Ninth Circuit and the Federal Circuit had issued the *Sega* and *Atari Games* decisions, further emphasizing the legitimacy of developing interoperable systems. In addition, the Supreme Court's decision in *Feist Publications, Inc. v. Rural Telephone Service Co.*,[92] denying copyright protection for alphabetically organized telephone directories for lack of originality, repudiated the "sweat of the brow" doctrine[93] and reaffirmed the "long recognized" principle "that the fact/expression dichotomy limits severely the scope of protection in fact-based works."[94] In addition, the *Borland* case had attracted tremendous interest among academics and interest groups.[95]

The First Circuit viewed the case as presenting an issue of first impression: "[w]hether a computer menu command hierarchy constitutes copyrightable subject matter."[96] The court properly distinguished *Altai* as dealing with protection of programming code and not the results of such code. Instead, the court saw the subject matter of this case as a "method of operation" falling directly within the exclusions from copyright set forth in §102(b).[97]

> We think that "method of operation," as that term is used in §102(b), refers to the means which a person operates something, whether it be a car, a food processor, or a computer. Thus a text describing how to operate something would not extend copyright protection to the

92. 499 U.S. 340 (1991).

93. A few lower courts had found that copyright could be established on the basis of substantial effort in gathering facts. *See, e.g.,* Leon v. Pacific Tel. & Tel. Co., 91 F.2d 484 (9th Cir. 1937); Jeweler's Circular Publ'g Co. v. Keystone Publ'g Co, 281 F. 83 (2d Cir. 1922). The Supreme Court in *Feist* rejected this "sweat of the brow" theory and held that originality is a requirement of copyright and therefore, unless a factual work exhibits originality as a compilation, it cannot receive protection under the Copyright Act.

94. *Feist*, 499 U.S. at 350.

95. Amicus briefs were filed on behalf of computer scientists, intellectual property professors, the Computer Software Industry Association, a coalition of users' groups, the Software Entrepreneurs' Forum, the American Committee for Interoperable Systems, two coalition of major computer and software manufacturers, and the Computer and Business Equipment Manufacturers Association.

96. *Borland*, 49 F.3d at 813.

97. The court noted that it did not need to determine whether the menu command hierarchy was also unprotectable under copyright law because it was a system, process, or procedure. *Id.* at 814.

> method of operation itself; other people would be free to employ that method and to describe it in their own words. Similarly, if a new method of operation is used rather than described, other people would still be free to employ or describe that method.
>
> We hold that the Lotus menu command hierarchy is an uncopyrightable "method of operation." The Lotus menu command hierarchy provides the means by which users control and operate Lotus 1-2-3. If users wish to copy material, for example, they use the "Copy" command. If users wish to print material, they use the "Print" command. Users must use the command terms to tell the computer what to do. Without the menu command hierarchy, users would not be able to access and control, or indeed make use of, Lotus 1-2-3's functional capabilities. The Lotus menu command hierarchy does not merely explain and present Lotus 1-2-3's functional capabilities to the user; it also serves as the method by which the program is operated and controlled. . . .[98]

The U.S. Supreme Court granted certiorari and affirmed without opinion by an equally divided vote.[99]

Subsequent appellate decisions have reached similar outcomes, although they have not fully subscribed to the First Circuit's reasoning. In *MiTek Holdings, Inc. v. ARCE Engineering Co.*,[100] the holder of a copyright in an application program which designed and arranged wood trusses for the framing of building roofs brought an infringement action against the maker of a competing program which featured a similar menu command tree and user interface. Affirming the lower court's decision, the Eleventh Circuit held that the menu and submenu command structure of the truss design program was uncopyrightable under §102(b) of the Copyright Act because it represents a process.[101] The court did not need to reach the broader

98. *Id.* at 815.

99. Lotus Dev. Corp. v. Borland Int'l, Inc., 516 U.S. 233 (1996) (Justice Stevens did not participate in the consideration of this case).

100. 89 F.3d 1548 (11th Cir. 1996).

101. *Id.* at 1556-57. The Court further noted that the lower court's decision could be sustained on the grounds that the menu and submenu command structures were unoriginal ("The look of the ACES program is basically industry standard computer-aided-design (CAD)") and that idea and expression had merged ("the ACES programs 'mimic the steps a draftsman would follow in designing a roof truss plan by hand' [quoting the conclusion of the district court] . . . The logical design sequence is akin to a mathematical formula that may be expressed in only a limited number of ways; to

question, addressed in *Lotus*, of whether all menu command structures are uncopyrightable as a matter of law. In *Mitel, Inc. v. Iqtel, Inc.*,[102] Mitel, the maker of a widely adopted computer system for automating the selection of telephone long distance carrier and remotely activating optional telecommunications features such as speed dialing, sued a competing firm which used the identical command codes for copyright infringement. Because Mitel's system had become a *de facto* standard in the marketplace, Iqtel defended its use of compatible controller codes on the ground that "technicians who install call controllers would be unwilling to learn Iqtel's new set of instructions in addition to the Mitel command code set, and the technician's employers would be unwilling to bear the cost of additional training."[103] As Borland had done, Iqtel's product included both its own set of command codes as well as a "Mitel Translation Mode." While commenting that a method of operation may in some circumstances contain copyrightable expression, the Tenth Circuit nonetheless concluded that the Mitel command codes, which were arbitrarily assigned, lacked the minimal degree of creativity to qualify for copyright protection.[104] The court further held that Mitel's command codes should be denied copyright protection under the scenes à faire doctrine because they are largely dictated by external factors such as compatibility requirements and industry practices.[105]

4. Protection for Computer User Interfaces

The interface between the computer and the user consists of a variety of input/ouput devices, including a keyboard, pointing tools (such as a mouse, joystick, and interactive pen), disk drives, audio equipment, microphone, and screen displays. Copyright law excludes from protection such obviously functional works as keyboards, pointing objects, speaker systems, and other hardware devices. The courts have also found that data input formats, such as the order and size of data fields, are not protectable under copyright law.[106] The visual images and text of screen displays may qualify as audiovisual, graphic, or literary works under copyright.[107] Some early courts afforded sub-

grant copyright protection to the first person to devise the formula effectively would remove that mathematical fact from the public domain.").

102. 124 F.3d 1366 (10th Cir. 1997).

103. *Id.* at 1369.

104. *Id.* at 1373-74.

105. *Id.* at 1374-76.

106. *Feist*, 499 U.S. at 350.

107. *See, e.g.*, Stern Electronics, Inc. v. Kaufman, 669 F.2d 852 (2d Cir. 1982).

stantial protection to elements of a user interface.[108] Such works remain, however, subject to the originality requirement and functionality limitations of §102(b), the merger doctrine, and *Baker v. Selden*. As a result of the network features of computer-human interfaces, many aspects of these works are not protectable under copyright law.

The Ninth Circuit addressed some of the limitations on copyright protection for audiovisual displays of computer programs in *Data East USA, Inc. v. Epyx, Inc.*,[109] in which the manufacturer of a video game depicting a karate match sought to prevent another firm from marketing a competing game featuring many of the same audio and visual elements. Notwithstanding the many similarities between the two works, the court held that no infringement had occurred because the similarities flowed from "constraints inherent in the sport of karate itself" and "various constraints inherent in the use of [the particular type of] computer."[110] After filtering out the unprotectable ideas in the work, the court applied a standard of "virtual identity" in determining that the competing work did not infringe.[111]

The most significant case to address the scope of copyright protection for network features of a computer-human interface is *Apple Computer, Inc. v. Microsoft Corp*,[112] in which Apple Computer alleged that Microsoft's Windows operating system and Hewlett-Packard's New-Wave operating system infringed Apple's copyrights in the desk-top graphical user interface for its Macintosh computer system. The copyright issue was somewhat muddied by the existence of a licensing agreement authorizing the defendants to use aspects of Apple's graphi-

108. *See, e.g.,* Broderbund Software, Inc. v. Unison World, 648 F.Supp. 1127, 1134 (N.D. Cal. 1986) (holding that the choice of typeface on user screen display and choice of works "Choose a Font" as the title for a screen for producing cards, brochures, and other printing projects were examples of audiovisual displays "dictated primarily by artistic and aesthetic consideration, and not by utilitarian or mechanical ones"); Digital Communications Associates, Inc. v. Softklone Distrib. Corp., 659 F.Supp. 449 (N.D. Ga. 1987) (finding that the arrangement of status screens and commands for a data communication program are protectable expression).

109. 862 F.2d 204 (9th Cir. 1988).

110. *Id.* at 209. *See also* Interactive Network v. NTN Communications, 875 F.Supp 1398 (N.D. Cal. 1995), *aff'd* 57 F.3d 1083 (Fed. Cir. 1996) (finding that football video game was not infringed because similarities between works were based on the rules of football and the idea of an interactive prediction game).

111. Prior case law in the Ninth Circuit held that "[w]hen idea and expression coincide, there will be protection against nothing other than identical copying." Sid & Marty Krofft Tel. Prod. v. McDonald's Corp., 562 F.2d 1157, 1168 (9th Cir. 1977).

112. 799 F.Supp. 1006 (S.D. Cal. 1992), *aff'd in part, rev'd in part*, 35 F.2d 1435 (9th Cir. 1994), *cert. denied* 513 U.S. 1884 (1995).

cal user interface. The court determined, however, that the licensing agreement was not a complete defense to the copyright claims[113] and therefore undertook an analysis of the scope of copyright protection for a large range of audiovisual elements of computer screen displays.

In framing the analysis, the district court expressly recognized the importance of standardization to consumers and the cumulative nature of innovation to the scope of copyright protection.[114] The court proceeded to determine those elements of the graphical user interface which were not protected on the grounds that they lacked originality or were not protectable under section 102(b), the doctrine of scenes à faire,[115] the merger of idea and expression, or due to the limited number of ways in which an idea could be expressed or the external constraints imposed by the computer system. The court found that all of the alleged similarities between Apple's works and Microsoft's Windows not authorized by the licensing agreement were either not protectable or subject to at least one of the limiting doctrines. As a result, the court applied the "virtual identity" standard in comparing the works as a whole and determined that no infringement had occurred. On appeal, the Ninth Circuit affirmed the district's court's dissection of the work in question to determine which elements are protectable, filtering out of unprotectable elements, and application of the "virtual identity" standard in this context.[116]

The *Apple* litigation established that many elements of the desktop-based graphical user interface are in the public domain and that the originality requirement and functionality doctrines of copyright law substantially limit the protection afforded the desk-top user interface. The Eleventh Circuit has since joined the Ninth Circuit in adopting the "virtual identity standard" for claims of software infringement in a computer-user interface based on a compilation of uncopyrightable elements.[117]

113. Apple Computer, Inc. v. Microsoft Corp., 709 F.Supp. 925, 930 (N.D. Cal. 1989); Apple Computer, Inc. v. Microsoft Corp., 717 F.Supp. 1428 (N.D. Cal. 1989): Apple Computer, Inc. v. Microsoft Corp., 759 F.Supp. 1444 (N.D. Cal. 1991).

114. *Apple*, 799 F.Supp. at 1025-26.

115. Under the doctrine of scenes à faire, a copyright protection is denied to expressions that are "as a practical matter, indispensable or at least standard in the treatment of a given [idea]." Atari, Inc. v. North American Phillips Consumer Electronics Corp., 672 F.2d 607, 616 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1982).

116. *Apple*, 35 F.3d 1435 (9th Cir. 1994), *cert. denied* 513 U.S. 1184 (1995).

117. *MiTek Holdings, Inc.*, 89 F.3d at 1558.

C. The Future of Copyright Protection for Computer Software

The federal courts' success in delimiting copyright protection for computer software shifted the software industry's attention to pursuing other means for protecting software innovation beyond the relatively thin protection available through copyright law. The courts have now fully opened the patent office to software-related inventions[118] and software developers have increasingly pursued that means of protection. In addition, the software industry has discovered contract law – in the form of shrinkwrap and clickwrap licenses – to be an inexpensive and reasonably effective means of protecting their products.[119] While the applicability of these other modes of protection raise a host of troubling issues,[120] they have largely dissipated pressure to push copyright protection for software beyond copyright's inherent limiting doctrines.

II. Copyright in the Age of Digital Reproduction and Distribution

Even though computer technology became a reality more than half a century ago, it is only in the past decade that it has begun to disrupt the foundations of the principal content industries — publishing, music, film, and television. The content industries' long-standing business models – selling books, newspapers, magazines, and records (and later tapes and CDs), exhibiting films (and later selling and renting home videos and DVDs), and broadcasting music and television shows – have proven quite resilient to the early generations of com-

118. *See* Diamond v. Diehr, 450 U.S. 175 (1981) (holding that a claim to a process for curing rubber that involved the use of a computer to calculate a mathematical equation constituted patented subject matter); State Street Bank & Trust v. Signature Financial Group, 149 F.3d 1368 (Fed. Cir. 1998), *cert. denied*, 525 U.S. 1093 (1999).

119. *See* Bowers v. Baystate Technologies, Inc., 302 F.3d 1334 (Fed. Cir. 2002); ProCD v. Zeidenberg, 86 F.3d 1447 (7th Cir. 1996); Robert W. Gomulkiewicz, *The License is the Product: Comments on the Promise of Article 2B for Software and Information Licensing*, 13 Berkeley Tech. L. J. 891 (1998).

120. *See, e.g.*, Rochelle Cooper Dreyfuss, *Are Business Method Patents Bad for Business?*, 16 Santa Clara Computer & High Tech. L.J. 263 (2000); John R. Thomas, *The Patenting of the Liberal Professions*, 40 B.C. L. Rev. 1139 (1999); Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 Berkeley Tech. L.J. 577 (1999); David Nimmer, Elliot Brown & Gary N. Frischling, *The Metamorphosis of Contract into Expand*, 87 Cal. L. Rev. 17 (1999); Mark A. Lemley, *Beyond Preemption: The Federal Law and Policy of Intellectual Property Licensing*, 87 Cal. L. Rev. 112 (1999); Dennis J. Karjala, *Federal Preemption of Shrinkwrap and On-Line Licenses*, 22 U. Dayton L. Rev. 511 (1997).

puter technology. The relatively late onset of the digital "piracy" threat can be attributed to the sheer informational magnitude of music and film and the inability, until recently, to bring to market affordable, high resolution means for perceiving (listening to and viewing) digital content. Even with the introduction and rapid popularity of digitally-encoded compact disks (CDs) and the proliferation of microcomputers beginning in the early 1980s, the record industry did not appreciate the dramatic changes that would be brought about by the emerging digital technologies. Available microprocessors, the low fidelity of computer peripherals, and limitations of memory storage capacity prevented music from being stored, perceived, and reproduced efficiently on computer devices until the mid-1990s.

As Moore's law (and related advances) continued to improve the capability and reduce the cost of computing, microcomputers became an attractive platform for video games, multimedia content, and music by the late 1980s and early 1990s.[121] The development of consumer versions of digital audio tape (DAT) technology around this same time set off the first alarm bells within the record industry. Concomitant with these developments, advances in network technology, eventually leading to the World Wide Web, data compression technologies, a new wave of consumer electronics (including portable hard drives for storing music), and the deployment of broadband for Internet home users drove the convergence of digital computers and traditional content. In so doing, the deployment of digital technology set the stage for what has become an epic battle over the future of copyright law.

Because digital sound recording files are widely available and relatively small (in comparison to film files), the sound recording industry has been the first content industry to be affected by the capabilities of the emerging digital platform. It has been referred to as the prover-

121. In the late 1970s and early 1980s, the motion picture and television industries perceived a threat from a new analog technology – the video cassette recorder (VCR). *See* JAMES LARDNER, FAST FORWARD: A MACHINE AND THE COMMOTION IS CAUSES (1987). This concern, however, proved misplaced as rental and sale of home video emerged by the mid-1990s as the leading revenue source for the movie industry. *See* HAROLD L. VOGEL, ENTERTAINMENT INDUSTRY ECONOMICS: A GUIDE FOR FINANCIAL ANALYSIS 62 (5th ed. 2001). Similarly, the recording industry became concerned about the proliferation of analog cassette tape recorders and the rise of home copying. *See* Office of Technology Assessment, U.S. Congress, Copyright and Home Copying: Technology Challenges Law (Oct. 1989). This threat did not prove a significant loss to the industry.

bial canary in the coal mine.[122] The health of the music canary, however, is a source of great controversy. Music industry profits remained robust throughout the 1990s, even as portable hard drives (MP3 players) became popular and consumers became able to copy and move sound recordings in much the way that they manipulated word processing files.[123] Bracing for the digital onslaught, content and technology industries in 1998 successfully pressed the Clinton Administration and Congress to enact legislation prohibiting circumvention of technological protection measures designed to prevent unauthorized access and use of digital content.

Less than a year later, however, the instant popularity and rapid diffusion of Napster, the first widely distributed peer-to-peer software application brought the digital piracy issue to the forefront of legal, economic, social, and political debate. Tens of millions of Internet users actively downloaded music over Napster's peer-to-peer network during its relatively short lifespan, resulting in the unauthorized distribution of potentially billions of copies of sound recordings.[124] Scarcely a teenager in America, the principal market for new sound recordings, was unaware of this new means of accessing and obtaining music. The market for MP3 players and recordable CD drives (and blank media, CD-Rs) skyrocketed. The record industry promptly brought suit against Napster for contributory and vicarious copyright liability, obtaining a preliminary injunction[125] which was later stayed[126] and then reinstated.[127] Although Napster has not operated since March 2001, its function has since been filled by numerous other peer-to-peer software programs and services, resulting in even greater unauthorized distribution of sound recordings.[128]

122. *See* NATIONAL ACADEMY OF SCIENCES, THE DIGITAL DILEMMA: INTELLECTUAL PROPERTY IN THE INFORMATION AGE 76 (2000) (hereinafter "Digital Dilemma Report").

123. Record labels attempted to subject these devices to a tax that Congress imposed on digital audio recording devices in 1992. *See* Recording Industry Ass'n of America v. Diamond Multimedia Sys., 180 F.3d 1072 (9th Cir. 1999), discussed *infra* text accompanying notes 203-08, 239-49.

124. *See* Melanie Warner, *Free Music: The New Napsters*, FORTUNE, Aug. 12, 2002, *available at* http://www.fortune.com/indext.jhtml?channel=print_article.jhtml&doc_id=208834.

125. *See* A & M Records, Inc. v. Napster, Inc., 114 F.Supp.2d 896 (N.D. Cal. 2000).

126. *See* A & M Records, Inc. v. Napster, Inc., 239 F.3d 1004 (9th Cir. 2001).

127. *See* A & M Records, Inc. v. Napster, Inc., 2001 WL 227083 (N.D. Cal. 2001).

128. *See* Brad King, *While Napster Was Sleeping* (Jul. 24, 2001), *at* http://www.wired.com/news/mp3/1,1285,45480,00.html; Melanie Warner, *Free Music: The New*

Despite this largely unregulated source of free music, the record industry's revenue stream has shown only a modest fall-off that arguably can be attributed to the economic recession of 2000-01, a dearth of new releases from blockbuster artists, and other cyclical determinants of music sales. Nonetheless, surveys and various other forms of evidence increasingly suggest that teenagers (a prime target audience for record labels) and others now consider peer-to-peer networks to be the most attractive source for obtaining sound recordings.[129] At the same time, digital technology has dramatically reduced the cost of producing, recording, marketing, and distributing sound recordings, suggesting that the supply of new music is richer and more diverse than ever before.

The computer and consumer electronics industries, a variety of online and consumer organizations, copyright scholars, and some recording artists have questioned the magnitude (and, in some cases, the existence) of the digital piracy threat.[130] They contend that the content industries are merely crying wolf, much the way that traditional print publishers did in arguing that public libraries[131] and later

Napsters, FORTUNE, Aug. 12, 2002, *available at* http://www.fortune.com/indext.jhtml?channel=print_article.jhtml&doc_id=208834.

129. *See* Edison Media Research, *The National Record Buyers Study II*, *at* http://www.edisonresearch.com/R&RRecordBuyersII.htm (last visited July 8, 2002).

130. *See, e.g.*, SIVA VAIDHYANATHAN, COPYRIGHTS AND COPYWRONGS: THE RISE OF INTELLECTUAL PROPERTY AND HOW IT THREATENS CREATIVITY (2001); Raymond Shih Ray Ku, *The Creative Destruction of Copyright: Napster and the New Economics of Digital Technology*, 69 U. CHI. L. REV. 263 (2002); JESSICA LITMAN, DIGITAL COPYRIGHT (2001); LAWRENCE LESSIG, THE FUTURE OF IDEAS (2001); Janis Ian, *The Internet Debacle – An Alternative View*, PERFORMING SONGWRITER MAGAZINE (May 2002), *available at* http://www.janisian.com/article-internet_debacle.html; John Borland, *Rapper Chuck D Throws Weight Behind Napster* (May 1, 2000) (seeing Napster as a unique promotional tool for lesser known artists), *available at* http://news.com/2100-1023-239917.html.

131. As noted by a mid-19th century observer,

> when circulating libraries were first opened, the booksellers were much alarmed; and their rapid increase added to their fears, and led them to think that the sale of books would be diminished by such libraries. But experience has proved that the sale of books, so far from being diminished [by public libraries], has been greatly promoted; as from these repositories many thousand families have been cheaply supplied with books, by which the taste of reading has become more general, and thousands of books are purchased each year by such as have first borrowed them at those libraries, and after reading, approving of them, have become purchasers.

CHARLES KNIGHT, THE OLD PRINTER AND THE MODERN PRESS 285 (1854). *See also* CARL SHAPIRO & HAL R. VARIAN, INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY 94-95 (1999).

photocopiers[132] would undermine the market for books and journals, radio would rob the music industry,[133] the video cassette recorder would lead to the demise of the film and television industries,[134] and analog cassette recorders would destroy the sound recording indus-

132. Early in the congressional hearings on copyright law revision [leading up to the 1976 Act], it became apparent that problems raised by the use of the new technologies of photocopying and computers on the authorship, distribution, and use of copyrighted works were not dealt with by the then pending bill. Because of the complexity of these problems, CONTU [the National Commission on New Technological Uses of Copyrighted Works] was created to provide the President and Congress with recommendations concerning those changes in copyright law or procedure needed both to assure public access to copyrighted work used in conjunction with computer and machine duplication systems and to respect the rights of owners of copyrights in such works, while considering the concerns of the general public and the consumer. *See* CONTU Report, *supra* note 22, at 1. In the end, CONTU offered relatively modest recommendations regarding the threat of photocopying – proposing only that fair use guidelines be developed, that the Register of Copyrights conduct a study of the impact of photocopying on proprietors' rights and the public's access, and that publishers, libraries, and government agencies cooperate in making information about the copyright status of published works more readily available to the public. *Id.* at 2.

133. Radio eventually became the leading promotional mechanism for sound recordings and a rich revenue stream for song composers and music publishers.

134. Jack Valenti, President of the Motion Picture Association of America (MPAA) testified at a House Judiciary Committee hearing in 1982 that the video cassette recorder represented a "growing and dangerous" threat to the film industry's "economic vitality and future security."

> There is going to be a VCR avalanche. Exports of VCR's from Japan totaled 2.57 million units in 1981. No. 2, the United States is the biggest market. No.3, February 1982, which is the latest data, shows the imports to the United States are up 57 percent over 1981. This is more than a tidal wave. It is more than an avalanche. It is here.
>
> Now, that is where the problem is. You take the high risk, which means we must go by the aftermarkets to recoup our investments. If those aftermarkets are decimated, shrunken, collapsed because of what I am going to be explaining to you in a minute, because of the fact that the VCR is stripping those things clean, those markets clean of our profit potential, you are going to have devastation in this marketplace. ***
>
> We are going to bleed and bleed and hemorrhage, unless this Congress at least protects one industry that is able to retrieve a surplus balance of trade and whose total future depends on its protection from the savagery and the ravages of this machine.
>
> Now, the questions comes, well, all right, what is wrong with the VCR. One of the Japanese lobbyists, Mr. Ferris, has said that the VCR – well, if I am saying something wrong, forgive me. I don't know. He certainly is not MGM's lobbyist. That is for sure. He has said that the VCR is the greatest friend that the American film producer ever had. I say to you that the VCR is to the American film producer and the American public as the Boston strangler is to the woman home alone.

try.[135] Various advocates and commentators contend that the content industries are merely trying to reimpose bottlenecks within the distribution pipeline and exert unwarranted control over the works of authorship.[136]

While there is little doubt that the leading companies within the traditional content industries seek to protect their "turf" and ensure continued success in the digital domain, extrapolating from these earlier analog piracy threats overlooks critical differences. Whereas protecting computer software within copyright law can be analogized to squeezing a square peg into a round hole, preventing the unauthorized distribution of copyrighted works through digital networks amounts to containing water in a sieve. The ease with which digital technology enables anyone with a computer and an Internet connection to reproduce and make available for wide-scale distribution flawless reproductions of works of authorship has proven a far greater concern and more wrenching adjustment for copyright law than accommodating computer software. This section begins by explaining the significance of the shift from analog media (paper, tape, film, and vinyl) to digital encoding and distribution for the principal content industries. It then examines the new provisions that have been added to copyright law over the past decade in response to digital technology and the first wave of enforcement actions applying these and traditional copyright protections. Section C describes the various forces — economic, technological, social, and legal — emerging in the copyright policy arena. Section D explores the likely contours and role of copyright law in the digital future.

A. The Shift from Analog to Digital Technology

Copyright law has always been a means to an end – the protection of authors and publishers from competition in the sale of original

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135. In the words of Federal Reserve Chairman, Alan Greenspan, then Chairman and President of Townsend-Greenspan & Co., Inc., and economic consulting firm,

> [f]or economic incentives to work appropriately, property rights must protect the rights of capital assets . . . . At present . . . severe economic damage [is being done] to the property rights of owners of copyrights in sound recordings and musical compositions . . . under present and emerging conditions, the industry simply has no out . . . Unless something is done to respond to the problem, the industry itself is at risk.

Testimony of Alan Greenspan, Hearings on the Home Recording Act, H. Rep., Subcomm. On Patents, Copyrights and Trademarks (Oct. 25, 1983).

136. *See supra* note 130.

works for sufficient time to promote creative expression.[137] The advent of the printing press and other mechanical means of reproducing works of authorship opened up vast new opportunities for the production of creative works while at the same time enabling those who have not created to compete with authors and their publishers in the sale of such works. Because the copyist did not bear the cost of authorship, their rapid entry into the market could undermine the incentives of authors and their publishers in producing and marketing their creations. Copyright law was "invented" to restrain such copyists, at least for a limited time deemed appropriate to enable authors and their publishers to reap a reasonable return on their endeavors. The evolution of copyright law has been driven by technological innovation in the means for capturing, reproducing, and distributing works of authorship.[138] Thus it is important to understand the technologies for storing and distributing content and how the shift from analog to digital technology alters the appropriation problem faced by content industries.

1. The Analog Age

For most of the history of copyright law, content storage and distribution innovations centered around means for mechanically capturing and reproducing works of authorship – such as phonographs, photographs, film, and photocopies – and new devices and methods for distributing, receiving, and perceiving content, such as broadcasting and cable television. All of these technologies have been based upon what has come to be known as an "analog" platform. They record or, to use copyright law's rubric, "fix" works of authorship through some human or mechanical process of deforming a physical object (such as stone, paper, vinyl, film) in a manner that conveys an image (a letter, number, or graphic image) or signal varying in audio frequency (sound) or light or color intensity (film). The term "analog" is used to signify that the medium uses an "analogy" to represent

137. *See* Statute of Anne (1710). The first "copyright" granted in England in 1556 by royal decree also served political ends – consolidating the new printing business in the hands of the Stationers' Company, which refused to publish books that the Crown considered politically or religiously objectionable. *See* David Lange, *At Play in the Fields of the Word: Copyright and the Construction of Authorship in the Post-Literate Millennium*, 55 LAW & CONTEMP. PROBS. 139 (1992).

138. *Cf.* Jessica Litman, *Copyright Legislation and Technological Change*, 68 OR. L. REV. 275, 353-54 (1989).

the phenomenon. Even the advent of broadcasting technology — the transmission of a signal to multiple receiving devices — has been based upon analog propagation (wave forms) of analog encoded content (sound recordings etched in vinyl and later tape and audiovisual works fixed in film).

The principal content industries — publishing, sound recording, film, and television industries — formed, developed, and thrived around analog technology platforms in part because they inherently impeded unauthorized reproduction and distribution of works of authorship. In the case of book publishing, at least prior to the advent of xerography in the late 1950s, a second comer would have to expend substantial resources to typeset a book or newspaper. Even after the availability of xerography, unauthorized copies produced using this mechanical system lacked the quality of the original. Furthermore, the cost of producing any substantial quantity of reading material using this technology was more expensive per volume than traditional printing. These costs, in combination with the relative ease of detecting unauthorized commercial-scale publication, provided an effective deterrent to copyright infringement in the publishing industry.

The sound recording and film industries had even stronger "natural" protection inherent in the underlying media and business models. By owning the master recording from which commercial recordings were made, the record labels had exclusive control over the best versions of the sound recordings commercially available. While this did not prevent competition from sound-like bands, who could gain authorization to record underlying musical compositions through a compulsory license, it did ensure that no second comer could offer the same quality as the original. Thus, even though Congress did not extend federal copyright protection to sound recordings until 1972,[139] the record industry thrived. Even after the advent of recordable media for the consumer market such as reel-to-reel machines (in the 1960s) and later cassette tape (in the 1970s), the quality of such second and third generation recordings paled in comparison to the original. The audiocassette copy of an analog recording suffers substantial degradation of quality due to distortions, such as background hiss and speed and alignment variation (wow and flutter), introduced by the limitations of the mechanical devices used for reproduction. Each subse-

139. Prior to that time, state protection existed for sound recordings. *See* MARSHALL LEAFFER, UNDERSTANDING COPYRIGHT LAW 137 (3d ed. 1999).

quent generation compounds these distortions. Consequently, the retail distribution model for sound recordings did not face significant threats of unauthorized reproduction and distribution, particularly after the enactment of federal copyright protection.

The film industry had even greater inherent controls on the unauthorized reproduction and distribution of their works. As with analog sound recordings, the quality of films degrade across successive generations of reproductions. By owning the physical film master, the movie studio controls the best version of the work. Furthermore, for most of the history of the industry, films have been distributed first through theatrical release. Therefore, consumers gain access to the works only through paying for admission. The prized asset of film industry remains under control of a relatively small group of theater owners. It was not until the advent of the VCR in the 1980s that typical consumers had the means of possessing a physical copy of a film product.[140] Thus, movie studios could directly control the release and viewing of their films and charge consumers on a pay-per-view model.

The advent of television provided a second market for feature films, as well as a primary market for a wide range of live and shorter duration programming. Here again, the original work could only be accessed in a constrained environment that maintained control over the physical storage media in the hands of copyright owners and their licensees (broadcasters). Consumers never gained physical control over the work. Unlike the theatrical release model, the television medium was complicated by the fact that it was not possible to set up ticket windows or other means of rationing access to television transmissions. This led to the development of an advertising-based model. As noted by one industry observer, television "programs are scheduled interruptions of marketing bulletins."[141] Film and television producers get paid by advertisers who sponsor the broadcasts.

This advertising model proved extraordinarily successful and has largely sustained the television industry throughout its history. With the widespread diffusion of television technology by the 1950s, advertisement-supported television has become one the central institutions in American society. By the 1960s, a large and growing percentage of

140. A relatively small industry of film rental libraries existed prior to the 1980s which rented films for exhibition. This industry was largely eclipsed by the video rental industry.

141. *See* HAROLD L. VOGEL, ENTERTAINMENT INDUSTRY ECONOMICS: A GUIDE FOR FINANCIAL ANALYSIS 173 (5th ed. 2001).

Americans would tune into one of the three major networks around the dinner hour for news and entertainment. The 6:00 pm to 9:00 pm window came to be known as "prime time" which many companies came to see as an unparalleled way of capturing the attention of a large audience. Competition for this limited resource – three principal networks – yielded a large and stable source of revenue, which enabled television networks and production companies to underwrite substantial programming investments. Unauthorized reproduction and distribution of television programming did not present much concern to the industry. Constraints on the telecommunications spectrum and the relatively high cost of broadcasting limited the number of broadcasters and allowed for the systematic monitoring and control of such activities. Furthermore, consumers could be relied upon to sit through whatever advertisements were embedded in the programming. Even after the development of remote control devices, mute buttons, and VCRs, most consumers took in the advertisements along with the featured programming. Even if consumers switched channels, the other two networks were likely to have commercials at roughly the same intervals.

Given the technological constraints on unauthorized reproduction and distribution of works of authorship, copyright law played an important, but relatively passive role in the development of these industries. Copyright did, of course, affect the ability of record labels and television and film producers to base new projects on protected musical compositions, scripts, and novels, but once produced with proper authorization, these works could be exploited without much risk of unauthorized reproduction and distribution. Apart from addressing the problem of wholesale counterfeiting, copyright owners could rely principally upon "technological" impediments attributable to the analog nature of the recording media to stave off unauthorized reproduction and distribution of their works. The business models supporting the sound recording, film, and television industries implicitly assumed a zero or low risk of downstream reproduction and distribution of protected works.

Advances in consumer electronics gradually reduced the cost and increased the ease of capturing and copying works of authorship. Tape recording decks and VCRs afforded consumers the ability to record protected works, but the quality of second generation copies, the time required, the cost of blank media, and the risk of copyright en-

forcement[142] curtailed any significant black market for such works. As of the late 1980s, even though approximately forty percent of a representative sample of consumers reported engaging in some "home copying" of copyrighted music, the predominant motivation for such activities was to create cassettes of already owned records and CDs for listening in car stereos or in portable devices. Such activities did not significantly erode the primary market for such works.[143] Because of the limitations of analog media and devices, the quality of the reproductions were below what could be obtained from the record company. With regard to films and television programming, although VCRs had become popular by that time, relatively few consumers used them for recording over-the-air broadcasts. Playing prerecorded home videos became the major use for such devices, creating a vibrant market for the rental and purchase of video cassettes. Furthermore, any recordings of television shows included the commercials accompanying the programming. Although most VCRs included fast forward buttons by that time, skipping commercials required more effort than most consumers were willing to expend. Hence, the VCR served to augment film and television industry income by creating new means of exploiting feature films and increasing the viewership of advertisement-supported programming. Contrary to Jack Valenti's dire predictions,[144] the VCR would propel the home video market past theatrical release in terms of total movie industry revenue by the mid-1990s.[145] Thus, even though advances in consumer electronics built upon the analog platform loosened record company, film studio, and television networks' control over downstream availability of their works, they more than offset the effect on bottom lines through increased demand for entertainment industry products and expanded revenue channels.

2. The Digital Age

Digital technology offers a much more versatile, although more porous, platform for storing, distributing, and reproducing works of

142. *See, e.g.*, Electra Records v. Gem Electronic Distributors, 360 F.Supp. 821 (E.D.N.Y. 1973) (holding electronic manufacturer and record store contributorily liable for copyright infringement for making available to consumers a coin-operated magnetic tape duplicating system which could reproduce 35 to 45 minute recordings on blank eight-track cartridges in approximately two minutes).

143. *See* United States Office of Technology Assessment, *Copyright and Home Copying: Technology Challenges Law* (Oct. 1989).

144. *See* Valenti, *supra* note 134.

145. *See* VOGEL, *supra* note 141, at 62.

authorship. Digital computers recognize fluctuations in electrical voltage. Information is encoded using a massive array of binary switches which can be turned on or off depending upon whether they have a high or low charge.[146] By encoding works in binary form, digital computers enable perfect reproduction of whatever is captured across unlimited generations of reproductions. Furthermore, by enabling anyone to "broadcast" via the Internet, digital networks remove many of the constraints of traditional broadcasting and limit the ability of content owners to control and monitor what is distributed. Although various factors have delayed and limited the digital revolution, the past several years have brought to fruition and diffused a powerful digital platform that is well along the way toward supplanting the analog storage and distribution media on which the content industries were built. The inexorable operation of Moore's law continues to reduce the cost and increase the power of this platform, rapidly bringing the analog age to a close. Just as word processing programs on general computers and laser printers have displaced typewriters, digital technologies and formats (CDs, MP3, and DVDs) have largely relegated analog storage media to historical interest. This shift portends profound implications for the content, computer, and computer electronics industries.

a. Principal Characteristics of the Emerging Digital Content Platform

It has taken a few decades for digital technology to supplant analog media. The sound recording industry began the shift in 1981 with its embrace of the compact disk (CD) format. Because CD devices of this era did not enable consumers to record from or onto this medium, CD technology did not significantly alter the traditional control of the record labels, at least until the mid-1990s. By offering a cleaner and more resilient sound quality – approximating the clarity of master recordings – and greater convenience, the CD boosted record industry profits as consumers repurchased works that they already owned in vinyl and magnetic tape formats. Furthermore, the improved sound quality and durability of this new medium increased consumers' willingness to pay, raising profit margins for record labels. Digital technology has only recently reached the consumer video market with the

146. The smallest unit of memory in a computer is called "a bit," a switch with a value of "0" (off) or "1" (on). A byte consists of group of eight bits. A kilobyte ("K") contains 1024 (2^{10}) bytes, a megabyte ("MB") 1024 kilobytes, and a gigabyte ("GB") 1024 megabytes.

introduction of the DVD format in 1997. Its popularity has grown rapidly as prices have declined.[147] Many consumers appreciate the high resolution, ease of search, added features, and ability to watch feature length motion pictures on portable devices and laptop computers. The availability of recording capability in the past year has further stirred interest in the DVD format. Digital technology has also broken into the book publishing industry through eBooks, although consumer acceptance of this format has been sluggish.

Over the past three years, the broader implications of the digital platform for the content industries have come into sharper focus as consumer adoption of enabling technology and the rollout of high bandwidth Internet access have unleashed the extraordinary capabilities of digital devices and networks. In order to appreciate these implications, it is necessary to understand the factors and characteristics responsible for the emergence of the digital content platform, the most important of which are: (1) dramatic advances in microprocessor speed, memory storage, and data compression; (2) achievement of high sampling rates in capturing digital content; (3) development of improved technologies for perceiving (listening to and viewing) digital content; (4) essentially flawless, inexpensive, and rapid reproduction capabilities; (5) precise manipulability of digital content; (6) archive management and searchability; (7) portability; (8) development of digital networks for distributing content (including broadband); and (9) convergence of distribution platforms.

Processor Speed, Memory Storage, and Data Compression. Notwithstanding the invention of computer technology more than half a century ago, the shift to a digital content platform could not begin until computers possessed the speed and memory capacity to handle the vast amount of information contained in music and audiovisual works at a reasonable price. This was far from achievable even after the early generation of microcomputers revolutionized the computer industry. These machines were too slow and cumbersome to handle the file sizes needed to encode digital content. The first such machines were challenged by simple video games (such as Breakout and Pong). Within a few years, they could handle more sophisticated multimedia works. The rapid improvement in microprocessor speed and memory storage, approximated by Moore's Law and related concepts, eventually

147. *See* Greg Wright, *Will DVD Popularity Drive VCRs to Extinction?*, DETROIT NEWS, Jan. 1, 2001.

brought general purpose computers to the point that they could serve as a platform for storing and reproducing rich entertainment works. To put this rate of technological advance in perspective, the capacity of a standard hard drive today (20 gigabytes) has 500,000 times more capacity than a standard hard drive a decade ago for even lower cost.[148]

Just as expanded memory enables computers to handle informationally rich digital content, more efficient file formats and compression technology reduce the memory capacity and bandwidth necessary to access and store such content.[149] The MP3 format, which refers to the Moving Picture Experts Group 1 Layer 3 file format for audio coding, maintains the original sound quality at a data reduction of 1:12 by reducing the size of codes and taking advantage of the fact that both channels of a stereo channel pair contain much of the same information.[150] Combining the latest developments in portable hard drive capability and MP3 compression technology, Apple's iPod, a pocket-sized 10 gigabyte hard drive weighing just 6.5 ounces (including a 10-hour battery supply), can hold 2,000 songs.[151] This device currently sells for $400. Smaller capacity devices, capable of holding an hour of music, can be purchased for under $100. The DivX compression algorithm, an open source software program,[152] can reduce a 5 gigabyte file into

148. IBM recently announced a new storage density milestone, compressing one trillion bits of data per square inch, approximately 25 times greater than current hard drives. This technology can potentially hold 25 million printed pages on a surface the size of a postage stamp. *See* Kenneth Chang, *A New System for Storing Data: Think Punch Cards, but Tiny*, N.Y. TIMES, June 11, 2002; Lisa Gill, *IBM Storage Breatkthrough Goes Nanotech* (June 11, 2002), *available at* http://www.newsfactor.com/perl/story/18172.html.

149. Such technology is often referred to as a "codec," or compression/decompression algorithm. A computer running a compressed file must have software to decompress the file.

150. *See* Fraunhofer Institut (creator of the format), *at* http://www.iis.fhg.de/amm/techinf/layer3/index.html.

151. *See* Apple Web Site, at http://www.apple.com/ipod/. Creative Labs' Nomad® 3 Jukebox Player, which weighs less than a pound, can store 8,000 songs and sells for under $400. "Digital home jukeboxes" can store nearly 1,000 CDs, eliminating the need for stacks of CDs and providing convenient access to an entire library of music. *See Good-Bye CD Towers*, WIRED, July 2002, at 82. Sony's PlayStation3 game console, which is scheduled for release in 2005, is expected to be able to hold 12,800 hours of music or 2,000 hours of video. *See* Dean Takahasi, *The Accelerator*, RED HERRING, July 2002, at 37-38.

152. The DivX algorithm is no relation to Divx, a proprietary standard developed for use as a pay-per-view platform for DVDs. *See* Michael Stutz, *Divx Protects Content, But Not Your Liberties*, WIRED NEWS, Sept. 17, 1997. This standard ultimately failed to gain acceptance in the marketplace and was abandoned by its principal commercial backer, Circuit City, in 1999. *See End of the Road for Pay-Per-View DVDs* (June 16, 1999), *at* http://

approximately 650 megabytes, the storage size of a recordable CD, without significant loss in resolution or sound quality.[153] This technology enables near-DVD quality films to be downloaded through broadband connections in a few hours.[154]

High Sampling Rates. As noted above, sound and visual motion are analog phenomena, continuous wave forms, not discrete data points. Yet digital technology captures these phenomena as discrete data, whereas analog sound recording technology (vinyl records and tapes) use continuous representations to approximate the phenomena to be captured. In order to approximate the continuous nature of sound and visual images, digital technology must "sample" the physical phenomena at a sufficiently high rate so that the human ear and eye cannot perceive differences between the real phenomenon and its digital representation. Advances in digital technology have surpassed these milestones over the past two decades. To put this in perspective, a standard music CD format takes measurements 44,100 times per second, using coding numbers ranging from 0 to 65,535 (16 bit sample (2^{16})).[155] Thus, a two channel (stereo recording) requires 176,400 bytes/second or roughly 10 megabytes per minute of music recorded. A full length CD (one hour) contains approximately 320 million samples.

Analog motion pictures have always relied upon sampling rates, but two phenomena must be distinguished: the capturing of static images (e.g., colors and composition) and the juxtaposition of temporal sequencing of static images. Analog motion pictures used analog technology (photography) to capture the former (although television monitors reproduce these images using a discrete number of cross-hatched lines) and rely upon adequate sampling rates to capture the dynamic dimension. Early film technology used relatively low sampling rates, which produced the impression of staccato images. In that sense, motion pictures have always involved capturing analog phenomena through discrete representations. Digital motion picture technology uses discrete representations of both the still images (color bit

www. Salon.com/tech/log/1999/06/16/dvd/; Stephanie Mills, *Behind Death of Divx Were Angry Customers* (June 17, 1999), *at* http://news.com.com/2100-1040-227248.html.

153. *See* Universal City Studios, Inc. v. Reimerdes, 111 F.Supp.2d 294, 313-14 (S.D.N.Y. 2000).

154. *See* John Borland, *Hacked Video Technology Provides Look at MP3-like Films* (Mar. 27, 2002), *at* http://news.com.com/2100-1023-238468.html.

155. *See* Digital Dilemma Report, *supra* note 122, at 29-30.

maps) and the dynamic dimension. The technology has now developed for using digital means for capturing both the static and dynamic elements of motion, although the resulting file requires comparatively large storage capacity.

Digital photography illustrates well the role of sampling rates (and memory storage capacity) in the transition from analog to digital platforms. The early generations of digital cameras for the consumer marketplace were expensive, constrained by memory capacity, and unable to capture the quality of reproduction available through traditional (analog) photography. Within the space of just a few years, digital cameras have come down substantially in price while gaining ground in terms of resolution. Digital storage technology provides great advantages over analog technology, such as the ability to port images to other digital devices and manipulate the images. Digital video technology is making comparable inroads into the traditional video marketplace.

Transparent Perception. Digital media have the ability to provide for more accurate reproduction of recordings and visual images (assuming sufficiently high sampling rates). Whereas analog sound technologies – vinyl records or magnetic tapes – introduce some imperfections in sound quality through the process of mechanical reproduction (even in the first generation copy), compact disks offer sound quality essentially equivalent to the master recording by duplicating the precise binary code. Furthermore, playback technology does not involve the use of moving parts to decipher the encoded content, thereby eliminating other distortions present in analog technology. This attribute has been particularly important in the market for portable hard drives that allow runners to listen to music files without any distortion from movement.

Until recently, computers lacked the sound reproduction and video resolution of home stereo and television monitors. These distinctions have gradually been eliminated to the point that computer based displays typically offer greater resolution than traditional television monitors. As will be discussed below, computers are increasingly integrated with high fidelity stereos and high resolution monitors.

Digital technology has yet to penetrate some content markets effectively due to limitations in visual quality of computer displays. The eBook market, for example, has been slow to form in part because many consumers do not find the displays for perceiving content to be as comfortable as printed books. Such devices do yet offer the resolu-

tion and readability in a wide range of environments (such as bright sunlight). As children increasingly grow up reading on video screens and the technology for eBook readers advance, this technology – which offers great storage capacity (e.g., five books and a dictionary on a device that is smaller than a paperback book), interchangeability of files, the ability to search and research texts, and integration with other media and functionality (e.g., sound, video, telecommunications) – will make inroads into the traditional book marketplace.

Flawless, Inexpensive, and Rapid Reproduction. The ability to store digital content in general purpose computing devices enables these files to be accessed and reproduced with the same ease as other digital files – such as word processing documents and spreadsheets. Although content files tend to be substantially larger than typical word processing files, the enhanced speed and memory capacity of modern computers enables them to be accessed and reproduced essentially instantaneously. The ability to store and reproduce content files has also been enhanced by the development of new storage media capable of holding vast amounts of information at very low cost. Zip drives, CD burners, and now DVD burners[156] have enabled home computer users to encode rich informational content on portable media. In the past year, sales of blank CDs, costing barely more than 10 cents each when purchased in bulk, surpassed sales of pre-recorded CDs.

Manipulability. The digital environment enables users to alter and arrange content with tremendous ease and flexibility. Digital camera images, for example, can be cropped, shaded, and morphed using a wide range of software based editing tools on general purpose computers. Recording engineers and musicians have increasingly used computer-based editing technology to enhance and mix sound recordings. The rap and hip hop genres make particularly heavy use of the manipulability of digital content. Film and animation studios now rely upon computer graphics and related technologies to produce special effects and edit their works. The growing capability of home computers has brought these opportunities for creative expression to a much broader audience. Now everyone from a Hollywood director to an aspiring musician to an elementary school student can develop new works of music, art, and film with affordable tools in their own homes.

156. *See* Andy Patrizio, *First DVD Recorder Debuts* (Aug. 9, 2000), *at* http://www.wired.com/news/technology/0,1282,38145,00.html.

They can start from scratch, build from existing content, or combine elements of both.

Of perhaps greater significance for the vast majority of music consumers, the digital platform enables users to assemble their own compilations. Since the mid to late 1960s, the sound recording industry has predominantly distributed music in bundles of 8 to 12 songs – first on 12 inch long-playing (LP) albums[157] and later on tapes and CDs. This strategy enabled the industry to charge substantially more for the package, even though manufacturing and marketing costs were only modestly higher than for singles. Although some albums cohere, many consumers favor particular songs and have, since the advent of home recording technology, assembled their own "greatest hits" collections from across many artists and albums, notwithstanding the inconvenience of recording and the inevitable loss in fidelity caused by analog technology. On a digital platform, consumers can much more easily produce such compilations without any loss in sound quality.

Management and Searchability. The vast storage capacity of modern computers enable consumers to archive vast amounts of content. Unlike shelves and drawers of analog content – records, tapes, and CDs – computer programs can index, arrange, and search these archives with a few keystrokes or mouse clicks. In addition, software can search within stored content for particular attributes.

Portability. One of the early forces driving the shift to a digital platform has been consumers' desire to have portable content. Portable hard drives for music became the first versatile digital content devices. (Traditional compact disk players use digital media, but offer little more functionality than traditional analog media.) The success of these players greatly expanded the market for digital content and more enhanced devices. The latest generation of devices can hold upwards of 10,000 songs. The DVD format has more recently afforded comparable portability for feature films. It has generated new devices (portable viewers) and enhanced demand for laptop computers with DVD playback capability. As the price of these devices have fallen, they have been installed in airplanes, buses, and automobiles. Digital tech-

157. The LP standard (33 revolutions per minute (rpm) was first introduced in 1947, but did not surpass sales of 45 rpm singles until the mid-1960s. The timing of this shift reflected a number of changes in the marketplace, including the emergence of the singer-songwriter genre and "album rock" as well as the diffusion of high-fidelity stereo equipment. Both of these factors inclined consumers and record labels toward higher quality, longer playing products.

nology offers almost unlimited ability to engage in what has come to be known as space and time shifting.

Network Distribution. Whereas the general purpose computer has provided a versatile platform for storing, reproducing, and manipulating content, the Internet and emerging digital wireless transmission technologies vastly expand the means for distributing content. Users typically gain access to information through the Internet by streaming or downloading content directly through web sites and sending attachments to e-mail messages. Web site operators can post content onto web servers that can be accessed by other Internet users (clients).

The principal technical constraints on the exchange of files are file size, bandwidth, and server capacity. In the decade since the World Wide Web became operational, transmission rates have increased dramatically. The rollout of broadband Internet service, in combination with enhanced computer speed, memory capacity, and compression technology, has already made possible nearly real time access to high resolution content.

As copyright-protected content began to flow across the Internet, content owners began to actively police web sites. They became quite proficient at locating unauthorized content and shutting down the relevant site through cease-and-desist letters to site operators or take-down notices to Internet Service Providers hosting the unauthorized content. Although the vast number of sites cannot be fully policed, the most significant leakage points can be effectively targeted in this manner. If the content owner searchers cannot find the content, then neither can most users of the Internet. Furthermore, any business seeking to profit from copyright infringement will have difficulty raising funds under this threat of enforcement.

The amount of content available over the Internet took a quantum leap in 1999 with the introduction of Napster's peer-to-peer network technology. This technology vastly expanded the effective storage and exchange capacity of the Internet by enabling computer users running Napster's software to search the computer drives of thousands of other users for files encoded in the MP3 compression format commonly used for music files. Napster's server contained the labels of MP3 files, typically some combination of band and song titles, which could be searched by users of the Napster software. Searches produced a list of Internet addresses of computers containing the search term. The Napster software would then form a connection through the Internet to the particular computer containing the file,

establish a link, and quickly and effortlessly transfer the file to the searcher's hard drive. In essence, the Napster platform converted every computer running the software and connected to Napster into a "servent" — enabling it to function as both a server and a client. It became the fastest adopted software application in the history of computer technology, attaining 70 million users within its relatively brief period of operation. Even before Napster was shut down on contributory and vicarious copyright infringement grounds, a range of more decentralized peer-to-peer architectures had taken root. MusicCity's Morpheus file-sharing software program and Sharman Networks' KaZaa application have each been downloaded nearly 100 million times since their release a little more than a year ago.[158] Although the content industries continue to pursue these new services, the level of unauthorized distribution of copyrighted works continues to grow. In addition, popular movies have found their way into peer-to-peer networks. One consulting firm estimates that 400,000 to 600,000 films are being downloaded without authorization each day.[159]

Convergence. Analog platforms have typically been device-specific and quite limited in terms of interoperability. Although multiple devices (e.g., tuner, record player, cassette deck, CD player) could plug into a single preamplifier, a CD player cannot play a record. This meant that if a consumer wanted to acquire the latest and highest quality media, they would have to maintain multiple devices in order to play their entire library of content. The digital platform promises to be much more unified and backward compatible. Just as computer users can access old file formats on new word processors, so can they play older content formats within the same computer (so long as they have appropriate software). This has two important implications for the future of content distribution. Consumers will increasingly be able to access the same content through multiple devices – computers, television sets, game players, home stereos, and portable devices. Various new technologies integrating these various devices, such as the Moxi Media Center, are just entering the marketplace. This product can store and stream a wide variety of content from the Internet, DVD and CD players, and cable or DSL routers, as well as digitally record television content. It also allows the user to browse the Internet, send in-

158. *See Napster Eclipsed by Newcomers* (Sept. 6, 2001), *at* http://www.wired.com/news/business/0,1367,46596,00.html.

159. *See* Reuters News Service, *For Movie Pirates, It's Full Speed Ahead* (May 30, 2002), *at* http://news.com.com/2100-1023-928426.html.

stant messages, and access video-on-demand services. Another affordable new product establishes a wireless network within a local area — such as a house or office — enabling multiple users on multiple computers and devices to access, share, and transfer content files. Although the future for any particular implementation remains unclear,[160] digital technology will undoubtedly bring together more and more content-related capabilities.

Secondly, the introduction of new technology will not necessarily require consumers to jettison the old, as has frequently been the case with analog formats. As a technical matter, the adaptability and versatility of digital information and software make it more likely that old formats can be accommodated on new devices. Nonetheless, the content and technology industries may use encryption in combination with incompatibility as a means of transitioning to a constrained digital platform in order to combat unauthorized distribution and reproduction of copyrighted works.[161]

b. Implications of Digital Content for the Principal Entertainment Industries

The coalescence of this broad array of capabilities, almost all of which can be currently obtained with the purchase of a moderately priced microcomputer (for approximately the cost of a premium color television just a few years ago) and a modest monthly subscription charge for connection to an Internet Service Provider, has afforded consumers unprecedented power to access, store, manipulate, reproduce, and distribute entertainment content. Advances in digital technology have brought about, at affordable cost, nearly unlimited access to high quality content virtually anytime and anywhere. This brave new digital world, however, raises difficult questions about the supply of new content. The digital platform has untethered content from the inherent limitations on reproduction and distribution that ensured a steady flow of revenue to content publishers and creators —

160. *See* Richard Shimm, *Picture Unclear for Moxi Digital* (Feb. 28, 2002), *at* http://news.com.com/2100-1040-848492.html.

161. *See, e.g.*, *Consumers Squeezed in Battle Between Hollywood, Silicon Valley* (Jan. 30, 2002) (discussing proposed legislation that would require the installation of piracy-detection devices into all digital consumer products), *at* http://www.siliconvalley.com/mld/siliconvalley/3576962.htm (last visited Oct. 8, 2002); Will Knight, *Microsoft's Anti-Piracy Plans Spark Controversy* (July 1, 2002), *at* http://www.NewScientist.com (describing a recent software update for Microsoft's Media Player that requires users to permit the automatic installation of future anti-piracy measures).

the traditional basis for funding and raising capital for the creation of new content. Once a work has been released, it can be propagated through digital networks, supplanting traditional markets for content. As technology advances, the bandwidth of the networks will expand as will the proportion of the society that they reach. Enforcement of copyrights throughout the Internet and beyond becomes increasingly difficult as information flows ever more freely, decentralized networks take root, and the cost of memory devices and faster processors continue to fall. The content industries must evolve new business models and distribution media if they are to appropriate revenue streams for their investments. In addition, they face new forms of competition as the Internet opens up new channels of marketing and distribution. All of this is very threatening to industries that have enjoyed relatively stable and robust growth rates for decades. The implications will, of course, vary across content industries and over time.

Music Industry. Thus far, the sound recording industry has faced the most direct effects of the digital revolution, caused in part by their decision more than 20 years ago to embrace a digital format (the Compact Disk). World-wide CD sales fell in 2001 for the first time since the introduction of this format in the early 1980s.[162] This year, U.S. music sales are down steeply.[163] Although many factors affect music sales, including general economic conditions and the number of releases by popular artists, surveys of consumer behavior,[164] data on piracy,[165] and

162. *See* Brad King, *Slagging Over Sagging CD Sales* (Apr. 17, 2002), *at* http://www.wired.com/news/mp3/0,1285,51880,00.html (reporting data compiled by the International Federation of the Phonographic Industry (IFPI)).

163. *See* Anna Wilde Mathews & Bruce Orwall, *Music Labels Go After Song-Swappers: Recording Companies Plan Lawsuits Against Individuals*, WALL ST. J., July 3, 2002.

164. *See* Edison Media Research, *National Record Buyers Study II*, *at*http://www.edisonresearch.com/R&RRecordBuyersII.htm (last visited July 8, 2002); Reuters, *RIAA Blames Web Pirates for Loss* (Feb. 25, 2002), *at* http://news.com.com/2100-1023-844919.html; Adam Creed, *RIAA Blames Digital Music Pirates for Bad Year*, NEWSBYTES, Feb. 25, 2002 (citing RIAA survey finding that 23 percent of music consumers say that they buy less music because of opportunities for free copies); Gwendolyn Mariano, *Music Industry Sounds Off on DC Burning* (June 1, 2002), *at* http://news.com.com/2102-1023-935120.html. Although some studies suggest that those who download music tend to purchase more music than they otherwise would and that the Internet has helped to promote music sales more than it has hurt. *See, e.g.*, Matt Richtel, *Access to Free Online Music is Seen as a Boost to Sales*, N.Y. TIMES, May 6, 2002 (reporting on a survey conducted by Jupiter Research), the aggregate data and market valuation of major record labels suggest that the net effect is negative and worsening.

165. Unauthorized distribution of recordable CDs has contributed significantly to the rising tide of black market sales of sound recordings. *See* IFPI, *Music Piracy Report*

business assessments of record labels[166] increasingly establish that unauthorized distribution of music represents a serious threat to the sound recording industry's principal revenue stream: retail sales of CDs and tapes. Having released their "master" recordings in unencrypted digital form, record labels lack the ability to put the genie back in the bottle. In addition, more so than in the publishing or film markets, music consumers enjoy listening to works multiple times, archiving works, arranging their own collections, and shifting the time and place that they can access sound recordings.[167] Therefore, they have been drawn toward the enhanced functionality afforded by the digital platform. They have also been dissatisfied with the practice of bundling songs on albums when they desire only a part of the package. The digital platform provides a ready means for building music collections and circumventing CD bundles.

The rapid deployment of peer-to-peer networks for acquiring music has taken the industry by storm. Efforts to develop new fee-based business models – either streaming or download based – have come up against direct competition from free alternatives. The early business models – such as Emusic.com, which offered downloads of songs (from independent record labels) for 99 cents – failed to gain traction against Napster and its successors. The major record labels have been slow in developing their own subscription services. They have been preoccupied with litigation to shut down the peer-to-peer channels and thus far fruitless attempts to develop an effective and broadly ac-

(June 2002), *at* http://www.ifpi.org/site-content/library/piracy2002.pdf; *see also* John Borland, *Movie Studios Tout First DVD Bust in U.S.* (Mar. 22, 2002), *at* http://news.com.com/2100-1023-867314.html. Before Eminem's latest record reached store shelves, it had become the second most played CD in computer drives and was widely available through bootleg channels. *See* John Borland, *Eminem CD Spotlights New Piracy Patterns* (May 28, 2002), *at* http://news.com.com/2100-1023-923472.html.

166. *See* Chuck Phillips, *Industry Woes Hit Vivendi's Music Unit Media: With Piracy Surging and Profit Falling, No Buyer is Seen for a Possible Sale*, L.A. TIMES, July 8, 2002 ("Studies show CD burning and Internet piracy have decimated sales of new hits and old catalog albums, shrinking international revenue by about 20% over the last three years."); David D. Kirkpatrick & David Carr, *A Media Giant Needs a Script: Grumbling at AOL Time Warner*, N.Y. TIMES, July 7, 2002, § 3, at 1 (noting a 60% drop in the stock price of the merged company and internal strife between the content and technology divisions).

167. *See* Tim Hanrahan & Jason Fry, *Real Time – Net Music: You Can't Always Get What You Want, or What You Need*, WALL ST. J., July 8, 2002 (noting the importance of "portability, permanence and selection" to music fans).

ceptable means of encrypting sound recordings.[168] Most recently, they have begun to allow their catalogs to become part of new on-line subscription services, in substantial part out of fear that the consuming public, especially the younger age cohort that has traditionally purchased the lion's share of new music, are coming to see unauthorized peer-to-peer as a convenient and legitimate means of accessing and acquiring music.[169] After much delay, the major record labels have begun to experiment with selling downloads of songs,[170] while continuing to assess and experiment with encryption and more sophisticated digital rights management techniques for controlling new releases. They have vowed to battle peer-to-peer services in court and through other means (such as flooding peer-to-peer networks with decoy music files)[171] while lobbying Congress for stronger legal protec-

168. In December 1998, the recording, consumer electronics, and information technology industries launched the Secure Digital Music Initiative (SDMI) in order to develop open technology specifications for protected digital music distribution. RIAA Press Release, *Worldwide Recording Industry and Technology Companies Kick-Off Work of SDMI* (Feb. 26, 1999), *at* http://www.riaa.com/PR_Story.cfm?id=68. After a much publicized fiasco surrounding its challenge to crack a prototype and disagreement among the participants, the SDMI suspended operations on May 18, 2001. *See* http://www.sdmi.org/; Associated Press, *SDMI: Quintessential Vaporware*, WIRED NEWS, Apr. 29, 2002.

169. *See* Amy Harmon, *Grudgingly, Music Labels Sell Their Songs Online*, N.Y. TIMES, July 1, 2002, at C1. A recent survey by Edison Media Research found that nearly three-quarters of 12- to 17-year-olds do not feel "there is anything morally wrong with downloading music for free on the Internet," 10.1% who actively download music from the Internet did not purchase a single CD or cassette in the last 12 months, and 53% have burned someone else's copy of a CD instead of buying their own copy. *See The National Record Buyers Study II, at* http://www.edisonresearch.com/R&RRecordBuyersII.htm (last visited July 8, 2002).

170. The major record labels have thus far resisted providing downloads of the most popular recordings in their catalog. *See* Jon Healey, *AOL Selling Songs Online in Unprotected Format – Music: The Company is Offering 99-cent MP3 Singles from New and Established Acts as Part of a 90-Day Experiment*, L.A. TIMES, June 15, 2002, *available at* http://www.latimes.com/business/la-0000041910jun15.story. Universal Music Group (UMG), the largest record label, recently announced that it plans to make 1,000 of its 11,000 albums available in unprotected MP3 format to subscribers who pay between $10 and $15 a month. Rather than offering the work of best-selling artists like Eminem and U2, UMG has chosen older, less popular content that does not sell quickly in stores. UMG's executives view this initiative as both a response to the rising level of unauthorized distribution of digital files and as a means of assessing the effects of legitimate online access on retail sales. *See* Simon Avery, *Company to Put Music Library Online* (July 9, 2002), *at* http://www.siliconvalley.com/mld/siliconvalley/news/3625461.htm.

171. *See* Dawn C. Chmielewski, *Music Industry Swamps Swap Networks with Phony Files* (June 27, 2002), *at* http://www.siliconvalley.com/mld/siliconvalley/3560356.htm (last visited Sept. 15, 2002).

tions, such as requirements that new digital consumer products contain piracy-detection protections.[172]

Notwithstanding the generally pessimistic view that the major record labels have taken of the digital future, advances in digital technology and the Internet offer cause for at least guarded optimism for the future of sound recording, although not necessarily for the current major record labels.[173] Various digital technologies have significantly reduced the costs of producing, marketing, and distributing content. Recording artists today can afford or have easy access to home recording studios and software tools comparable to the most elite professional studios of a generation ago.[174] Furthermore, the Internet enables record labels and artists to promote new music easily and effectively through label and artist-supported web sites.[175] Moreover, new artists can gain exposure through new distribution channels, such as MP3.com[176] and Garageband.com.[177] New subscription models, such as Listen.com's Rhapsody service which streams a vast library of music

172. *See* Declan McCullagh, *AntiCopy Bill Hits D.C.* (Mar. 22, 2002) (reporting on the Consumer Broadband and Digital Television Promotion Act sponsored by Senator Fritz Hollings), *at* http://www.wired.com/news/politics/0,1283,51245,00.html.

173. *Cf.* Steve Morse, *Burned?*, BOSTON GLOBE, Apr. 21, 2002, at L1 (quoting rock artist Elvis Costello stating that the record labels "loaded the game so the house has been winning for a long time. Now it's time maybe for the house not to win for a while. Maybe they have to take some losses.").

174. In the words of Jon Anderson, cofounder and lead singer of the 1970s rock supergroup Yes, "the great Apple and Digidesign equipment I'm using affords me the opportunity to have a perfectly good studio at home, capable of producing truly professional quality work." *See* Jon Anderson, *Embarking on a New Solo Project*, *at* http://www.apple.com/creative/musicaudio/jonanderson/ (last visited July 2, 2002).

175. *See* Richard Morin, *New Musical Acts Get Lift from Internet; Downloading Levels Field, Study Finds*, S.F. CHRONICLE, Apr. 17, 2002; Reuters News Service, *Dave Stewart of Eurythmics Launches Record Label* (June 5, 2002) (discussing Artists' Network, a new record label promising a more artist-friendly business model), *at* http://story.news.yahoo.com/news?tmpl=story&u=/nm/20020605/en_nm/people_stewart_dc_2.

176. Begun as an independent venture but now owned and operated by one of the major record labels, MP3.com provides clearinghouse for artists to showcase their music to fans worldwide. As one of the first and best known music download destinations on the web, it receives a half-million visitors per day. *See* MP3.com site, *at* http://help.mp3.com/help/article/general_what.html (last visited July 2, 2002).

177. According to Garageband.com's website,

> [t]raditional major labels spend between $500,000 to $5 million to find, launch and market a single artist or band, based on the hunches of a few individuals. Garageband uses the opinions of hundreds of thousands of actual consumers to make these decisions. Furthermore, Garageband will simultaneously be helping musicians find their way through the traditional

on a monthly service charge basis, may become a viable source of income. Webcasting offers new opportunities for streaming music without losing control over the content, although the economic basis for that marketplace remains in doubt.[178] Moreover, the Internet allows sound recording companies to promote new music more effectively. Perhaps most significantly, digital technology may provide the basis for various new revenue streams should an effective digital rights management standard become workable.

Film Industry. Due to the large size of feature length digital motion picture files and the use of DVD encryption in digital release of film products, the film industry has only recently begun to experience the challenges posed by unauthorized on-line distribution of its content. The rapid advance of digital technology has now brought feature films into peer-to-peer and other unauthorized online distribution channels. Recent releases of much anticipated feature films – such as Spiderman, Harry Potter and the Sorcerer's Stone, and Star Wars: Episode II Attack of the Clones – found their way onto peer-to-peer networks and black markets soon after (and in some cases before) their release to theaters.[179] A media and entertainment consulting group estimates that 400,000 to 600,000 movies are downloaded over the Internet per day, a 20 percent rise from over a year ago.[180]

Nonetheless, the film industry differs from the sound recording industry along multiple dimensions that make it less vulnerable to unauthorized distribution. Thus far, the time to download feature films

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record industry and exploring less capital-intensive alternatives to traditional distribution mechanism.

at http://www.garageband.com/htdb/companyinfor/profile.html (last visited July 2, 2002).

178. *See* Christopher Stern, *Curtain Call for Webcasts? Some Decry Order to Pay Royalties to Musicians*, WASH. POST, June 21, 2002, at E1 (describing reaction to recent decision by the Librarian of Congress establishing compulsory licensing rates for webcasting).

179. *See* Brian McWilliams, *"Spidey" Already Being Swapped by Online Pirates*, NEWSBYTES, May 6, 2002; Elizabeth Rosenthal, *Counterfeiters Turn Magic into Cash: Pirated Copies of "Harry Potter" Film Already for Sale in China*, N.Y. TIMES, Nov. 25, 2001, at A26; Jon Healy & Richard Verrier, *Latest Plot Twist for "Star Wars": Attack of the Cloners – Internet: Bootlegged Copies Hit the Web Before Movie Debuts, in Latest Challenge to Industry*, L.A. TIMES, May 10, 2002, at A1.

180. *See* Reuters News Service, *For Movie Pirates, It's Full Speed Ahead* (May 30, 2002), *at* http://news.com.com/2100-1023-928426.html (last visited Sept. 15, 2002); Andrew W. Frank, Reinhold Beutler & Aaron Markham, *The Copyright Crusade* (June 2001) (Viant Media and Entertainment Report), *at* http://www.viant.com/pages2/downloads/innovation_copyright.pdf (last visited Sept. 15, 2002) (hereinafter The Copyright Crusade).

as well as the generally poor quality of the first wave of online copies distributed has not significantly affected the market for film products. Relatively few consumers have the bandwidth, storage capacity, expertise,[181] and patience to acquire film content in this way. In fact, online availability of poor quality versions may help to promote consumer interest. Furthermore, even as bandwidth and memory storage expand, the fact that consumers do not tend to view films repeatedly in the way that they listen to music suggests that archiving will not play the same role in film as it does in music.

Most importantly, the film industry can still control the important first waves of distribution without significant leakage in unauthorized channels. They continue to hold tight controls over theatrical release, pay-per-view, and premium channel distribution. Such versioning strategies will continue to work into the digital future.[182] Moreover, the video market is already built upon an encrypted format, which will hinder, although not entirely defeat, unauthorized distribution of films. Furthermore, competitive pricing of DVDs and the potential for directors' cuts (with previously unreleased scenes), behind-the-scenes footage, game and merchandising tie-ins, and other added features will keep many consumers within the legitimate market for content.[183] As bandwidth and memory capacity expand and new devices, such as DVD burners, become more widely diffused, the film industry will experience somewhat greater competition for the video market as well as marginal effects on what they can charge for theatrical release, but the

181. Most films circulate on what is referred to as the Internet Relay Chat (IRC) Network, an infrastructure that predates the World Wide Web (Web). The Web provides a network architecture that allows information (including text, data, audio and video content, and software programs) to be stored on servers in hypertext documents (commonly referred to as "web pages"). Internet users can easily store, search, and access such pages. Its great versatility and ease of use has made the Internet popular among a wide range of computer users. IRC enables individuals to participate in live typed discussions over the Internet. It requires use of an IRC software program and has thus far been used principally by more sophisticated computer users. *See* The Copyright Crusade, *supra* note 180, at 14-17.

182. *See, e.g.,* Rick Lyman, *Box Office Has a Record Weekend, "Men in Black" Leading the Way*, N.Y. TIMES, July 8, 2002, at E1 (noting that July 4th box office revenues for the top dozen films exceeded $219 million, shattering prior records and that ticket sales grew 16% despite a rise in ticket prices), *available at* http://www.nytimes.com/2002/07/08/movies/08BOXO.html.

183. *See* Patrick Goldstein, *The Big Picture: Technology is Movies' Angel, But Record Industry's Devil*, L.A. TIMES, July 2, 2002, Part 6, at 1.

multi-faceted nature of its business model will be able to adapt reasonably effectively.

Ultimately, digital technology may significantly improve the film industry's delivery and revenue models. There is substantial opportunity to reduce the costs borne by consumers in renting and purchasing movies. Online business models can eliminate the video store intermediary as well as offer tremendous convenience to consumers. Thus far, however, the difficulty of protecting content online has impeded the rollout of online film distribution channels.[184]

Television Industry. As noted above, the television industry has for most of its history operated on an advertising-based business model in which content was freely available to anyone with a receiving set. Even before the arrival of digital technology, the expansion of channels, particularly through cable and satellite television, the use of VCRs to "time shift" viewing, and remote control devices (for easy channel surfing and muting) have gradually eroded the traditional three networks' hold on viewer attention. The introduction of digital video recorders (DVRs, also known as personal video recorders (PVRs) has raised concerns across the television and advertising industries about the future of advertiser-supported programming.

The first generation of DVRs functioned largely as more capacious and easily programmed video cassette recorders. These devices could record many hours of programming and had software to seek out shows that the user had shown prior interest in viewing. Because the information was stored digitally, commercials could be skipped more conveniently than with the fast forward of analog VCRs. Since TiVo, the first major player in this marketplace, received substantial financial backing from the television industry, it downplayed this feature of its product. The second major player to enter this market, ReplayTV, has been less concerned with the television industry's reactions to its product's functionality.[185] In addition to prominently advertising its "Commercial Advance" (which automatically skips over advertisements on recorded programs) and "QuickSkip" (which lets views skip in 30 second intervals, the length of most commercials) features, ReplayTV al-

184. *See* Jack Valenti, *Movies Get Framed: Films on the Net – We'd Love It. But Not for Free*, WASH. POST, Feb. 25, 2002, at A23.

185. *See* Farhad Manjoo, *TiVo Town or Sonicblue City?* (June 6, 2002), *at* http://www.wired.com/news/business/0,1367,53008,00.html (last visited Sept. 15, 2002).

lows consumers to distribute stored content over the Internet.[186] Recent studies show that approximately three-fourths of DVR owners frequently or always skip commercial advertisements.[187]

These new technologies have reshaped viewing habits in ways that erode the ability of advertisers to predictably reach target audiences. Round the clock news cable shows, DVRs, and the ubiquity of syndicated series available throughout the day have diluted the traditional prime time window. Commercial skipping technology has reduced the number of viewers watching a particular show that actually see the advertisements. Nonetheless, as with the film industry, the television marketplace has developed a range of revenue models. Whereas particular players, such as the traditional networks may lose share and revenue, the industry as a whole has ample means for adapting to digital technology.

As a starting point, it is important to recognize that advertisement-based programming is no longer the only appropriability mechanism. Cable television, satellite delivery, premium channels, and pay-per-view programming have augmented the "free" television platform on which the industry was built. Premium channels now offer some of the most critically and commercially successful programming, as demonstrated by Home Box Office's award winning series "The Sopranos" and "Sex and the City." They have also enjoyed success in producing their own feature length movies. Although these channels are not vulnerable to commercial skipping, they can be hurt by unauthorized distribution

186. The United States is currently in a transition process from analog to digital television transmission. According to Federal Communication Commission (FCC) regulations, all over-the-air television viewers will have some access to digital television (DTV) by the end of 2002. At the same time, analog service will also continue until 2006, after which all broadcasters will transmit only DTV. *See* FCC, *Digital Television Frequently Asked Questions*, *at* http://www.fcc.gov/mb/policy/dtv/#12 (last visited Aug. 22, 2002). This new format will vastly improve resolution and sound quality and enable a wide range of interactive features. The television and movie industries have, however, stated that they will not release their most valuable programming in digital format until the transmission platform incorporates protections against this content being copied and distributed by way of the Internet. Representatives of Hollywood studios and technology companies have formed the Broadcast Protection Discussion Group to develop standards for such a platform. Progress on this effort has been slow and it remains to be seen whether the FCC's 2005 target date for full transition can be achieved. *See* Amy Harmon, *Hollywood Has a Setback in Controls for Digital TV*, N.Y. TIMES, June 5, 2002, at C4.

187. *See* Benny Evangelista, *Hot Button Issue: TV Moguls Are Threatened by DVRs that Zip Past the Ads*, S.F. CHRON., May 27, 2002, at E1.

over the Internet to non-subscribers. These providers already have significant experience dealing with various forms of signal piracy.[188]

Television networks have also responded to the changing landscape of new devices and viewing habits by moving advertisements more directly into programming. Television shows now routinely include logos, short advertisements, and coming attractions in a corner of the screen. Signs in sporting venues and on-air graphics during sports broadcasts also bring advertisements directly to the viewer. Television shows, like films, now sell product placements and marketing tie-ins as part of the scripting and set design for their productions.[189] Television networks can also adjust to reductions in advertising revenues by shifting toward lower cost programming, such as reality and game shows. While these effects will erode the "quality" of advertisement-supported programming, they may simply shift production of better produced shows toward the premium channels and public-supported networks. In a reversal of sorts, shows developed for premium cable channels may one day be syndicated into network broadcasting. Furthermore, various forms of programming are less vulnerable to commercial skipping, such as news, current affairs shows, sports, reality programs, and game shows, which derive their value from being live or first run. Eventually, digital rights management technology may foster a wide array of business models catering to the diversity of tastes and willingness of consumers to pay for access to television programming.

Publishing Industry. The traditional publishing industry spans a wide range of markets, from traditional books (a wide domain itself) to daily newspapers and periodic magazines. The Internet has opened up vast new distribution channels for all imaginable types of written content. Legal research services, Lexis-Nexis and Westlaw, were among the first successful ventures in providing modern online information services. Most major newspapers and periodicals today have online offerings, most commonly based upon web-advertising and tie-ins to newsstand and subscription channels. A few sources, most notably the Wall Street Journal, have experimented with a subscription model with mixed success.[190]

188. *See, e.g.*, Jennifer 8. Lee, *In Satellite Piracy War, Battles on Many Fronts*, N.Y. TIMES, May 9, 2002, at G1.

189. *See* Bill Carter, *New Reality Show to Place Ads Between the Ads*, N.Y. TIMES, Apr. 30, 2001, at A1.

190. *See* Alex Salkever, *Special Report: The Future of E-Business – The Battle of the Online Content Models: In the Pay-to-Read Corner is the Journal. In the Give-it-Away Corner is the*

Thus far, the online distribution model has made only modest inroads into the direct distribution of novels and more traditional books, by which I mean the downloading of book text in electronic book ("eBook") form.[191] The technology for reading books in digital form has been available for four years,[192] but consumers have been slow to adopt this means of reading books.[193] The devices are relatively expensive and lack the resolution of the printed page. Nonetheless, they offer search capabilities, the ability to store multiple books, and other features not available in bound books.

Over the longer term, the eBook market can be expected to make substantial inroads into traditional book markets and to provide new opportunities for distributing literary works.[194] Although the first generation of products incorporate encryption technology,[195] ultimately the publishing industry may be the most vulnerable content industry to unauthorized reproduction and distribution because the content (text) will always be directly perceptible (and hence subject to copying, even if through scanning or re-typing). Furthermore, libraries have become interested in distributing eBooks through their web-

Times. Which One Will Prevail? (May 13, 2002), *at* http://www.businessweek.com/magazine/content/02_19/b3782608.htm (last visited Oct. 8, 2002).

191. Amazon.com and other on-line book retailers have, of course, had a substantial effect on the selling of traditional books through the Internet.

192. *See* Steve Silberman, *E-Books' Bash in Big Apple* (Oct. 23, 1998), *at* http://www.wired.com/news.culture/0,1284,15808,00.html (last visited Sept. 26, 2002). Computers have provided a means for reading ASCII text on screens since the 1950s, but relatively consumers have considered this a serious substitute for bound books as a source of pleasure reading.

193. *See* M.J. Rose, *2001 Was a Tough Read for E-Books* (Dec. 25, 2001) (reporting on disappointing results in eBook publishing), *at* http://www.wired.com/news/culture/0,1284,49297,00.html.

194. A recent report suggests that the eBook market has experienced rapid growth, albeit from a small base. *See eBooks by the Numbers: Open eBook Forum Compiles Industry Growth Stats, Report Points to Solid Growth of Electronic Publishing*, *at* http://www.businesswire.com/index/html (July 22, 2002); M.J. Rose, *Promising Chapter in E-Book Story* (July 9, 2002) (noting tremendous growth in visits to eBook web sites, purchases of eBook readers, and sales of eBooks), *at* http://www.wired.com/news/culture/0,1284,53699,00.html (last visited Sept. 26, 2002); *see also* Open eBook Forum, *at* http://www.openanebook.org. Random House's eBook revenues doubled from 2000 to 2001, while other publishers experienced double-digit growth. Average monthly downloads of Adobe's Acrobat eBook Reader increased by approximately 70% from 2001 to 2002.

195. *See* M. J. Rose, *At What Cost, E-Books?* (Oct. 17, 2000), *at* http://www.wired.com/news/culture/0%2C1284%2C39471%2C00.html (last visited Sept. 26, 2002).

sites.[196] More than 7,300 public libraries provide remote access to the texts of hundreds to thousands of electronic books. These activities may seed the market for eBooks.[197] Whereas music and audiovisual content can be encrypted in such a way that the user cannot see the content without authorization, the essence of books (the text) will always be available to the extent that the books are sold in hard copy form. Therefore, would-be copyists will be in a position to scan such content into digital form within hours of a book's release.

B. The First Waves of Digital Copyright Law

The content industries have increasingly focused their energies on forestalling and bracing for the blossoming of a digital platform. Even before the free flow of content in the Napster and post-Napster era, the content industries actively resisted the introduction of digital technologies and used the threat of such technologies as a basis for obtaining new legislation expanding rights and enforcement powers of copyright owners.[198] This section summarizes the various amendments to copyright law during the 1990s and the efforts by the content industries to preclude and combat technologies that contribute to the unauthorized reproduction and distribution of copyrighted works.

1. Digital Copyright Legislation

a. Record and Software Rental Legislation

Even before the availability of home digital recording technology, the sound recording industry became concerned that home copying on widely available and improving analog cassette recorders

196. *See* David D. Kirkpatrick, *Battle Over Access to Online Books*, N.Y. TIMES, June 17, 2002, at C7.

197. The new role for libraries, however, puts them at odds with traditional and online booksellers. Whereas traditional libraries circulated books to one patron at a time, ebooks can be made available to multiple patrons at once. Many ebook ventures that initially sought to partner with traditional publishers have instead turned their attention to libraries, some consummating intriguing licensing deals. RosettaBooks, for example, which distributes a wide range of ebooks including works by some leading contemporary authors such as Kurt Vonnegut, Jr. and William Styron, has offered to license distribution of a collection of 100 20th Century classics to libraries for an annual fee of $200 to $1,000. *See* Random House, Inc. v. Rosetta Books, 283 F.3d 490 (2d Cir. 2002) (upholding denial of preliminary injunction sought by print publisher); *See* David D. Kirkpatrick, *Battle Over Access to Online Books*, N.Y. TIMES, June 17, 2002, at C7.

198. *See* Pamela Samuelson, *The Copyright Grab* (Jan. 1996), *at* http://www.wired.com/wired/archive/4.01/white.paper_pr.html (last visited Oct. 8, 2002).

threatened the retail market for sound recordings.[199] In 1984, the industry persuaded Congress to amend the first sale doctrine – which affords purchasers of authorized copies of a copyrighted work freedom to do with the copies as they wish[200] – to prohibit the rental of sound recordings.[201] The software industry obtained comparable prohibitions on rentals of software in 1990.[202]

b. Audio Home Recording Rights Act of 1992

As analog recording technology grew during the 1980s, the sound recording industry became particularly concerned about the inevitable arrival of digital recording technology.[203] Such equipment could produce the viral spread of high quality copies. By the mid-1980s, just a few years after the release of the record labels' catalogs in unencrypted digital format (on CDs), consumer electronics companies sought to introduce a host of new products that would enable consumers to make digital copies of audio recordings. These technologies (digital audio tape (DAT) and mini-disc (DCC)) made it possible to produce identical copies of copyrighted works without any significant degradation of quality. As occurred with the introduction of video cassette recording technology in the early 1980s,[204] copyright owners immediately sued the principal manufacturer of this technology, the Sony Corporation.[205]

In the shadow of costly and uncertain litigation (and following Sony's acquisition of CBS Records, one of the leading record labels, in 1987),[206] the various interests resolved their differences through negotiations, which culminated in Congress' passage of the Audio Home Recording Rights Act of 1992.[207] For the first time in the history of

199. *See generally* United States Office of Technology Assessment, *Copyright and Home Copying: Technology Challenges Law* (Oct. 1989).

200. *See* 17 U.S.C. § 109.

201. *See* Record Rental Amendment of 1985, Pub. L. No. 980450, 98 Stat. 1727 (1984).

202. *See* Computer Software Rental Amendments of 1990, Pub. L. No. 101-650, 104 Stat. 5089, 5134-37 (1990) (codified at 17 U.S.C. § 109(b) (2002)).

203. *See generally* United States Office of Technology Assessment, *Copyright and Home Copying: Technology Challenges Law* (Oct. 1989).

204. *See* Sony Corp. of America v. Universal Studios, Inc., 464 U.S. 417 (1984).

205. *See* Cahn v. Sony Corp., 90 Civ. 4537 (S.D.N.Y. filed July 9, 1990).

206. *See* Sony Music: History, *at* http://www.sonymusic.com/world/aboutus/history.html.

207. *See* Pub. L. No. 102-563, 106 Stat. 4237 (1992) (codified at 17 U.S.C. §§ 1001-10 (2002)).

copyright, the government imposed technological design constraints on the manufacture of copying devices. This legislation also established a royalty on the sale of devices and blank recording media. Section 1002(a) prohibits the importation, manufacture, and distribution of any digital audio recording device that does not incorporate technological controls (Serial Copy Management System or functional equivalents) that block second-generation digital copying. This technology control allowed users to make copies directly from a compact disk, but not from digital copies made using this technology. In so doing, the AHRA sought to limit the viral spread of copies. Consumers could make first-generation copies, but no further copies could be made from those copies.

As a means to compensate copyright owners for the copying that could result from these new technologies, the Act requires manufacturers and importers of digital audio recording equipment and blank tapes, disks, or other storage media to pay a percentage of their transfer prices (2% for digital audio devices and 3% for storage media) into a royalty pool, which is distributed to owners of musical compositions (one-third) and sound recordings (two-thirds) based on prior year sales and air time.[208] This compensation mechanism is administered by the Register of Copyright, with provisions for arbitration of disputes.

Section 1008 affords immunity for the manufacture, importation, and distribution of digital audio devices meeting the §1002 design requirements, any analog audio recording devices, and any recording media. It also immunizes consumers from infringement liability for the noncommercial use of analog or qualifying digital devices for making copies. Violations of the AHRA are not copyright violations. Rather, the AHRA contains its own enforcement, remedy, and dispute resolution provisions.

c. Digital Performance Rights in Sound Recording Act of 1995

Sound recordings, as distinguished from the underlying musical compositions, did not receive federal copyright protection until 1972.[209] By that point in time, radio broadcasters had sufficient political clout to exclude a public performance right from the rights accorded owners of sound recording copyrights. As a result, when a

208. *See* 17 U.S.C. §§ 1003-07 (1992).

209. *See* Sound Recording Act of 1971, Pub. L. No. 92-140, 85 Stat. 391 (1971).

radio station broadcasts a post-1972 Frank Sinatra rendition of Cole Porter's "I've Got You Under My Skin," only Cole Porter receives a public performance royalty payment (typically through ASCAP's or BMI's blanket performance right license regime for musical compositions). This arrangement has always rankled record labels and recording artists.[210] When the Internet opened up a new distribution channel for sound recordings – what has come to be known as webcasting – record labels seized the opportunity to establish a performance right, even if only with respect to digital audio performances.[211] They voiced great concern that this new medium could seriously disrupt the market for sound recordings. If consumers could access and possibly even download high-quality recordings of their favorite songs over the Internet whenever they desired, then there would be little demand for retail record (CD) sales.

Interestingly, the prospect of webcasting and other online subscription services united traditional broadcasters and the sound recording industry in support of a digital performance right. Recording artists and record labels could at least partially rectify the omission of a public performance right in sound recordings while traditional broadcasters could impose an extra licensing requirement (and cost) upon new competitors. Since this new industry was not yet well-developed, it lacked the political clout to block this new right, although the owners of musical composition copyrights (and their performing rights societies, ASCAP, BMI, and SESAC), which did not wish to empower another set of music licensing claimants, succeeded in constraining the reach of this new right along a number of dimensions. Furthermore, Congress sought to ensure that the new right would not unduly interfere with the development of new digital transmission business models.

The ultimate compromise amended sections 106 and 114 of the Copyright Act to establish an exclusive right to perform sound recordings "publicly by means of a digital audio transmission." The practical effect of this provision is that record companies who hold a right in the sound recording can demand a royalty on digital "performances," which include downloading, uploading, and streaming of the digital transmissions. The Act tempers this new right with various exemptions

210. *See* Steven J. D'Onofrio, *In Support of Performance Rights in Sound Recordings*, 29 U.C.L.A. L. REV. 169 (1981).

211. *See* Lionel Sobel, *A New Music Law for the Age of Digital Technology*, 17 ENT. L. REP. 3 (Nov. 1995).

and limitations[212] and a compulsory licensing regime applicable to non-interactive services meeting various complex requirements.[213]

d. No Electronic Theft Act of 1997

Congress enacted the No Electronic Theft (NET) Act in order to strengthen criminal prosecution and penalties against those who distribute copyrighted works without authorization. It specifically responded to the ruling in *United States v. LaMacchia*,[214] in which the court held that a computer bulletin board operator[215] providing users with unauthorized copies of copyrighted software without charge could not be prosecuted under federal copyright law because the government could show that the operator benefitted financially from the copyright infringement. The NET Act closed this loophole by criminalizing various intentional acts of copyright infringement without regard to whether the defendant received any financial benefit from such acts. It also stiffened the criminal penalties applicable to copyright infringement committed through electronic means. A person found guilty under this provision can receive three years in prison for a first offense and be forced to pay a substantial fine, even for illegally distributing sound recordings valued as little as $1,000.[216]

e. Digital Millennium Copyright Act of 1998

Somewhat analogous concerns prompted computer software companies and content owners to lobby national and international authorities for greater protections against digital piracy in the mid-1990s.[217]

212. Traditional television and radio broadcasters may continue to perform sound recordings without being subject to this new right, even if they convert their signal to digital form. *See* 17 U.S.C. § 114 (d)(1). In addition, various secondary transmissions of exempt primary transmissions and transmissions within business establishments (such as MUZAK) do not implicate the digital performance right.

213. 17 U.S.C. § 114(d), as amended by the Digital Millennium Copyright Act of 1998. *Cf.* Bonneville Int'l v. Peters, 153 F.Supp.2d 763 (E.D. Pa. 2001) (addressing the problems of categorizing Internet broadcasters).

214. 871 F.Supp. 535 (D. Mass. 1994).

215. Electronic bulletin boards were precursors to modern Internet web pages, in which users could access information – typically organized by interests areas, such as science fiction or particular software areas – and chat rooms through modems. They are still used today, often as proprietary systems for technical support, software upgrades and patches, and the like. *See* MICROSOFT PRESS, COMPUTER DICTIONARY 46 (3d ed. 1997).

216. *See* 18 U.S.C. § 2319.

217. *See* Samuelson, *supra* note 198.

These content distributors came to see encryption and digital rights management as critical elements in the development of the online marketplace for content. They recognized, however, that such technologies would be vulnerable to hacking. As a result, they sought to expand copyright protection beyond its traditional prohibitions against infringement of copyright's exclusive rights to include limits on the decrypting or circumventing of technological protection systems and the trafficking of such decryption tools. They argued that without such protection, they would be unwilling to release content onto the Internet, which in turn would hamper the adoption of broadband services. Various other interests – ranging from Internet service providers and telecommunications companies to consumer electronic manufacturers,[218] library associations, computer scientists, and copyright professors[219] – expressed concern about chilling effects of such an expansion of copyright law upon those who transmit content and wish to make "fair use" of copyrighted works. The resulting legislation – the Digital Millennium Copyright Act of 1998 (DMCA) – accepted the content industries' premises and responded to their core concerns[220] by enacting anticircumvention and anti-trafficking bans, while assuaging

218. Many of these companies participated in the Home Recording Rights Coalition (HRRC), an organization formed after the Sony Betamax dispute to oppose the imposition of technical constraints upon the design of consumer products. The HRRC seeks to foster technological innovation in consumer electronics and consumer freedom to engage in time shifting, place shifting, and other private, noncommercial reproduction of lawfully obtained music and video content. *See* HRRC Core Principles, *at* http://hrrc.org/html/core_principles.html (last visited Aug. 22, 2002).

219. Educational, scholarly, library, consumer, consumer electronics, computer, telecommunications, and network access industries forged the Digital Future Coalition (DFC) in 1995 in response to the release of the Clinton Administration's White Paper on Intellectual Property and the National Information Infrastructure. The DFC seeks to strike "an appropriate balance in law and public policy between protecting intellectual property and affording public access to it." *See A Description of the Digital Future Coalition* (July 7, 2002), *at* http://www.dfc.org/dfc1/Learning_Center/about.html.

220. As explained in the Senate Report,

> Due to the ease with which digital works can be copied and distributed worldwide virtually instantaneously, copyright owners will hesitate to make their works readily available on the Internet without reasonable assurance that they will be protected against massive piracy. Legislation implementing [the World Intellectual Property Organization] treaties provides this protection and creates the legal platform for launching the global digital online marketplace for copyrighted works. It will facilitate making available quickly and conveniently via the Internet the movies, music, software, and literary works that are the fruit of American creative genius. It will also encourage the continued growth of the existing off-line global marketplace

the concerns of the most powerful opposing interest group coalition – ISPs and telecom companies – by creating a series of online service provider safe harbors. The DMCA addressed the various other competing interests through a series of narrow limitations and exemptions, producing a bewildering labyrinth of rules that raise myriad interpretive issues.[221]

Anticircumvention and Anti-trafficking Provisions (Title I). Somewhat like the AHRA, Title I of the DMCA goes beyond traditional copyright approaches in order to address the threat of unauthorized reproduction and distribution of copyrighted works in the digital age.[222] But rather than mandating specific technology controls,[223] the DMCA focuses on ensuring the efficacy of technological control measures put in place by copyright owners. The Act distinguishes between technological measures that effectively control *access* to a work (e.g., being able to read an eBook) and technological measures protecting particular rights of a copyright owner by regulating *use* of a work where access is granted (e.g., preventing scenes from being altered in an encrypted movie).

With regard to technological measures controlling *access* to a work, Section 1201(a) prohibits both specific acts to circumvent the technological measure[224] and the manufacture, import, trafficking in, and marketing of devices that: (1) are primarily designed or produced for the purpose of circumventing a technological measure that effectively "controls access to" a copyrighted work; (2) have only limited commercially significant purpose or use other than to circumvent such

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for copyrighted works in digital format by setting strong international copyrights standards.

S.REP. NO. 105-190, at 8 (1998); H.R. REP. NO. 105-551, pt. 2, at 23 (1998).

221. *See* David Nimmer, *Puzzles of the Digital Millennium Copyright Act*, 46 J. COPYRIGHT SOC'Y U.S. 401 (1999); David Nimmer, *A Riff on Fair Use in the Digital Millennium Copyright Act*, 148 UNIV. PA. L. REV. 673 (2000).

222. Although codified as part of Title 17 of the U.S. Code, violations of the DMCA do not constitute copyright infringements. *See* 17 U.S.C. §§ 1203-04 (specifying civil and criminal remedies for violations of the DMCA's anticircumvention and anti-trafficking provisions).

223. While generally eschewing technology mandates, *see* 17 U.S.C. § 1201(c)(3) (the "no mandate" provision), the DMCA does impose limited technology controls on some video cassette recorders. *See* 17 U.S.C. § 1201(k) (requiring future analog VCRs to incorporate new anticopying technology).

224. 17 U.S.C. § 1201(a)(1). To circumvent a technological measure is defined as descrambling a scrambled work, decrypting an encrypted work, or "otherwise to avoid, bypass, remove, deactivate, or impair a technological measure, without the authority of the copyright owner." *Id.* at § 1201(a)(3)(A).

technological protection measures; or (3) are marketed for use in circumventing such technological protection measures.[225] With regard to technological measures regulating *use* of a work where access has been lawfully obtained (e.g., through the purchase of a DVD), section 1201(b) prohibits only trafficking in and marketing of circumvention devices. This more limited protection was designed so as not to impair users' ability to make fair use of content to which they have been given access.[226] This limitation, however, provides little solace to advocates of broad fair use standards because although it allows circumvention of use controls, the ban on trafficking of circumvention devices (including instructions) puts the means for such access beyond the reach of all but the most technically adept – those possessing the ability to decrypt restricted works. Section 1202 further bolsters encryption efforts by prohibiting the removal or alteration of "copyright management information" conveyed along with a copyrighted work.[227]

The DMCA addresses the many objections and concerns raised by various groups through a complex series of narrow exemptions.[228] In order to reduce adverse effects of Section 1201 upon fair use of copyrighted works, the DMCA authorizes the Librarian of Congress, in consultation with the Register of Copyrights[229] and the Assistant Secretary for Communications and Information of the Department of Commerce, to exempt any classes of copyrighted works where persons making noninfringing uses are likely to be adversely affected by the anticircumvention ban.[230] Perhaps of most significance, the DMCA

225. 17 U.S.C. §1201(a)(2).

226. *See* H.R. REP. NO. 105-551, pt. 1, at 18 (1998); Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 65 Fed. Reg. 64, 557 (2000) (codified at 37 C.F.R. §201).

227. *See* 17 U.S.C. § 1202. This provision is designed to discourage counterfeiting by stripping identifying information from a work or falsely identifying the author of a work.

228. Detailed exemptions exist for law enforcement activities, radio and television broadcasters, libraries, encryption researchers, filtering of content to prevent access by minors, and protection for personally identifying information. *See* 17 U.S.C. §§ 1202(d), (e), (h), (i).

229. The Copyright Office is an arm of the Library of Congress.

230. 17 U.S.C. § 1201(a)(1)(B). The Library of Congress is required to review such classes every three years. In its first review, the Librarian of Congress exempted two relatively narrow classes of work: (1) compilations consisting of lists of websites blocked by filtering software applications; and (2) literary works, including computer programs and databases, protected by access control mechanisms that fail to permit access because of malfunction, damage or obsolescence. These exemptions are in effect from October 28, 2000 to October 28, 2003. *See* Recommendation of the Register of Copy-

authorizes the circumvention of technological protection measures for purposes of reverse engineering of computer programs for the "sole purpose of identifying and analyzing those elements of the program that are necessary to achieve interoperability of an independently created computer program."[231]

Online Service Provider Safe Harbors (Title II). Online service providers ("OSPs"), such as America Online (AOL) and Yahoo, warned that potential third party copyright liability could severely impair their rapidly emerging industry and impede the growth of economic activity on the Internet. At their urging (and over the resistance of the content industries), Congress established a series of safe harbors insulating OSPs from liability for various acts, such as transmitting, storing, or linking to unauthorized content. In order to qualify for safe harbor treatment, an OSP must meet three general threshold conditions: (i) adopt, implement, and inform its subscribers of its policy for providing for termination of users who are repeat copyright infringers;[232] (ii) adopt standard technical measures used by copyright owners to identify and protect copyrighted works;[233] and (iii) designate an agent to receive notification of claimed infringement from copyright owners and register that agent with the Copyright Office. The Act imposes more specific criteria in order to qualify for the particular safe harbors: (1) transmission and routing – transmitting copyrighted material without authorization;[234] (2) storage – storing such material on their servers;[235] (3) caching – making temporary copies on their systems (system

rights and Determination of the Librarian of Congress, 65 Fed. Reg. 64555 (Oct. 27, 2000).

231. 17 U.S.C. § 1201(f)(1). Many observers consider the exemptions to be overly narrow, severely restricting the traditional fair use of copyrighted works. *See* Pamela Samuelson, *Intellectual Property and the Digital Economy: Why the Anti-Circumvention Regulations Need to Be Revised*, 14 BERKELEY TECH. L J. 519 (1999); David Nimmer, *A Riff on Fair Use in the Digital Millennium Copyright Act*, 148 U. PA. L. REV. 673 (2000). The DMCA's reverse engineering exemption to the anticircumvention provisions, for example, is far more limited than what the courts have permitted under the fair use doctrine. *See supra* text accompanying notes 58-78.

232. *See* 17 U.S.C. §512(i)(1)(A).

233. *See* 17 U.S.C. §512(i)(1)(B).

234. The OSP must act as a passive conduit, neither directing, initiating, selecting, or modifying the content being transmitted by third parties. *See* 17 U.S.C. §512(m); *see also* MARSHALL LEAFFER, UNDERSTANDING COPYRIGHT LAW 425 (3d ed. 1999).

235. *See* 17 U.S.C. §512(c). The OSP must not have actual knowledge that infringing material resides on its servers. Upon learning of copyright violations, the OSP must remove or block access to such material expeditiously. In order to protect users' rights, however, the OSP must promptly notify users that material has been blocked or re-

caching);[236] and (4) linking – providing links to infringing material.[237] OSPs satisfying these requirements are shielded from monetary relief and most forms of equitable relief.

2. Enforcement and Judicial Articulation of Digital Copyright Law

In addition to their various efforts to strengthen and reorient copyright protection to address the risks posed by digital technology, the Recording Industry Association of America ("RIAA"), which represents more than 500 companies engaged in the creation, manufacturing, and distribution of sound recordings, has spearheaded an aggressive campaign against the entire MP3 pipeline.[238] In view of the vast reaches of digital technology, the recording industry has focused its efforts on the most significant "leakage" points in order to have the greatest impact. Its most prominent legal battles have focused on MP3 devices and peer-to-peer networks, although it has also stepped up efforts against the end points of the pipeline (such as universities and businesses), and has considered taking action against the most active individuals involved in distributing content files through peer-to-peer networks. More recently, the Motion Picture Association of America (MPAA), which represents the major film and television production studios, has also become active in enforcing copyrights in cyberspace. Its major battle has focused on ensuring that the DVD encryption code remains secure. The MPAA has also acted quickly to shut down pirate movie distribution sites around the Internet. In addition, some of its members have pursued an action against new devices and services ena-

moved. The user may then provide a "counter notification" stating that the material may be properly stored, which the OSP must promptly pass along to the copyright owner. The OSP must replace or unblock the material within 10 to 14 business days of receiving the counter notification unless the copyright owner informs the OSP that it has filed a court action to restrain the infringement. *See* 17 U.S.C. §512(g)(2).

236. *See* 17 U.S.C. §512(b) (detailing various conditions that must be met in order to qualify).

237. *See* 17 U.S.C. §512(d). As with the storage safe harbor, the OSP must not have actual knowledge that it is providing links to sites containing infringing material and must comply with the notification, take down, and counter notification process. *See supra* note 235.

238. The National Music Publishers Association and individual copyright owners, such as the rock group Metallica and the famed music composers Jerry Leiber and Mike Stoller (authors of such classic hits as Hound Dog, Yakety Yak, Love Potion No. 9, Charlie Brown, and Stand by Me, among others) have also brought suit in some of these cases.

bling consumers to distribute television content through the Internet. This section reviews the broadening copyright enforcement battleground, focusing in turn upon actions targeting devices, search engines, online services and software, publishers of decryption code, and increasingly OSPs and end users.

a. Digital Devices

In 1998, Diamond Multimedia introduced the Rio portable digital audio technology, a portable hard drive capable of storing approximately one hour of music compressed using the MP3 file format. This product dramatically increased consumer interest in downloading MP3 files over the Internet and extracting or "ripping" sound recording files from CDs to a computer hard drive and compressing them. Prior to the introduction of this product, the principal benefit that consumers could derive from downloading or ripping sound recordings was to listen to these files through headphones or speakers at their computers. The Rio rendered these files portable. In comparison to portable cassette players, the Rio 300 was more compact, easier to use, and more resistant to motion.

The RIAA brought suit to enjoin the manufacture and distribution of the Rio, alleging that it violated the requirements for digital audio recording devices under the Audio Home Recording Act of 1992 because it does not employ a Serial Copyright Management System ("SCMS")[239] and Diamond Multimedia failed to pay royalties on sales of a digital audio recording device.[240] Recognizing that the legislative bargain effectuated by the AHRA applied narrowly to digital audio recording devices (and not general computer technology), the Ninth Circuit held that the Rio device did not implicate the AHRA and dismissed the action.[241] Echoing the Supreme Court's decision in the *Betamax* case that "time shifting" fell within the fair use doctrine, the Ninth Circuit observed, in dicta, that "space shifting" was "paradigmatic noncommercial personal use."[242]

In November 2001, television networks and production studios brought suit against ReplayTV, alleging that its features enabling consumers to skip commercials and to transmit digital copies of television

239. *See* 17 U.S.C. §1002(a)(2).

240. *See* 17 U.S.C. §1003.

241. *See* Recording Industry Ass'n of America v. Diamond Multimedia Systems, 180 F.3d 1072 (9th Cir. 1999).

242. *Id.* at 1079.

programming over the Internet to other ReplayTV owners violate copyright law.[243] Various ReplayTV users, represented by the Electronic Frontier Foundation, have since filed an action requesting that a court declare that use of ReplayTV to record and skip commercials falls within the scope of the fair use doctrine.[244]

These lawsuits test the limits of the scope of the fair use doctrine in the digital age.[245] Although the recording capabilities of DVRs parallel those of the VCRs at issue in the *Sony Betamax* case, the facility with which digital technologies enable consumers to record and skip advertisements can be shown to have a larger market effect than was established in the *Sony* case. The trial court concluded that the plaintiffs failed to adduce adequate evidence of any adverse effects on the market (or potential market) for the copyrighted works, including lost advertisement revenue.[246] In assessing the likelihood of harm from commercial skipping, the trial court noted that

> to omit commercials, Betamax owners must view the program, including the commercials, while recording. To avoid commercials during playback, the viewer must fast-forward and, for the most part, guess as to when the commercial has passed. For most recordings, either practice may be too tedious. As defendants' survey showed, 92% of the programs were recorded with commercials and only 25% of the owners fast-forward through them. Advertisers will have to make the same kinds of judgments they do now about whether persons viewing televised programs actually watch the advertisements which interrupt them.[247]

243. *See* Doug Isenberg, *ReplayTV Lawsuit: Napster Redux?* (Nov. 12, 2001), *at* http://news.com.com/2010-1079-281601.html.

244. *See* Joanna Glasner, *Craig Gets Listed in Replay Suit* (June 7, 2002), *at* http://www.wired.com/news/privacy/0,1848,53032,00.html.

245. *See* Sony Corp. of America v. Universal City Studios, Inc., 464 U.S. 417 (1984) (finding that the manufacturer of video cassette recorders may not be held liable for contributory copyright infringement because this "staple article of commerce" has substantial noninfringing uses and that consumers who record television shows using VCRs for purposes of time shifting do not infringe copyright in the shows because their actions fall within the fair use doctrine.)

246. *Id.* at 453-56.

247. *See* Universal City Studios, Inc. v. Sony Corp. of America, 480 F.Supp. 429, 468 (C.D. Cal. 1979).

ReplayTV vastly simplifies advertising skipping through the use of a 30 second advance button and allows consumers to set its latest model to skip commercials automatically.[248] A recent survey of consumers using digital video recorders finds that 35 percent say they never watch commercials while nearly 60 percent say they watch them only occasionally.[249] The content industries contend that these differences in consumer behavior provide a basis for distinguishing this case from the *Betamax* decision.

b. Search Engines, Services, and Software

The first legal skirmishes over the unauthorized distribution of copyrighted works over the Internet took place at the level of web sites. The RIAA began sending cease-and-desist letters to thousands of sites containing protected works without authorization. As the Internet grew and websites and services evolved to ease the search for and access to content, the record industry took aim at these businesses. Of greatest significance, the development of peer-to-peer networks vastly expanded the stakes and legal complexity surrounding online distribution of content. The legality of these various tools, software products, and service-based systems centers around the application of the fair use doctrine,[250] the *Sony Betamax* decision,[251] and doctrines of contributory[252] and vicarious[253] liability to decentralized distribution architectures in which the consumers engage in reproduction, uploading, and downloading of protected works.

Search Engines. In 1999, MP3board.com developed a generalized search engine that automatically scours the Internet for MP3 files and

248. ReplayTV claims that "[u]nder controlled test conditions with major network daytime and prime time broadcasts, approximately 96% of intraprogram commercials are eliminated." *See ReplayTV 4500 Features*, *at* httpp://www.sonicblue.com/video/replaytv/replaytv_4000_features.asp (last visited July 8, 2002).

249. *See* Benny Evangelista, *DVRs Alter Habits – Ads Aren't Watched*, S.F. CHRONICLE, Apr. 22, 2002, *available at* http://sfgate.com/cgi?bin/article.cgi?file=/chronicle/archive/2002/04/22/BU15029.DTL.

250. 17 U.S.C. § 107.

251. *See* Sony Corp. of America v. Universal City Studios, Inc., 464 U.S. 417 (1984).

252. *See, e.g.,* Elektra Records v. Gem Elec. Dist., 360 F.Supp. 821 (E.D.N.Y. 1973) (extending contributory copyright liability to those who have knowledge of infringing activity and induce, cause or materially contribute to such activity); Gershwin Publ'g Corp. v. Columbia Artists Mgmt., Inc., 443 F.2d 1159, 1162 (2d Cir. 1971).

253. *See, e.g.,* Fonovisa, Inc. v. Cherry Auction, Inc., 76 F.3d 259 (9th Cir. 1996) (holding that vicarious copyright liability extends to those who have the right and ability to control the infringer's acts and derive direct financial benefit from the infringement).

provides links to such sites. In October of that year, the RIAA sent cease-and-desist letters to MP3board.com and its online service providers demanding that they halt operation of this service. In order to remove the liability cloud hanging over its business, MP3board.com filed an action in June 2000 seeking to declare that hypertext linking created by automated processes does not constitute copyright infringement even if the destination of a link is to a website containing copyrighted material was posted without authorization.[254] Although the litigation still proceeds, MP3Board.com has since modified its site to enable copyright owners to block links to sites containing infringing content with relative ease.[255]

Online Music "Lockers." First introduced in October 1997, MP3.com quickly gained great popularity as a portal for recording artists to make available their songs for downloading and general information about the music industry. Its high traffic rate enabled the site to earn substantial advertising revenues from banner advertisements and attract substantial venture capital financing.[256] In order to expand its operations and open up new revenue sources, MP3.com launched its "MyMP3.com" service in January 2000. This service enabled subscribers to develop a virtual online music locker from which they could access sound recordings from any Internet portal through a password protected user interface. The service was premised on the idea that the fair use doctrine authorizes consumers to "space shift" music that they have lawfully acquired.

254. *See* Brad King, *MP3 Site Sues RIAA Over Linking* (June 5, 2000), *at* http://www.wired.com/nes/culture/0,1284,36778,00.html; Plaintiff's Complaint for Declaratory Judgment, Damages, and Injunctive Relief and Demand for Jury Trial (filed N.D. Cal, June 2, 2000), *available at* http://www.techfirm.com/briefs/riaacomp.pdf. The RIAA filed a counter suit three weeks later. *See* Brad King, *RIAA: No Hyperlinking Allowed* (June 26, 2000), *at* http://www.wired.com/news/politics/0,1283,37227,00.html.

255. *See MP3Board Offers to Server Links* (June 26, 2000), *at* http:www.wired.com/news/politics/0,1283,37775,00.html. MP3Board.com implemented this modification to its site through LinkBlaster, the software allows music copyright owners to review and request the removal of links that they allege to be violating copyright law. The software automates the notice and take-down process set forth in the DMCA. *See supra* note 235. Once a user requests to terminate a link, the software sends an email to the owner of the allegedly infringing websites, who can then submit a counter-affidavit refuting the claim. If the site owner submits a counter affidavit and the copyright owner fails to take legal action within 10 days, then MP3Board.com restores the link.

256. *See* Jennifer Sullivan, *Big Money Backs MP3.com* (Jan. 15, 1999), *at* http://www.wired.com/news/business/0,1367,17354,00.html.

The MyMP3.com service operated in the following way. MP3.com purchased and uploaded thousands of CDs onto its servers. Subscribers to this service could establish that they lawfully acquired particular CDs either by purchasing the CD online through a cooperating online retailer (the "Instant Listening Service") or by loading a CD that the subscriber owned into his or her computer CD-ROM drive (the "Beam-it Service"). Software on the computer could verify the presence of the particular CD. Once "ownership" was established in one of these two ways, MyMP3.com provided access to the copy of the CD stored on MP3.com's server. Thus, subscribers did not in fact access their own copy but rather MP3.com's copy. The notion of an actual private locker was metaphorical. In fact, subscribers had differential access to the same "locker" on MP3.com's servers.

The major record labels sued MP3.com a week after the launch of MyMP3.com[257] and promptly moved for summary judgment on the ground that MP3.com's initial copying of CDs onto its server and its distribution of such music to its subscribers over the Internet infringed their copyrights. MP3.com defended both activities as falling within fair use. The court had little trouble finding that MP3.com could not meet its burden.[258] The court found the service to be commercial in purpose and non-transformative in character, rejecting MP3.com's argument that "space shifting" of a copyrighted work transforms it in legally cognizable ways. The court instead applied a more literal test: whether the defendant added "new aesthetics, new insights and understandings" to the sound recordings. The second and third fair use factors – the nature of the copyrighted work and the amount taken – clearly favored the plaintiffs. MP3.com relied principally upon the fourth factor – the effect upon the potential market for or value of the work – arguing that its service promotes sales of CDs by providing a means to make them more readily available. The court concluded, however, that this service impinged upon copyright owners' ability to develop their own online distribution channels.[259]

257. *See* Christopher Jones, *RIAA Sues MP3.com* (Jan. 22, 2000), *at* http://www.wired.com/news/politics/0,1283,33634,00.html. The National Music Publishers Association joined the suit two months later. *See MP3.com Comes Under Fire Again* (Mar. 22, 2000), *at* http://www.wired.com/news/business/0,1367,35107,00.html.

258. Judge Rakoff opened his opinion by noting that "The complex marvels of cyberspatial communication may create difficult legal issues; but not in this case." UMG Recordings, Inc. v. MP3.com, Inc., 92 F.Supp.2d 359 (S.D.N.Y. 2000).

259. *Id.* at 352-53.

MP3.com subsequently settled the case with four out of the five major record labels for approximately $80 million.[260] After the court assessed liability to Universal Music Group (UMG) at $25,000 per CD copied, MP3.com and UMG settled for another $53.4 million.[261] MP3.com faced further exposure to independent record labels and music publishers.[262] The various legal problems and licensing complexities eventually led MP3.com to abandon its efforts to establish a broad-based "music locker" service, limiting this venture to the files voluntarily loaded onto its website by independent artists and a few smaller record labels. In a somewhat surprising shift in direction, Vivendi Universal, UMG's parent corporation, acquired MP3.com in April 2001.[263]

Peer-to-Peer Networks. As discussed earlier, Napster's peer-to-peer technology has had the most dramatic effects on the traditional music distribution marketplace, vastly expanding the public's access to and interest in MP3 encoded sound recordings. Within weeks of its public release, millions of copies were downloaded and hundreds of millions of copies of sound recordings had been exchanged. It is no exaggeration to say that Napster caused profound changes in consumer behavior, transforming within a matter of months how millions of consumers gained access to music and accelerating the transition to a digital music platform. Napster's technology involved two principal dimensions: the software that consumers downloaded from Napster's servers and the centralized indexing service running on Napster's servers. Although Napster itself did not engage in any direct acts of copying or distributing copyrighted works (apart from its own software), its software and file indexing service facilitated others in reproducing and distributing millions of sound recordings. The major record labels

260. *See* Brad King, *MP3.com: Four Down, One to Go* (Aug. 22, 2000), *at* http://www.wired.com/news/business/0,1367,38351,00.html.

261. *See MyMP3.com Reborn, But for a Price* (Nov. 15, 2000), *at* http://www.wired.com/news/business/9,1367,40196,00.html.

262. *See* Brad King, *Now It's the Indies Suing MP3.com* (Nov. 17, 2000), *at* http://www.wired.com/news/business/0,1367,40245,00.html.

263. *See* Brad King, *MP3.com Goes Universal* (May 21, 2001), *at* http://www.wired.com/news/mp3/0,1285,43972,00.html. Michael Robertson, MP3.com's outspoken founder and CEO, earned a prominent reputation for his barbed comments about the traditional music labels. In one characteristically blunt message to MP3.com visitors in late 1998, Robertson commented that "What the music industry really needs is an Internet enema. It needs to start over. This is the promise of music in the digital age." *See* Jim Hu & John Borland, *MP3.com Buy: The Taming of a Generation* (May 21, 2001), *at* http://news.com.com/2100-1023-257993.html.

promptly sued Napster,[264] seeking a preliminary injunction against distribution of its software and operation of its indexing service on the grounds of contributory and vicarious copyright infringement.

Napster raised several defenses, including immunity under the DMCA's online service provide safe harbor (for linking), the staple article of commerce doctrine articulated in the *Sony Betamax* case (arguing that Napster's technology had substantial noninfringing uses, such as "space shifting" of works already owned by users and distribution of authorized works), noninfringement by Napster's users under the fair use doctrine[265] and the AHRA's §1008 immunity for noncommercial home taping, and copyright misuse, arguing that the major record labels were improperly using their copyrights to squelch the development of alternate distribution channels for sound recordings. In May 2000, Chief Judge Patel of the Northern District of California denied Napster's motion for partial summary judgment on grounds that Napster did not "transmit, route, or provide connections through its systems" within the meaning of §512(a) and therefore did fall within the definition of the transmission immunity under the OSP safe harbor. The court further found that Napster had not adequately established compliance with the general threshold requirements under §512 because it had not adopted, reasonably implemented, and informed users of a termination policy for repeat copyright infringers.[266]

In August 2000, Chief Judge Patel found that the record labels had established a prima facie case of copyright infringement, that Napster's defenses were unlikely to succeed, and that the balance of hardships favored the issuance of a preliminary injunction enjoining the Napster service.[267] In particular, the district court found that the

264. *See* Jennifer Sullivan, *RIAA Suing Upstart Napster* (Nov. 15, 1999), *at* http://www.wired.com/news/business/0,1367,32559,00.html. A few recording artists, most notably the widely popular heavy metal rock group Metallica and the rapper Dr. Dre, and the music composers (Lieber and Stoller) also filed suit against Napster relatively early in the litigation process. *See* Christopher Jones, *Metallica Rips Napster* (Apr. 13, 2000), *at* http://www.wired.om/news/politics/0,1283,35670,00.html. 27,000 music publishers from the National Music Publishers Association later joined the lawsuit. Brad King, *Publishers Set to Pile on Napster* (Apr. 12, 2001), *at* http://www.wired.com/news/business/0,1367,43007,00.html.

265. Napster asserted that its users were merely engaged in noncommercial uses, such as sampling music, time shifting and place shifting. Since they would not be liable for direct infringement, Napster could not be held liable for contributory or vicarious liability.

266. A&M Records v. Napster, 2000 WL 573136 (N.D. Cal. 2000).

267. A&M Records v. Napster, 114 F.Supp.2d 896 (N.D. Cal. 1999).

plaintiffs had established that most of Napster's users would likely not fall within the fair use doctrine.[268] In assessing the first fair use factor – the purpose and character of the use – the court found that although Napster's users' activities in uploading and downloading song files could not be considered "paradigmatic commercial activity," nor could it be characterized as "personal in a traditional sense."[269] In finding that this factor weighed in the plaintiffs' favor, the court observed that "the fact that Napster users get for free something they would ordinarily have to buy suggests that they reap economic advantages from Napster use."[270] The court readily found that the second and third factors – the nature of the copyrighted work and the amount taken – favored the plaintiffs.[271] With regard to the crucial fourth factor – the effect upon the potential market for or value of the work – the court found that Napsters' users supplanted the current retail market[272] and hindered potential online distribution channels that the record labels were in the process of developing.[273]

The court separately rejected arguments that Napster's users have a fair use privilege to sample music (as they might in a record store listening kiosk or through a stream from a record label's online promotional site) and space shift music that they have already purchased. With regard to sampling, the court refused to equate permanent physical possession of a sound recording (as occurs with downloads) and transitory access through record store devices or streamed clips of a song. Even if Napster's service were shown to have systematically stimulated CD sales, the court observed that a positive impact on sales does not necessarily negate the copyright holder's entitlement to licensing

268. The court also rejected Napster's argument that §1008 of the Audio Home Recording Act immunized all noncommercial home taping or authorized space shifting. *Napster*, 114 F.Supp.2d at 916, n.19. As more fully explained by the Ninth Circuit, the AHRA immunity applies only to those digital reproductions on media for which the AHRA royalties has been paid. Since no royalty is paid on hard drives, Napster users derived no immunity under the AHRA. *See Napster*, 239 F.3d 1004, 1024-25 (9th Cir. 2001).

269. *Napster*, 114 F.Supp.2d at 912.

270. *Id.*

271. *Id.* at 913.

272. The court relied upon sales data showing that retail purchases of CDs in college area retail markets were down relative to national averages. The plaintiffs' expert witnesses attributed this pattern to the wide use of the Napster service among college students. *See Napster*, 2000 WL 1170106 at *2-*3 (N.D.Cal. 2000); *Napster*, 114 F.Supp.2d at 909-13.

273. *Napster*, 114 F.Supp.2d at 913.

fees or access to derivative markets. On balance, the court held that sampling in the manner accomplished on the Napster system did not constitute a fair use because of its likely adverse effects on the royalty streams of music publishers and the potential online opportunities available to record labels.[274]

The district court rejected the argument that "space shifting" using Napster's service constituted fair use on factual and legal grounds. As a factual matter, the court was persuaded by survey evidence indicating that most Napster users do not already own copies of the music that they download. As regards to the legal standard, the court distinguished the *Sony* Court's finding that "time shifting" using a VCR constituted fair use from the Napster "space shifting" scenario on the ground that time shifting represented the *principal* use of VCRs whereas space shifting represents an occasional use of Napster's software and service.[275]

The court also rejected Napster's argument that the use of its software and service to "space shift" and to access authorized works – such as works distributed by independent artists – constitute substantial noninfringing uses and hence shield Napster from contributory copyright liability under the "staple article of commerce" doctrine articulated in the *Sony* decision. Without directly addressing the threshold for "substantiality" of a noninfringing use, Chief Judge Patel determined that Napster fell outside of this doctrine because of the service nature of its business. Unlike Sony, which lost control of its VCRs after they were sold, Napster exercised ongoing control of its network and therefore can be said to actively facilitate its users' illegal activities.[276] The court further determined that the staple article of doctrine did not apply to claims of vicarious liability. Although Napster did not in fact have a revenue model in place, the court stretched the second prong of the vicarious liability (derive direct financial benefit from the infringement)[277] to include ability to raise capital through having a larger user base.[278]

274. *Id.* at 915.

275. *Id.* at 916.

276. *Id.* at 916-17.

277. *See* Fonovisa, Inc. v. Cherry Auction, Inc., 76 F.3d 259 (9th Cir. 1996).

278. *Napster*, 114 F.Supp.2d at 921-22.

Based upon these findings,[279] the district court issued a broad injunction requiring that Napster ensure that no "copying, downloading, uploading, transmitting, or distributing" of plaintiffs' works occur on its system. Napster immediately appealed and requested a stay of the injunction pending the appeal. After granting the stay, the Ninth Circuit ultimately affirmed Chief Judge Patel's principal conclusions.[280] The Ninth Circuit did, however, clarify the proper application of the doctrines of vicarious and contributory liability on the Internet[281] and remand the case for a narrowing of the injunction.

With regard to the application of the *Sony* Court's "staple article of commerce" doctrine, the Ninth Circuit held that the district court had "improperly confined the use analysis to current uses, ignoring the systems' capabilities," placing "undue weight on the proportion of current infringing use as compared to current and future noninfringing uses."[282] Furthermore, the Ninth Circuit backed off of the district court's statement that a service can never qualify for immunity from contributory copyright infringement. Instead, the court articulated how the doctrine applies in the context of an online activity where a party becomes aware of specific acts of infringement within its power to regulate: "If a computer system operator learns of specific infringing material available on his system and fails to purge such material from the system, the operator knows of and contributes to direct infringement."[283] The Ninth Circuit concluded that because Napster had actual knowledge of specific infringing material within its system (based on information provided by the plaintiffs) and the ability to block access to the system by such suppliers, the district court's conclusion of likely contributory infringement was proper.[284]

279. The court also dismissed various other defenses – First Amendment, copyright misuse, and waiver – as lacking substance. *Id.* at 923-25.

280. *Napster,* 239 F.3d 1004.

281. The Ninth Circuit also questioned the district court's determination that the DMCA OSP safe harbor could not shelter Napster from indirect liability, but inexplicably postponed resolution of that issue until trial. *Id.* at 1025. Even if this defense were successful, however, Napster would have been subject to nearly the functional equivalent of the injunction that did ultimately issue. Under the DMCA's notice and takedown provisions, *see supra* note 235, Napster would have had to block files identified by the plaintiffs as infringing.

282. *Napster*, 239 F.3d at 1021.

283. *Id.*

284. *Id.* at 1022.

Although affirming the district court's finding of vicarious liability,[285] the Ninth Circuit more carefully circumscribed the scope of such liability to "the boundaries of the premises that Napster 'controls and patrols.' "[286] The court noted:

> that Napster's reserved 'right and ability' to police is cabined by the system's current architecture. As shown by the record, the Napster system does not 'read' the content of indexed files, other than to check that they are in the proper MP3 format. Napster, however, has the ability to locate infringing material listed on its search indices, and the right to terminate users' access to the system. The file name indices, therefore, are within the 'premises' that Napster has the ability to police. . . . As a practical matter, Napster, its users and the record company plaintiffs have equal access to infringing material by employing Napster's 'search function.'[287]

Based upon these amendments to the district court's indirect liability analysis, the Ninth Circuit held that the district court's preliminary injunction, placing on Napster the entire burden of ensuring that no "copying, downloading, uploading, transmitting, or distributing" of plaintiffs' works occur on the system, was overbroad. The appellate court remanded the case for the district court to craft a narrower injunction that both placed the burden on plaintiffs to provide notice to Napster of unauthorized works on its system, which Napster would then be obliged to block, and imposed upon Napster responsibility to police its system within the limits of its architecture.[288] The district court issued a revised injunction along the lines set forth by the Ninth Circuit shortly thereafter.[289] The deluge of artists, song titles, and variations that might be used to identify protected works as well as complaints by the record labels that Napster was not doing an adequate job

285. *Id.* at 1022-24. The Ninth Circuit confirmed that *Sony's* staple article of commerce doctrine affords no defense to such claims of vicarious liability, *id.* at 1022-23, and that deriving a "direct financial benefit" can encompass greater likelihood of "future revenue," *id.* at 1023.

286. *Id.* at 1023.

287. *Id.* at 1024.

288. *Id.* at 1027-28.

289. *See Napster Forced to Police System* (Mar. 6, 2001), *at* http://www.wired.com/news/business/0,1367,42231,00.html.

of cleansing its network quickly brought about Napster's demise.[290] Napster was ultimately acquired by Bertelsman, one of the major record labels, with hopes of using its software, customer list, and trademark in developing a legitimate subscription service.[291]

While the *Napster* case was being litigated, the MPAA filed suit against Scour, another peer-to-peer software company and website (Scour.net) that was capable of distributing movie files over the Internet.[292] The prospect of potentially billions of dollars in damages quickly dried up funding for the venture and eventually forced Scour into bankruptcy.[293]

Over the two years during which the Napster litigation unfolded, several new generations of file sharing technology evolved, ranging from the highly decentralized Gnutella platform to various intermediate architectures using a supernode structure.[294] Internet users quickly migrated to these new architectures, with Morpheus, KaZaa, and Grokster, all based on the supernode architecture, attracting the most users.[295] Therefore, even after prevailing in the *Napster* case, the record labels found themselves back where they started. According to Webnoize, a company that measures Internet traffic, the top four file-sharing systems were used to download more than 3 billion sound recording files in August 2001.[296] The record labels sued the operators of the Morpheus, KaZaa, and Grokster services in October 2001 and the case is scheduled for trial in early 2003.[297]

The *Napster* case provides relatively clear guidance on some of the defenses, while leaving others open to debate. It is relatively clear, for example, that most users of these systems who upload or download

290. *See* John Borland, *Judge: Napster Filtering Efforts "Disgraceful"* (Apr. 10, 2001), *at* http://news.com.com/2100-1023-255634.html; Brad King, *The Day the Napster Died* (May 15, 2002), *at* http://www.wired.com/news/mp3/0,1285,52540,00.html.

291. *See* Brad King, *Napster Now Bertelsmann's Baby* (May 17, 2002), *at* http://www.wired.com/news/business/0,1267,52626,00.html.

292. *See* Brad King, *Movie Industry Skewers Sour* (July 20, 2000), *at* http://www.wired.com/news/business/0,1367,37697,00.html.

293. *See* Associated Press, *Scour Files for Bankruptcy* (Oct. 13, 2000), *at* http://www.wired.com/news/business/0,1367,38444,00.html.

294. *See supra* notes 158-59; David P. Anderson & John Kubiatowicz, *The Worldwide Computer*, SCIENTIFIC AM., Mar. 2002, at 40-47.

295. *See* Brad King, *While Napster Was Sleeping* (July 24, 2001), *at* http://www.wired.com/news/mp3/0,1285,45480,00.html; Melanie Warner, *Free Music: The New Napsters* (Aug. 12, 2002), *at* http://www.fortune.com/indext.jhtml?channel= print_article.jhtml&doc_id=208834.

296. *See* Brad King, *File Trading Sites in Crosshairs* (Oct. 3, 2001), *at* http://www.wired.com/news/mp3/0,1285,47296,00.html.

297. *See* Brad King, *Jury to Hear File-Trading Case* (Mar. 4, 2002), *at* http://www.wired.com/news/business/0,1367,50836,00.html.

unauthorized works would be deemed to be direct infringers and that banner advertising by these services would constitute financial benefits for purposes of the second prong of the vicarious liability standard. Unlike Napster, however, these architectures are not limited to MP3 format (and hence may have a broader range of noninfringing uses), run autonomously, and afford the system operator relatively little control over the system. Furthermore, the operators were careful to set up their systems so as to meet the threshold requirements of the DMCA's OSP safe harbor. They all feature prominent notices stating their policy of terminating repeat infringers and compliance with the notice and take-down provisions. Thus, the resolution of these cases may turn on the subtleties alluded to by the Ninth Circuit's decision – the extent to which the computer system operator can regulate downstream behavior, the range of future noninfringing uses, the boundaries of the premises that the operator "controls and patrols," and the applicability of the DMCA's partial immunities. The Ninth Circuit's *Napster* decision can be read to allow the indirect liability of peer-to-peer networks to be judged on the architectural limitations built into the system. Thus, a suitably autonomous system might avoid indirect liability. Under the Ninth Circuit's *Napster* decision, a peer-to-peer system operator must have "actual knowledge that specific infringing material" is being transmitted over its system and the ability "to block access to [its] system[ ] by the suppliers of the infringing material" in order to be held contributorily liable for the infringing acts of its users. On the other hand, courts might be willing to consider the extent to which a system operator designed its software and revenue model in order to profit from copyright infringement.[298]

The ReplayTV litigation also raises a file sharing issue. The plaintiffs have alleged that the "Send Show" feature of the ReplayTV device, which allows users to transmit television programming over the Internet to others, infringes copyright law. Although this feature plausibly increases the exposure of commercial advertising on "free" television (depending upon whether the advertisements are included and are watched) as was found in the *Sony Betamax* case, it has no parallel in the *Sony* case and potentially circumvents the subscription payment mechanism relied upon by premium channels such as Home Box Office and Showtime. Furthermore, the greater storage capacity

298. *Cf.* Lisa M. Bowman, *Judge Puts File Swappers in Hot Seat* (Mar. 4, 2002) (noting that the judge hearing the second generation file-sharing case against Morpheus, KaZaa, and Grokster denied defendants' motion for partial summary judgment under the staple article of commerce doctrine), *at* http://news.com.com/2100-1023-851332.html.

and ease of skipping advertisements compared with the VCR at issue in *Sony* could produce a different result.[299]

Stream Capture Technology. In order to enable content owners to exercise greater control over the distribution of protected works in cyberspace, RealNetworks developed the RealPlayer technology for streaming music over the Internet. Internet users can download the enabling software for free. Once loaded, their computers can access RealNetworks servers, establish a digital handshake, and stream content (coded in RealNetworks' proprietary .RMA format) to be perceived in realtime at their computer. The user cannot, however, store the content on their computer (unless the content provider activated the download capability). Streaming technology has greatly expanded the range of copyrighted works accessible over the Internet.

In December 1999, RealNetworks sued Streambox, the manufacturer and distributor of the Streambox VCR and Ripper techhnologies, for violations of the Digital Millennium Copyright Act.[300] The Streambox VCR product enables users to access and download copies of RealMedia files that are streamed over the Internet. This product enables the user to mimic the operation of RealPlayer software. It then circumvents the authentication procedure in order to gain access to streamed content. Unlike the RealPlayer, however, the Streambox VCR bypasses the copy switch so that users can download content, even if the content owner had intended that it only be streamed. Once downloaded, the content can then be accessed, copied, and distributed at the user's discretion. Streambox's Ripper technology enables users to convert files from RealMedia (.RMA) format to other formats such as .WAV (a format commonly used for music editing), .WMA (Windows Media Player) and MP3, as well as among these formats.

On RealNetworks' motion for a preliminary injunction, the court held that aspects of the Steambox VCR were likely to violate the DMCA's anticircumvention provisions.[301] In particular, the court found that the authentication process used to establish a handshake between the RealPlayer and a RealNetworks' server constitutes a "technological measure" that "effectively controls access" to copyrighted works. The VCR's means of establishing access and then bypassing the

299. It should also be noted that the *Sony* case was a close decision (5-4). On the other hand, the decision has not seriously been questioned and the effects on the film and television industry have proven quite the opposite of what the plaintiffs had predicted. *See supra* text accompanying notes 179-89.

300. *See* Jeff Pelline & Greg Sandoval, *Real Wins Temporary Injunction in Copyright Suit* (Dec. 28, 1999), *at* http://news.com.com/2100-1023-234941.html.

301. *See* RealNetworks, Inc. v. Streambox, Inc., 2000 WL 127311 (W.D. Jan. 18, 2000).

copy switch circumvents the technological protection measures. The court further found that it had no significant commercial purpose other than to enable users to access and record protected content. The court rejected Streambox's defense that its software allows consumers to make "fair use" copies, such as to time or space shift access to content. It distinguished the *Sony* case on two grounds: (1) many of the copyright owners there authorized or would not object to having their content time shifted whereas all of the content owners using the RealNetworks' technology to stream their works specifically chose not to authorize downloading; and (2) *Sony* did not address the new protections afforded by the DMCA.[302] The court declined to enjoin Streambox's Ripper software, raising serious doubts as to whether the .RMA format constituted a "technological protection measure" within the meaning of the DMCA and noting that it could serve significant legitimate purposes.

c. Distributors and Publishers of Decryption Code

As first presented by the *Streambox* case, content industries have sought to use the DMCA to choke off distribution of technology that can decrypt technological protection measures. Such decryption code can be distributed in the form of software products or more generally through any publishing channel. In a series of high profile cases, the content industries have pursued publishers of decryption code under the DMCA. These cases have brought Title 17 into tension with the First Amendment.

Universal City Studios v. Corley. The most prominent and economically important such case involves a decryption algorithm developed to decode the Content Scrambling System (CSS) designed to protect the content contained on DVDs. In order to protect itself from the problems the music industry has faced from distribution of its master works in an unencrypted format (CDs), the film industry sought to agree upon an encryption format for commercial release of its digital content. In 1996, the major studios adopted CSS, an encryption stan-

302. The court cited *Nimmer on Copyright* for the proposition that "those who manufacture equipment and products generally can no longer gauge their conduct as permitted or forbidden by reference to the *Sony* doctrine. For a given piece of machinery might qualify as a staple item of commerce, with a substantial noninfringing use, and hence be immune from attack under *Sony'* s construction of the Copyright Act – but nonetheless still be subject to suppression under Section 1201." 1 NIMMER ON COPYRIGHT §§ 12A.18[B] (Supp. 1999). As such, "[e]quipment manufacturers in the twenty-first century will need to vet their products for compliance with Section 1201 in order to avoid a circumvention claim, rather than under *Sony* to negate a copyright claim." *Id.*

dard developed by Matsushita Electric Industrial Co. and Toshiba Corp. The system is designed so that DVDs can only be played on hardware devices (DVD players and computers) loaded with software to unscramble CSS-encrypted content. Matsushita and Toshiba granted a royalty-free license to the DVD Copy Control Association, which in turn licenses this technology to hardware manufacturers and motion picture studios for a modest administrative fee.[303]

Notwithstanding the substantial investment into the development of CSS technology, a fifteen year-old computer enthusiast from Norway named Jon Johansen succeeded in reverse engineering CSS and developing DeCSS, a program that decodes CSS, in September 1999. Using this program, a user can rip DVD content onto a hard drive in unencrypted form. Although the full code version of a feature length motion picture typically fills 5 gigabytes, compression using the DivX algorithm can reduce the file to approximately the capacity of a recordable CD.[304] Jan Johansen posted this code on his personal web site, from which it spread throughout the Internet. At the behest of the movie industry, authorities in Norway eventually arrested Johansen and removed the DeCSS code from his site.[305]

In November 1999, Eric Corley, the publisher of *2600: The Hacker Quarterly*, posted the DeCSS code on his publication's website and provided links to other sites posting DeCSS. Eight major motion picture studios sued Corley, alleging that his posting of this code on his website violated the DMCA's antitrafficking ban. Corley defended his actions on three principal bases: (1) that his sole motivation for posting DeCSS was to enable people with computers running the Linux operating system to enable a Linux-based DVD player and hence fell within the DMCA's reverse engineering exception;[306] (2) that the purpose of DeCSS is to allow others to make fair use of the plaintiffs' copyrighted

303. *See* Universal City Studios, Inc. v. Reimerdes, 111 F. Supp.2d 294, 310 (S.D.N.Y. 2000).

304. *See supra* note 150.

305. *See* Courtney Macavinta, *Teen Charged in Connection with DVD Cracking Tool* (Jan. 25, 2000), *at* http://news.com.com/2100-1023-236054.html.

306. Under §§1201(f)(1) and (2), a person may circumvent, or develop and employ technological means to circumvent, access control measures in order to achieve interoperability with another computer program provided that doing so does not infringe another's copyright. In addition, under §1201(f)(3), that person may make information acquired through such efforts "available to others, if that person . . . provides such information solely for the purpose of enabling interoperability of an independently created computer program with other programs, and to the extent that doing so does not constitute" copyright infringement.

works (e.g., for educational use in comparing films, time shifting); and (3) that the DMCA violated his First Amendment freedom of expression by preventing him from speaking, namely posting and linking to DeCSS, a form of speech.

The court rejected the statutory arguments without much difficulty. Judge Kaplan found the reverse engineering defense inapplicable because the statute limits its application to only the person who successfully reverse engineers the program (i.e., Jon Johansen), not anyone who seeks to disseminate the program (even if for the sole purpose of promoting interoperability).[307] As regards the fair use argument, the court reviewed the DMCA's legislative history and determined that Congress intended that the anticircumvention and antitrafficking provisions would trump traditional fair use (and *Sony*'s staple article of commerce doctrine).[308] In the court's view, Congress determined that fair use under the DMCA would be handled through limitations built into the anticircumvention ban,[309] specific exemptions, and the periodic rulemaking process set forth in §1201(a)(1)(B)-(E) for exempting particular classes of works for which fair use is likely to be adversely affected.[310]

The First Amendment defense generated the most heat. The court held that computer code, including decryption algorithms, constituted "protected speech" under the First Amendment.[311] Nonetheless, the court upheld the DMCA's limitations on such speech. Because these limitations were in the court's view content-neutral (they target the "functional" aspect of the speech and only incidentally

307. Even if Johansen had been the defendant, the court found that he would not be eligible for this defense as the record established that he was not motivated "solely" by a desire to achieve interoperability with the Linux operating system. In the words of Judge Kaplan, "Mr. Johansen is a very talented young man and a member of a well known hacker group who viewed 'cracking' CSS as an end it itself and a means of demonstrating his talent and who fully expected that the use of DeCSS would not be confined to Linux machines." *Reimerdes*, 111 F. Supp.2d at 320.

308. *Id.* at 323-24.

309. For example, violation of the anticircumvention ban cannot be the basis to prohibit "fair use" of content obtained through such circumvention. *See* 17 U.S.C. § 1201(c)(1).

310. The court expressed some concern that the DMCA's anticircumvention ban might one day be used to deny access to works already in the public domain, such as pre-1972 sound recordings, but concluded that Congress "clearly faced up to and dealt with this question in enacting the DMCA." *Reimerdes*, 111 F. Supp.2d at 322.

311. *Id.* at 327.

affect its message),[312] they were subject to intermediate scrutiny. They were adequately justified by the substantial governmental interest in developing effective means for restraining unauthorized distribution of copyrighted works in the digital age, were not related to the suppression of free expression, and did not burden substantially more speech than necessary to further the interest in arresting piracy.[313] The court also upheld the constitutionality of the DMCA's application to linking on similar grounds.[314] Analogizing copyright piracy in the digital age to spread of disease, the court determined that injunctive relief was proper due to the great harm caused by unauthorized distribution of copyrighted works to copyright owners and the need to take strong preventive measures, including restrictions upon the freedom of expression, to reduce the risk of widespread piracy via the Internet.[315] Corley appealed the First Amendment rulings to the Second Circuit. In a decision written by Judge Newman, the court affirmed Judge Kaplan's analysis and conclusions on somewhat broader grounds.[316]

Felten v. RIAA. The recording industry has also invoked the DMCA's trafficking ban in an effort to restrain the publication of decryption code through academic research. This case grew out of an embarrassing series of events. In an effort to develop and call attention to the Secure Digital Music Initiative (SDMI), the RIAA and other participants issued a "hacker challenge": anyone who could successfully strip out prototype watermarks without degrading the audio quality of the recording would win a $10,000 prize.[317] Participants in the challenge agreed not to disclose information that would defeat the technologies presented.

Professor Edward Felten, a well-known computer security expert from Princeton University, and other researchers at Princeton, Rice University, and Xerox Corporation succeeded in removing the watermarks. Upon learning that Professor Felten planned to share his findings at an academic conference, SDMI representatives informed Professor Felten that such disclosure "could result in significantly

312. *Id.* at 328-29.

313. *Id.* at 329-33. The court also rejected prior restraint, overbreadth, and vagueness challenges. *Id.* at 333-39.

314. *Id.* at 339-41.

315. *Id.* at 332, 341-46.

316. Universal City Studios, Inc. v. Corley, 273 F.3d 429 (2d Cir. 2001).

317. *See* John Borland, *SDMI Offers $10,000 Challenge to Hackers* (Sept. 8, 2000), *at* http://news.com.com/2100-1023245518.html.

broader consequences and could directly lead to the illegal distribution of copyrighted material."[318]

Professor Felten and his colleagues ultimately filed a lawsuit asking a court to declare that presentation of this research at a USENIX (Advanced Computing Systems Association) Security Symposium and publication of their research, including a paper entitled *Reading Between the Lines: Lessons from the SDMI Challenge*, do not violate the DMCA's anti-trafficking ban and, if they do, such provisions violate the First Amendment. The trial court dismissed the matter on justiciability grounds, noting that the defendants had disavowed the letter threatening to sue and would not take any such action.[319]

United States v. ElcomSoft and Dmitry Sklyarov. The eBook publishing industry has also invoked the DMCA in order to curtail the distribution of decryption code. Adobe Systems Corporation, a leading software manufacturer best known for creating the de facto industry standard for electronic document distribution (Portable Document Format (PDF)) and the Acrobat Reader, developed the Adobe Acrobat eBook Reader to provide publishers with a secure system for distributing their content. Publishers requested that this platform afford them the ability to prevent eBook files from being copied from one computer to another.[320]

ElcomSoft, a Russia-based company, developed Advanced eBook Processor, a program that cracks the encryption protection on Adobe's eBook format and converts it to Adobe's PDF format. In June 2001, Adobe requested that ElcomSoft cease distributing the program.[321] Adobe also requested that the FBI investigate the matter. In July 2001, the FBI arrested Dmitry Sklyarov, a programmer for ElcomSoft and one of the developers of ElcomSoft's Advanced eBook Processor, as he was preparing to speak at Def Con, a conference billed as the "the largest underground internet security gathering on the planet" and

318. *See* Lisa M. Brown, *Researchers Face Legal Threats over SDMI Hack* (Apr. 23, 2001) (quoting letter from SDMI to Professor Felten), *at* http://news.com.com/2100-1023-256277.html.

319. *See* Final Hearing Transcript, Felten v. RIAA, Case No. 01 CV 2669 (D.N.J. Nov. 28, 2001) (Hon. Garrett E. Brown), *available at* http://www.eff.org/Legal/Cases/Felten_v_RIAA/20011128_hearing_transcript.html.

320. *See* Gwendolyn Mariano, *Consumers May Find e-Books a Tough Read* (Nov. 20, 2000), *at* http://news.com.com/2100-1023-249189.html?tag=bplst.

321. *See* Robert Lemos, *Russian's Arrest Latest in Copyright Fight* (July 18, 2001), *at* http://news.com.com/2100-1001-270129.html?legacy=cnet.

"the largest hacker convention on the planet!"[322] held in Las Vegas.[323] The government charged Sklyarov and ElcomSoft with criminal violations of the DMCA, with penalties ranging up to five years imprisonment and fines up to $2.25 million.[324]

The arrest outraged the computer science and civil liberties communities.[325] The Electronic Frontier Foundation, a civil liberties organization working to protect rights in the digital world, took on Sklyarov's cause. Responding to a boycott and vocal protests, Adobe withdrew its support for the government's prosecution of Sklyarov[326] and the government eventually dropped the charges against him on the condition that he testify against his employer.[327] The government continued to pursue its prosecution against ElcomSoft.

In the first stage of this prosecution, ElcomSoft filed a motion seeking to dismiss the complaint on grounds that the DMCA violates the First Amendment.[328] In ElcomSoft's view, Congress' effort to both ban circumvention tools and to maintain fair use produced a statutory regime that is unconstitutionally vague. Judge Whyte rejected this argument on the grounds that the DMCA in fact prohibits trafficking in and marketing of *all* circumvention devices.[329] The court dismissed many of the First Amendment challenges following the analysis ap-

322. *See* http://www.defcon.org./

323. *See* Lemos, *supra* note 321.

324. *See* IDG, *Russian Arrested for Alleged DMCA Violations* (July 18, 2001), *at* http://www.thestandard.com/article/0,1902,28048,00.html.

325. *See, e.g.,* Declan McCullagh, *Hacker Arrest Stirs Protest* (July 19, 2001), *at* http://www.wired.com/news/politics/0,1283,45342,00.html; John Leyden, *Boycott Adobe Campaign Launches* (July 19, 2001), *at* http://www.theregister.co.uk/content/4/20499.html; Will Knight, *Computer Scientists Boycott US Over Digital Copyright Law* (July 23, 2001), *at* http://www.newscientist.com/news/news.jsp?id=ns99991063 (last visited Sept. 19, 2002).

326. *See* Robert Lemos, *Adobe: Free the Russian Programmer* (July 23, 2001), *at* http://news.com.com/2100-1001-270440.html?legacy=cnet&tag=mn_hd%20tag=pt.salon.

327. *See* Michelle Delio, *Russian Hacker Charges Dropped* (Dec. 13, 2001), *at* http://www.wired.com/news/politics/0,1283,49122,00.html.

328. *See* United States v. Elcom, Ltd., N.D. Cal., No. CR 01-20138 RMW (Order Denying Motions to Dismiss Indictment), *available at* http://www.eff.org/IP/DMCA/US_v_Elcomsoft/20020508_dismiss_deny_order.pdf.

329. *See* Order Denying Motions to Dismiss Indictment, at 7-12. Judge Whyte viewed the statute as serving a prophylactic purpose:

> Congress sought to ban all circumvention tools because most the time these tools would be used to infringe copyright. Thus, while it is not unlawful to circumvent for purposes of engaging in fair use, it is unlawful to traffic in tools that allow fair use circumvention. This is part of the sacrifice Congress was willing to make in order to protect against unlawful piracy and

plied in the *Corley* case.[330] The court rejected ElcomSoft's assertion that enactment of the DMCA exceeded Congress' constitutional authority.[331]

d. OSPs, Investors, Advisors, and End Users

While focusing their attention upon peer-to-peer networks, decryption of protection measures, and other critical choke points in the unauthorized distribution of copyrighted works, the content industries have also devoted attention to lower levels of the digital distribution pyramid. These industries have always felt some reluctance to pursue individual copyists and distributors out of practical concerns and potential backlash among their customers. Nonetheless, as the level of unauthorized distribution has risen, the content industries have expanded their efforts to both stop and deter unauthorized reproduction and distribution as well as educate the public about the structure and benefits of copyright protection. These efforts have taken place at a number of levels: online service providers, universities, investors and advisors, businesses, and end users. The content industries have also lobbied the government to step up public enforcement of copyright law.

Online Service Providers. While immunizing OSPs from monetary damages and most forms of injunctive relief, the DMCA's safe harbor provisions also imposed responsibilities upon OSPs to promptly block or take down sites containing unauthorized content. Pursuant to these provisions, the RIAA and the MPAA have sent out thousands of cease-and-desist letters and shut down thousands of sites with the cooperation of Internet Service Providers.[332]

Recognizing the heavy use of "file sharing" sites by college students and the large portion of CDs purchased by 18 to 24 year olds, the RIAA has pressured universities to block access to file sharing sites

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promote the development of electronic commerce and the availability of copyrighted materials on the Internet.

Id. at 11.

330. *Id.* at 12-23.

331. *Id.* at 26-32. ElcomSoft was ultimately acquitted of the charges in a jury trial. The defense successfully argued that the company was not aware it was violating the DMCA, and therefore did not meet the willfulness element of the crime. *See* Joanna Glasner, *Jury Finds ElcomSoft Not Guilty* (Dec. 17, 2002), *at* http://www.wired.com/news/business/0,1367,56897,00.html.

332. *See* Education, Innovation, and Enforcement, *at* http://www.riaa.org/Protect-Online-3.cfm (last visited Sept. 19, 2002).

through university networks. Many universities initially erected firewalls blocking student access to Napster based in part on network performance and bandwidth concerns,[333] although most have backed off restrictions on Internet use.[334] The RIAA has also begun filing take down notices directly with universities in their capacity as OSPs for their students.[335] Indeed, college students have been the target of RIAA initiated crackdowns that have resulted in arrest and discipline.[336]

Digital Distribution Venture Investors and Advisors. As the legal exposure for digital distribution ventures became apparent after the Scour, MyMP3.com, and Napster cases, venture capitalists became increasingly wary of the legal costs, economic risk, and potential vicarious liability associated with investing in these ventures.[337] The recording industry has substantially raised the stakes for investors by bringing suits directly against officers, directors, and venture capitalists involved in Napster.[338] Universal Music Group has sought to expand the net of exposure one step further. After winning a large verdict from MP3.com in its litigation over the MyMP3.com service and later acquiring the company, it turned around and sued MP3.com's former attorneys for malpractice.[339] The net effect of these actions could be to

333. *See Schools Recess on Napster* (Aug. 30, 2000) (reporting a Gartner Group survey finding that 17 of 59 U.S. colleges and universities had banned students from accessing Napster's website), *at* http://www.wired.com/news/culture/0,1284,38525,00.html (last visited Sept. 19, 2002).

334. *See* Brad King, *Campus Music Trades Continue* (Aug. 27, 2001), *at* http://www.wired.com/news/school/0,1383,45817,00.html (last visited Sept. 19, 2002).

335. *See* Scott Carlson, *Company Identifies Student and Complains to Their Colleges, Chronicle of Higher Education* (Nov. 7, 2001), *at* http://chronicle.com/free/2001/11/1001110701t.htm; *see also* Diana Kilmanis, *Campus Students Liable for Copyrighted Music*, THE DIAMONDBACK, Nov. 7, 2001 (University of Maryland student newspaper), *available at* http://www.inform.umd.edu/News/Diamondback/archives/2001/11/07/news6.html (last visited Sept. 19, 2002).

336. *See* Janelle Brown, *MP3 Crackdown* (Nov. 17, 1999), *at* http://www.salon.com/tech/log/1999/11/17/riaa/index.html (last visited Sept. 19, 2002).

337. *See* Dawn Kawamoto, *Lawsuits Dampen VCs' File-Sharing Enthusiasm* (Sept. 4, 2000), *at* http://news.com.com/2100-1023-245275.html.

338. *See* Paul Elias, *Lawyers in Napster Suit Go After Deep Pockets: Venture Backer Hummer Winblad Could Be Held Liable if the Music-Swapping Company is Found Guilty of Piracy* (Aug. 18, 2000), *at* http://www.redherring.com/industries/2000/0818/ind-legal081800.html. Chief Judge Patel ultimately dismissed claims against these parties.

339. *See* Brenda Sandburg, *MP3.com Sues Cooley Over Legal Advice* (Jan. 21, 2002), *at* http://www.law.com/servlet/ContentServer?pagename=openMarket/Xcelerate/View&c=LawArticle&cid=101573988432&live=true&cst=1&pc=0&pa=0; Sonia K. Katyal, *A Legal Malpractice Claim by MP3.com: In The Changing Area of Cyberlaw, Is A Crystal Ball*

chill both investment in and advising of new technology ventures relating to reproduction and distribution of content.

Businesses. The record industry has also begun focusing upon private companies. After receiving an anonymous tip, the RIAA sued Integrated Information Systems alleging that its employees had set up a computer server that allowed co-workers to download and access MP3 files. The firm settled the case, agreeing to pay a large fine.[340] This case and others have led companies to establish policies prohibiting downloading of music on company computers.[341]

End Users. Thus far, the content industries have declined to pursue typical end users directly, even though it is relatively clear (from the Napster litigation) that such lawsuits could succeed. Recent reports suggest that the recording industry may be reassessing this strategy,[342] possibly with an eye toward targeting those end users most responsible for the unauthorized spread of music files. A study by researchers at Xerox's Palo Alto Research Center revealed that the top 20 percent of the users of Gnutella, one of the more decentralized architectures, are responsible for 98 percent of all files shared.[343] Therefore, by targeting the most egregious conduits of unauthorized content, the RIAA might be able to reduce the flow of unauthorized sources as well as deter Internet users from exposing themselves to liability. This strategy risks further alienating the industry's customers and fueling a legislative backlash.

Government Enforcement. As reflected in the ElcomSoft case, the federal government has taken an active and increasing role in the enforcement of copyright law in cyberspace. The NET Act was specifically created to ease such prosecutions. In the first NET Act prosecution, completed in November 1999, federal prosecutors pro-

Necessary to Avoid Liability? (Feb. 7, 2002), *at* http://writ.news.findlaw.com/commentary/20020207_katyal.html.

340. *See* Christine L. Romero, *Music Piracy Costs Temp Firm $1 Million* (Apr. 11, 2002), at http://www.arizonarepublic.com/news/articles/0411music11.html.

341. *See* Betty Evangelista, *Deleting Downloads: Companies Concerned Over Employees' File-Sharing at Work*, S.F. CHRONICLE, June 3, 2002; Lisa M. Bowman, *Kiss Your MP3s at Work Goodbye* (June 27, 2002), *at* http://news.com.com/2100-1023-939791.html.

342. *See* Anna Wilde Mathews & Bruce Orwall, *Music Labels Go After Song-Swappers: Recording Companies Plan Lawsuits Against Individuals*, WALL ST. J., July 3, 2002; *See also* Brad King, *File Trading Furor Heats Up* (July 3, 2002), *at* http://www.wired.com/news/mp3/0,1285,53662,00.html.

343. *See* Eytan Adar & Bernardo A. Huberman, *Freeriding on Gnutella*, (5 First Monday: Peer-Reviewed Journal on the Internet, No. 10 (Oct. 2000)), *available at* http://www.firstmonday.org/issues/issue5_10/adar/index/html.

ceeded against a college student who had posted MP3 files, movie clips, and software on his web site.[344] Although a plea bargain kept the student out of jail, the case received substantial publicity.[345] The more general problem of computer crime – fraud and the spreading of computer viruses – has led the United States Department of Justice to establish specialized cybercrime units throughout the nation.[346] In December 2001, federal agents carried out raids in 27 cities as part of an effort to break up a particularly notorious software piracy ring known by the name "DrinkorDie."[347]

C. The Emerging Array of Forces Bearing on Copyright's Digital Future

Notwithstanding the tremendous expansion of copyright and related protections during the past decade and largely favorable judicial decisions in enforcement actions, the major content industries have come to believe that existing law may not be adequate to protect content in the digital age.[348] The rapid rise of peer-to-peer networks and the success of hackers in cracking and disseminating means of decrypting the DVD Content Scrambling System (and other technological protection measures) demonstrate the vulnerability of the current network architecture to widespread unauthorized distribution and the rel-

344. *See* Kristine Olson & Sean B. Hoar, *District of Oregon Nets First Conviction for Copyright Infringement on the Internet*, 47 FED. LAWYER 28 (July 2000).

345. *See, e.g.*, Jennifer Sullivan, *MP3 Pirate Gets Probation* (Nov. 24, 1999), *at* http://www.wired.com/news/politics/0,1283,32276,00.html.

346. *See* Lisa M. Bowman, *U.S. to Cybercriminals: You're Going Down* (July 11, 2001) (reporting on Attorney General Ashcroft's vow to increase enforcement of cybercrime by expanding 10 specialized units so they can better concentrate on catching hackers and pirates), *at* http://news.com.com/2100-1001-270322.html?tag=rn.

347. *See* Robert Lemos, *U.S. Plans New Raids on File Swappers* (Dec. 12, 2001), *at* http://news.com.com/2100-1023-276885.html; Associated Press, *Feds Zero in on Piracy Ring* (Dec. 11, 2001), *at* http://www.wired.com/news/politics/0,1283,49026,00.html (last visited Sept. 19, 2002); Reuters, *DrinkorDie Leader Pleads Guilty* (Feb. 27, 2002), *at* http://www.wired.com/news/politics/0,1283,50715,00.html (last visited Sept. 19, 2002).

348. *See* Declan McCullagh, *Anti-Copy Bill Hits D.C.* (Mar. 22, 2002), *at* http://www.wired.com/news/politics/0,1283,51245,00.html (last visited Sept. 19, 2002); Declan McCullagh, *The DMCA is the Toast of D.C.* (May 17, 2002) ("To Hollywood, the DMCA is just the first step: It only made most types of 'circumvention' illegal. Now movie studios want to require copy-protection technology in most software and hardware"), *at* http://www.wired.com/news/politics/0,1283,52602,00.html (last visited Sept. 19, 2002).

ative impotence of existing legal protections.[349] Of comparable significance, the shift toward a digital platform has shaken up and augmented what was already a complex set of players vying to influence public policy. For these reasons, concern for the future of copyright law has moved beyond the relatively specialized content industry circles to encompass the digital technology world (computer hardware vendors, semiconductor manufacturers, software companies, Internet service providers, and computer scientists) as well as civil libertarians and the public at large. Just about everyone with a computer, an Internet connection, and a desire to access content has become aware of the raging debate over copyright's proper role. Therefore, in order to envision the future of copyright law, it is necessary to examine the emerging array of forces bearing on its evolution. This section begins by exploring the larger economic themes affecting the role and contours of copyright law. It then discusses how technological considerations and evolving social movements may bear on copyright's future course.

1. Economics: Content versus Technology

Copyright law has traditionally centered on economic interests – assuring content creators and distributors means of appropriating sufficient return in the marketplace in order to promote investment in creative endeavors. Throughout much of its history, new technologies for storing and distributing expressive works have by and large served the interests of content creators and distributors. Innovations in media and distribution channels have created new markets for content. Although tensions have certainly arisen from time to time and some particular content niches have suffered from the new technologies,[350] from an overall perspective both the content and technology sectors of the economy have generally benefitted from new technology in what can best be described as a symbiotic relationship.

349. *See* Melanie Warner, *Free Music: The New Napsters* (Aug. 12, 2002), *at* http://www.fortune.com/indext.jhtml?channel=print_article.jhtml&doc=208834.

350. For example, many performing artists and musicians lost economic opportunities as motion pictures and recorded music supplanted some of the public's enthusiasm for live performances. Similarly, the player piano and piano rolls decreased demand for sheet music, cutting into the revenues of sheet music publishers and, for at least a time, music composers. The advent of radio and the development of a vibrant market for sound recordings proved a great revenue source for authors of musical compositions. *See* M. WILLIAM KRASILOVSKY & SIDNEY SHEMEL, THIS BUSINESS OF MUSIC (8th ed. 2000) (describing the licensing of music).

One of the key factors harmonizing this relationship has been the inherent limitations of analog technology platforms on unauthorized reproduction and distribution of works of authorship.[351] The principal digital technology platform today — general purpose microcomputer (and portable devices) and unencrypted file formats in conjunction with peer-to-peer networks operating on the World Wide Web — lacks such constraints. Among its defining characteristics are the ease with which content can be inexpensively, quickly, and flawlessly reproduced and distributed widely with relatively little risk of detection. Thus, while digital technology offers great promise to content creators and distributors, it exposes content to unauthorized reproduction and distribution dramatically beyond that what used to be possible on prior technology platforms.

Not surprisingly, the transition from analog to digital storage and distribution technology has generated deepening conflict between the content and technology sectors, producing what has increasingly been referred to as a battle between the content and high technology sectors of the economy.[352] The conflict took root in earlier battles over the VCR and digital audio tape players, but has taken on unprecedented fury with the growth of peer-to-peer technology. Whereas these prior controversies proved tractable – through Hollywood's eventual recognition that VCRs opened markets without adversely affecting viewership and the largely consensual imposition of technological constraints on DAT devices through the AHRA compromise[353] – the current conflict represents a far greater challenge. The current digital piracy threat vastly exceeds these prior controversies while cutting at the heart of the technology sector: the design of general purpose computers, related devices, and computer software and the architecture of the Internet.

While sharing a common interest in preventing unauthorized reproduction and distribution of copyrighted works – whether computer software or music and audiovisual content – the computer software industry and content sector have been bitterly divided over the means of

351. *See supra* text accompanying notes 138-45.

352. *See* Thomas C. Greene, *MS Denounces Hollywood DRM Jihad* (June 6, 2002), *at* http://www.theregister.co.uk/content/4/25593.html; Amy Harmon, *Piracy, or Innovation? It's Hollywood vs. High Tech*, N.Y. TIMES, Mar. 14, 2002, at C1; Declan McCullagh, *Digital Security Fomenting a Feud* (Feb. 27, 2002), *at* http://www.wired.com/news/politics/0,1283,50702,00.html; Declan McCullagh, *High Tech: U.S. Out of Hollywood* (Feb. 27, 2002), *at* http://www.wired.com/news/politics/0,1283,50716,00.html.

353. *See supra* note 299 and text accompanying notes 203-08.

accomplishing this objective. Both supported the enactment of the DMCA,[354] which bolsters privately developed and implemented technological protection measures against piracy. They also joined forces in launching the Secure Digital Music Initiative (SDMI).[355]

The ineffectiveness of the DMCA in combating decryption of DVDs, the proliferation of unauthorized distribution of copyrighted works, and the demise of the SDMI, however, have forced a wedge between the technology and content sectors of unprecedented proportions. While the leakage of protected content has begun to disrupt the sound recording industry's business models[356] and sent a chill through the film and television sectors, the computer hardware industry has benefitted from the ease with which consumers can access content through illicit channels. The popularity of file-sharing has stimulated demand for hard drives, faster microprocessors, and new portable digital devices, even in a generally sluggish economic period. Word processing and traditional spreadsheet analysis has never required 40 gigabyte hard drives or burners for writing large files to CDs and DVD capacity media. Computer product design and advertising have increasingly appealed to this new generation of computer users with slogans such as "rip, mix, burn." Content sector leaders now openly attack the marketing tactics of Apple and Gateway,[357] two of the more aggressive marketers of new lines of consumer products targeting

354. John Borland, *D.C. Anti-Piracy Plans Fuel Culture Clash* (Mar. 27, 2002), *at* http://news.com.com/2100-1023-869902.html. Computer hardware manufacturers, however, opposed the DMCA, fearing that it would lead to regulation of technology.

355. *See* Paul Festa, *RIAA to Address Music Downloads* (Dec. 11, 1998), *at* http://news.com.com/2100-1023-219026.html.

356. The record industry has seen a 15 percent drop in CD shipments in the past year. While the record industry has attributed the downturn to unauthorized distribution, *see* Reuters, *Downloads Blamed for Low CD Sales* (Aug. 26, 2002), *at* http://www.wired.com/news/business/0,1367,54767,00.html, others have suggested that declining sales can be attributed to the economic recession and increased competition from other media (such as DVDs and video games). *See* Reuters, *Forrester Sees $2 Billion Digital Music Market by 2007* (Aug. 13, 2002), *at* http://www.siliconvalley.com/mld/siliconvalley/news/editorial/3856253.htm. In one of the first empirical assessments of record sale trends through this period, Professor Stan Liebowitz finds the recent dip in CD sales supports the claim that unauthorized distribution is causing harm to the recording industry and that this trend will likely continue. *See* Stan Liebowitz, *Record Sales, MP3 Downloads, and the Annihilation Hypothesis* (Aug. 22, 2002), *at* http://www.utdallas.edu/~liebowit/knowledge_goods/rl6310.html (last visited Sept. 26, 2002).

357. *See* Brad King, *Are Ads a Gateway to Illegal CDs?* (Apr. 11, 2002), *at* http://www.wired.com/news/mp3/0,1285,51719,00.html.

young music fans, and question the technology industry's commitment to developing adequate protection for digital content.

The content industries have resolved to press for more powerful controls over the architecture of digital technology and at their urging, Senator Ernest Hollings recently proposed the Consumer Broadband and Digital Television Promotion Act[358] which calls for the Federal Communications Commission, in consultation with the Copyright Office, to establish security system standards and encoding rules for all digital media devices sold or offered for sale in the United States. The bill allows a one year period for representatives of digital media device manufacturers, consumer groups, and copyright owners to agree upon such standards before the FCC which would initiate formal rule-making proceedings and also requires that any standards – whether negotiated or administratively determined – satisfy various criteria such as effectiveness in preventing piracy, reasonable cost, and accommodation of fair use.[359]

Technology companies and industry associations have bitterly denounced the Hollings proposal and have more generally voiced opposition to any government-mandated anti-piracy controls.[360] In their view, such standards would threaten product, software, and network

358. *See* S. 2048. 107th Cong. (2002); John Borland, *Anti-Piracy Bill Finally Sees Senate* (Mar.21, 2002), *at* http://news.com.com/2100-1023-866337.html. This bill largely incorporates the provisions of an earlier proposal, the Security Systems Standards and Certification Act (SSSCA). *See* Declan McCullagh, *New Copyright Bill Heading to Congress* (Sept. 7, 2001), *at* http://www.wired.com/news/politics/0,1283,46655,00.html.

359. In addition to a general provision calling for consideration of effects on fair use in setting the standard, the Act would specifically require that consumers be able to make personal copies of television broadcasts (including from cable and satellite premium channels). *See* CBDTPA § 3(e)(2).

360. *See* John Borland, *D.C. Anti-Piracy Plans Fuel Culture Clash* (Mar. 27, 2002), *at* http://news.com.com/2100-1023-869902.html; Declan McCullagh, *High Tech: U.S. Out of Hollywood* (Feb. 27, 2002) (reporting on a letter from top Silicon Valley executives noting "consensus within the industry that a government-mandated standard is not in the best interests of effectively solving this problem" and advocating "voluntary multi-industry standards setting efforts to be optimally effective in reaching workable market solutions."), *at* http://www.wired.com/news/politics/0,1283,50716,00.html; Microsoft Corporation, *Art & Commerce in the Digital Decade: Protecting Intellectual Property Will Take Cooperation and Innovation* (June 3, 2002), *at* http://www.microsoft.com/issues/essays/2002/06-03digitalrights.asp; *see also* Robert MacMillan, *Lobbying Group Protests Copyright-Protection Proposal*, NEWSBYTES, Oct. 1, 2001 (describing opposition by the Association for Computing Machinery to Senator Hollings' earlier proposal); Charles Cooper, *Ted Waitt Takes on Hollywood* (May 28, 2002) (describing Gateway Computer's criticism of the content industries and its aggressive marketing of products that enable consumers to access digital content), *at* http://news.com.com/2008-1082-923477.html; Declan Mc-

innovation, undermine market solutions to the piracy problem, and risk implementation of premature and inefficient standards. Most significantly, such a policy would place government officials in the middle of basic product design decisions. In the view of the technology sector, the technology marketplace is far too dynamic for any such government intervention to succeed.

This impasse does not show signs of easy, quick, or stable resolution. Although technology industry leaders have indicated that they are willing to collaborate with the content industries in combating piracy,[361] they have pointedly stated their support for peer-to-peer technology. A recent letter from technology industry leaders to their counterparts in the content sector asserts that such technology represents "a basic functionality of the computing environment today" and is "critical to further advances in our economy."[362] The technology industry leaders propose addressing the piracy problem through consumer education, enforcement of existing laws, and the development of new ways to use the Internet to distribute content. They caution that "[a]ny solutions to the problem of piracy must not compromise the innovations [peer-to-peer technology] has to offer."[363] Further distancing themselves from the priorities of the leading content companies, the technology industry executives note that many consumers have expectations about "fair use" of entertainment products that must be factored into the resolution of this controversy.[364]

This posture bodes poorly for cross-sector consensus on how to combat unauthorized reproduction and distribution of copyrighted works. While continuing to pursue enforcement and new, albeit modest, business initiatives,[365] the content industries have placed new legislation high among their strategic priorities. Although the content sector has contributed heavily to political candidates over the years[366]

Cullagh, *Why Telecoms Back the Pirate Cause* (Aug. 27, 2002), *at* http://news.com.com/2102-1082-955417.html.

361. John Borland, *Tech Execs: Hands Off P2P* (July 15, 2002), *at* http://news.com.com/2100-1023-943946.html.

362. *Id.*

363. *Id.*

364. *Id.*

365. *See supra* text accompanying notes 175-78.

366. The television, film, and music industries combined have ranked among the top 10 industrial groups in terms of political campaign contributions during most of the past decade. *See* Center for Responsive Politics, *TV/Movies/Music: Long Term Contribution Trends, at* http://www.opensecrets.org/industries/indus.asp?Ind=B02 (last vis-

and maintained a strong lobbying presence in Washington for many years, it cannot expect to ride roughshod over the political interests of the technology sector. Any significant incursions into the freedom to develop new products will encounter forceful opposition from the technology sector, which, over the past decade, has invested substantial resources in the legislative process and gained valuable experience in working the halls of Congress.[367] The economic significance of the technology sector to the United States economy vastly exceeds the contributions of the content industries and technology companies have strong financial motivation to maintain their freedom to innovate.[368]

ited Sept. 19, 2002). As a percentage of industry revenues, the content industries rank at the very top in terms of campaign contributions.

367. Prior to the mid-1990s, technology companies tended to disdain lobbying and resolved their battles in the marketplace. They did not devote significant resources to campaign contribution or lobbying infrastructure. *See* Center for Responsive Politics, *Computers/Internet: Long-Term Contribution Trends* (reporting that the computer/Internet industrial category ranked between 30th and 53rd among industrial categories in terms of campaign contributions, a rather lower contribution rate in comparison to the economic size of the industry), *at* http://www.opensecrets.org/industries/indus.asp?Ind=B02 (last visited Sept. 19, 2002). As the industry has matured, this attitude has gradually changed. *See* Claire Tristram, *Silicon Valley Grows Up*, N.Y. TIMES, May 24, 2002. The concerted effort of Silicon Valley companies to press for antitrust scrutiny of Microsoft brought about a new awareness of the role of politics. *See* John Heilemann, *The Truth, the Whole Truth, and Nothing But the Truth: The Untold Story of the Microsoft Antitrust Case and What it Means for the Future of Bill Gates and His Company* (Nov. 2000), *at* http://www.wired.com/wired/archive/8.11/microsoft.html. Microsoft itself has since taken an active interest in governmental and legislative affairs, becoming one of the leading contributors to political coffers. Its campaign contributions rose from less than a quarter million dollars in the 1996 election cycle to more than $4.25 million in 2000, placing it 5th among all donors. *See* Center for Responsive Politics, *Computer Software: Top Contributors*, *at* http://www.opensecrets.org/industries/contib.asp?Ind=C5120&Cyle=2000 (last visited Sept. 19, 2002). In the year 2000 election cycle, the computer/Internet industries ranked 7th in political campaign contributions, contributing over $40 million to Democratic and Republican candidates and organizations, pulling ahead of the content sector for the first time. *See* Center for Responsive Politics, *Computers/Internet: Long-Term Contribution Trends, at* http:/www.opensecrets.org/industries/indus.asp?ind=B02 (last visited Sept. 19, 2002); *see also* Center for Responsive Politics, *Telecom Services and Equipment: Long-Term Contribution Trends* (noting comparable increases in contributions by the telecom sector), *at* http://www.opensecrets.org/industries/indus.asp?Ind=B02 (last visited Sept. 19, 2002). The content industries have, however, surpassed technology sector contributions in 2002. Compare Center for Responsible Politics, *TV/Movies/Music: Long Term Contribution Trends, at* http://www.opensecrets.org/industries/indus.asp?Ind=B02, with Center for Responsive Politics, *Computers/Internet: Long-Term Contribution Trends, at* http:/www.opensecrets.org/industries/indus.asp?ind=B02.

368. The technology sector brings in substantially more revenue than the music and film industries. Even the star power of Hollywood cannot overshadow this dispar-

Nonetheless, even if the content sector cannot push their ideal package of copyright reforms through Congress, they hope to at least pressure technology companies to the bargaining table. A recent flurry of congressional hearings on digital piracy, proposed bills,[369] and overtures by technology executives to studio executives[370] suggest that this approach is achieving some results, although enactment of a bill resembling the CBDTPA anytime soon remains unlikely.[371]

At a more basic level, the present controversy challenges long-established economic structures and evolutionary paths. Whereas developers of new content storage and distribution technologies have often gained substantial economic power during the formative years of their technology, owing to patents or other competitive advantages, they inevitably have given way to competition in the supply of content, ena-

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ity. *See* John Naughton, *Hollywood at War with the Internet* (July 26, 2002) (London), *at* http://www.timesonline.co.uk/article/0,,7-365250,00.html. The consumer electronics industry alone, with revenues of early $100 billion per year, is several times larger than the music and film industries combined. *See* Brad King, *ReplayTV Won't Quit, Won't Quit* (June 4, 2002), *at* http://www.wired.com/news/digiwood/0,1412,52944,00.html.

369. *See* Amy Harmon, *Movie Studios Press Congress in Digital Copyright Dispute*, N.Y. TIMES, July 29, 2002, *available at* http://www.nytimes.com/2002/07/29/technology/29DIGI.html?tntemail; Declan McCullagh, *Could Hollywood Hack Your PC?* (July 23, 2002), *at* http://news.com.com/2100-1023-945923.html; Howard L. Berman, *Just Desserts for Scofflaws* (July 9, 2002), *at* http://news.com.com/2010-1078-942325.html; Lisa Bowman, *Copyright Holders Praise Proposed Bill* (May 1, 2002) (discussing proposal by Senator Joseph Biden that would expand strong software anti-counterfeiting laws to include digital content, criminalize replication of authentication measures on copyrighted materials), *at* http://news.com.com/2100-1023-896676.html; John Borland, *Anti-Piracy Bill Finally Sees Senate* (Mar. 21, 2002), *at* http://news.com.com/2100-1023-866337.html (last visited Sept. 19, 2002).

370. *See* John Borland, *Tech Execs: Hands Off P2P* (July 15, 2002), *at* http://news.com.com/2100-1023-943946.html; Declan McCullagh, *High Tech: U.S. Out of Hollywood* (Feb. 27, 20002) (reporting on letter from top Silicon Valley executives), *at* http://www.wired.com/news/politics/0,1283,50716,00.html; letter archived *at* http://216.110.42.179/docs/sssca/opponents/letter.02202.html; *Cf.* Joint Statement, Press Release, *AOL Time Warner – Intel Joint Statement of Principles* (Mar. 21, 2002) (outlining a common vision for their companies), *at* http://www.intel.com/pressroom/archive/releases/20020319aol_intel.htm.

371. *See* Declan McCullagh, *White House Cool to Hollings' Act* (Apr. 27, 2002) (reporting statements by James Rogan, the Commerce Department's undersecretary for intellectual property, that "negotiations are presently underway among hardware manufacturers and content owners to develop improved means for protecting online content" and urging legislators to await the results of that process before voting on a proposal such as the Hollings bill), *at* http://www.wired.com/news/politics/0,1283,52145,00.html; Declan McCullagh & Robert Zarate, *Content Spat Split on Party Lines* (Mar. 1, 2002), *at* http://www.intel.com/pressroom/archive/releases/20020319aol_intel.htm.

bling enterprises better able to develop popular content to control the emerging industry built upon the new technological platform.[372] Thus, motion pictures, sound recording, television, and radio are all viewed today as content industries, notwithstanding early control by the technological innovators. As patents expired and consumer demand grew, these "industries" shifted into the hands of those who could produce, package, and distribute content more successfully. The "technology" companies focused on consumer electronics products, broadcasting equipment, and exhibition devices supporting these content platforms, thereby producing the symbiosis of technology and content industries.

The largely non-proprietary nature of the microcomputer and Internet architectures has thus far enabled easy entry into the digital distribution marketplace. This ease of entry as well as the difficulty of changing entrenched content industrial structures have contributed to the content industries' attitude that they can and should control any new content distribution channels.[373] Thus, they have stifled most entrepreneurial ventures by "outsiders" through either lack of cooperation or outright hostility and litigation. Napster is the most publicized example. Napster sought to use its first mover advantage in the peer-to-peer arena as leverage in negotiating a new distribution vehicle for

372. For example, after the Edison company's early film patents expired and its attempt to monopolize the motion picture industry through licensing agreements were defeated, *see* Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. 502 (1917), the Edison Company's film division rapidly declined as others entered the industry. *See* EILEEN BOWSER, THE TRANSFORMATION OF CINEMA, 1907-1915. HISTORY OF THE AMERICAN CINEMA, VOL. 2 (1994); CHARLES MUSSER, BEFORE THE NICKELODEON: EDWIN S. PORTER AND THE EDISON MANUFACTURING COMPANY (1991); History of Edison Motion Pictures: Decline of the Edison Company (1908-18), Inventing Entertainment *at* http://memory.loc.gov/ammem/edhtml/edec.html#D (last visited July 26, 2002).

373. Even in the area of technological protection measures, the content industries have tended to view such innovations as goods that should be freely provided through government fiat. *See* Gwendolyn Mariano, *Harry Potter's DVD Protection Goes Poof* (June 20, 2002) (quoting an industry observer speculating that "Hollywood's rational[e] for dumping millions of dollars into lobbying and soft money to influence Congress is viewed as a one-time expense, as opposed to an ongoing expense of paying for the encryption license for each and every movie they make."), *at* http://news.com.com/2100-1023-938008.html; *cf.* Amy Harmon, *Lawmakers Seek Rules to Stop Redistribution of Digital TV*, N.Y. TIMES, July 23, 2002 (highlighting that content owners seek the implementation of content protection through the imposition of hardware standards on device manufacturers, whereas technology companies contend that entertainment companies should bear responsibility for protecting their content at the source), *available at* http://www.nytimes.com/2002/07/23/technolgy/23DIGI.html.

content, but the record labels saw no reason to negotiate with a firm threatening their principal business model, hampering their development of revenue-based digital distribution markets, and lacking effective intellectual property protection for its technology.[374]

Other online content ventures have either withered away or been taken over by major content companies. After losing a costly legal battle over its online music locker business model, MP3.com eventually cut costly settlements with the major record labels before being purchased at a substantial discount by the Universal Music Group.[375] Emusic.com, a pay-per-download venture, was unable to license content from the major record labels. Although it developed a sizable catalog of music from smaller labels, its business failed to gain traction in competition with Napster, and it too was eventually purchased by Universal Music Group at a substantial discount.[376] Licensemusic.com developed an innovative online service for searching and licensing music but ultimately failed because no major record label was willing to use the service. Warner/Chappell Music, a leading music publisher, ultimately entered the market with its own service called OneStopTrax.[377]

The television industry has taken a somewhat more conciliatory approach toward the development of digital video recorders by investing in the digital video recorder industry[378] and seeking to develop a more collaborative working relationship with the developers of this

374. As noted earlier, Bertelsman, one of the major record labels, has invested (modestly) in Napster in the hopes of gaining some edge in the digital distribution marketplace based on Napster's name recognition among music fans and its software assets. *See supra* text accompanying note 291.

375. Brad King, *MP3.com Goes Universal* (May 21, 2001), *at* http://www.wired.com/news/mp3/0,1285,43972,00.html.

376. *See* Jim Hu, *Universal to Buy Emusic for $24.6 Million* (Apr. 9, 2001), *at* http://news.com.com/2100-1023-255492.html.

377. *See* OneStopTrax website, *at* http://www.onestoptrax.com/wcmost/home2,jsp; PRNewswire, *Warner/Chappell Music and Warner Special Products Launch First Fully Integrated Online Music Licensing Service* (Apr. 29, 2002) (press release), *available at* http://biz.yahoo.com/prnews/020429/nym138_1.html.

378. *See* Jim Davis, *New TV Recording Devices a Potential Ad Gold Mine* (Aug. 18, 1999) (reporting investments by Disney, Showtime and Time Warner in TiVo and ReplayTV), *at* http://new.com.com/2100-1040-229995.html. Brad King, *ReplayTV on Sale Despite Suits* (Nov. 29, 2001) (reporting that Time Warner Cable, Viacom, and Disney have invested in ReplayTV or it parent company, SonicBlue), *at* http://www.wired.com/news/digiwood/2,1412,48691,00.html.

technology.[379] After initially bashing television executives through its early product advertisements, TiVo has discontinued advertisements directly attacking the major networks and has downplayed its product's ability to skip commercial advertisements. It has made a conscious decision to try to "bridge the gap" between consumers and networks, recognizing that "as much as the consumers have difficulties with networks, they do provide the content — if you're going to completely alienate them, what will happen to the content?"[380] TiVo has partnered with broadcasters and advertisers to offer "Advertainment," a new form of interactive advertising.[381] It has also decided not to include a commercial skip feature in its product, although it continues to offer a rapid forward feature. ReplayTV has taken the opposite tack, aggressively marketing features of its technology that circumvent commercial advertisements and allow content to be redistributed through the Internet and honing a public image as a renegade fighting the television industry's advertising business model on behalf of consumers.[382] As noted previously,[383] the television and film industries have sued ReplayTV for copyright infringement. These industries have also pressured Congress and the FCC to adopt rules preventing the unauthorized distribution of digital television signals.[384]

The content industries' fears of cannibalizing their existing revenue streams through digital distribution initiatives, a lack of effective encryption technologies, and concerns about adverse consumer reactions to content protection measures have constrained the industries' embrace of the Internet. The record labels' first online services,

379. *See* Davis, *supra* note 378 (reporting investments were intended as both a hedge against the future and a means of ensuring that advertising remains a part of the TV experience), *at* http://news.com.com/2100-1040-229995.html.

380. *See* Farhad Manjoo, *TiVo Town or Sonicblue City?* (June 6, 2002), *at* http://wired.com/news/business/0,1367,53008,00.html.

381. For example, in a campaign for the electronics retailer Best Buy, TiVo users can hit a button on the remote control whenever they see a Best Buy advertisement and view a "Video Showcase" of "innovative Best Buy branded entertainment." *See* Press Release, *TiVo, Best Buy Launch New Generation of "Advertainment" With Exclusive Sheryl Crow Jam Session, Electronic Feng Shui Vignettes* (May 16, 2002), *at* http://biz.yahoo.com/prnews/020516/sfth069_2.html.

382. *See* King, *supra* note 368; Manjoo, *supra* note 380 (quoting a TiVo spokesperson characterizing SonicBlue, ReplayTV's parent, as trying "to make themselves look like the consumer watchdog who is against *the man*").

383. *See supra* text accompanying notes 243-45.

384. *See* Amy Harmon, *Lawmakers Seek Rules to Stop Redistribution of Digital TV*, N.Y. TIMES, July 23, 200, *available at* http://www.nytimes.com/2002/07/23/technology/23DITI.html.

MusicNet and Pressplay, have been criticized for lacking the variety, functionality, and flexibility of other online services as well as peer-to-peer networks.[385]

In addition to these concerns about the extent and quality of online ventures by major record labels, any legitimate service faces a daunting challenge in developing a single source for the full range of music. Consumers rarely know the label behind any particular artist or recording and hence would find the task of locating music across individual label web sites challenging.[386] Furthermore, the dual copyrights comprising sound recordings – in the underlying musical composition and the sound recording – complicates the clearances required to offer a broad catalog.[387] Furthermore, efforts by the record industry to

385. *See* Brad King, *Music So Nice, You May Pay Twice* (Dec. 18, 2001), *at* http://www.wired.com/news/mp3/0,1285,49188,00.html; Brad King, *Pressplay Arrives in Music Fog* (Jan. 23, 2002), *at* http://www.wired.com/news/mp3/0,1285,49934,00.html; Jim Hu, *Labels Defend MusicNet, Pressplay* (July 8, 2002) (noting complaints about catalog limitations and "clunky" technology), *at* http://news.com.com/2100-1023-942066.html; *Universal Music Goes Online* (July 9, 2002) (noting that Universal is limiting its download service to older and less well-known artists so as to assess whether online distribution erodes record store sales), *at* http://www.wired.com/news/business/0,1367,53721,00.html. CNET provided the following review of Pressplay, which offers music from Sony, EMI, and Universal Music Group:

> THE GOOD: Inexpensive; songs don't expire; lets you burn music onto compilation CDs; allows songs on two computers.
>
> THE BAD: Limited music selection; CD burning is limited; awful search function; no cintosh version; low streaming bit rates; no premium content.
>
> THE BOTTOM LINE: Pressplay's range of music and features don't justify its price. We prefer RealOne MusicPass's [MusicNet] searching options and simpler interface, but if you are dying to burn CDs, Pressplay is the only for-pay choice.

Pressplay Product Review, CNET Software, *at* http://www.cnet.com/software/0-3227898-1204-8494686.html (last visited July 26, 2002).

386. The music industry eventually solved this problem in the radio industry through the development of blanket licenses through ASCAP and BMI. *See* M. WILLIAM KRASILOVSKY & SIDNEY SHEMEL, THIS BUSINESS OF MUSIC 151-74 (8th ed. 2000) (describing the role of performing rights organizations).

387. *See* Richard D. Rose, *Connecting the Dots: Navigating the Laws and Licensing Requirements of the Internet Music Revolution*, 42 IDEA 313 (2002); Anthony Reese, *Copyright and Internet Music Transmissions: Existing Law, Major Controversies, Possible Solutions*, 55 UNIV. MIAMI L. REV. 237 (2001). The radio industry did not face this problem because sound recordings were not subject to federal copyright protection until 1972; even after passage of the Sound Recording Act of 1971, sound recordings were not accorded public performance rights.

The many clearances required to establish a rich online music catalog brings to mind "the tragedy of the anti-commons," whereby a proliferation of complex rights undermines productive activities. *Cf.* Michael A. Heller & Rebecca S. Eisenberg, *Can*

form cooperative ventures face antitrust scrutiny. In fact, the major labels are currently under investigation with regard to the formation of the MusicNet and Pressplay services and their limitations of licensing their content to other entities.[388] As one means of easing the creation of broad online catalogs and easing antitrust concerns, legislation has been introduced which would require record labels that license their songs to a third-party company to grant licenses to other distributors on non-discriminatory terms.[389] The sound recording industry, however, has opposed the legislation as imposing excessive regulation.[390]

On the other side of the debate, the technology sector has exhibited its own arrogance and delusions of grandeur in the digital age.[391] The hype surrounding dot com business models generated unrealistic optimism about what could be accomplished through give away and

Patents Deter Innovation? The Anticommons in Biomedical Research, 280 SCIENCE 698 (May 1998); Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998). Such problems doomed the MyMP3.com service. *See supra* text accompanying notes 257-63.

388. *See* John Borland, *DOJ Interest Unlikely to Quiet Music Standoff* (Aug. 6, 2001) (reporting that the Antitrust Division of the U.S. Department of Justice has opened an investigation into whether the five major record labels have violated antitrust laws), *at* http://news.com.com/2100-1023-271140.html?legacy=cnet; *see also* John Borland, *Record Labels Targeted in Napster Suit* (Oct. 10, 2001) (reporting Chief Judge Patel's concerns in the *Napster* case regarding the record labels' exclusionary licensing practices in setting up MusicNet and Pressplay: "I'm really confused as to why the plaintiffs came upon this way of getting together in a joint venture. Even if it passes antitrust analysis, it looks bad, sounds bad, smells bad."), *at* http://news.com.com/2100-1023-274248.html.

389. *See* Brad King, *Music May Yet Stream from the Web* (Aug. 4, 2001) (describing the introduction of the Music Online Competition Act), *at* http://www.wired.com/news/mp3/0,1285,45813,00.html.

390. *See id.* In response to the introduction of this legislation, Hillary Rosen, CEO of the RIAA, stated that "This is not only wrong, it is also inconsistent with the strongly held views of experts and the private sector that government regulation of the Internet would be a disastrous mistake." *Id.* This view seems particularly hypocritical in view of the RIAA's strong support of the Consumer Broadband and Digital Television Promotion Act.

391. For example, Mark Andreesen, one of the developers of Netscape, the breakthrough Internet browser, has stated that digital technology "is the Trojan horse for the computer industry to take over the entertainment industry." Quoted in Ernie Schenck, *TiVo's Not the End of the World, Or Is It?* (Mar./Apr. 2001), *at* http://www.commarts.com/CA/colad_d/ernS_47.html; *see also* Rob Walker, *Creating Synergy Out of Thin Air*, N.Y. TIMES, July 28, 2002 (dispelling, in retrospect, the promise of "synergy" anticipated from the merger of AOL and Time Warner), *available at* http://www.nytimes.com/2002/07/28/opinion/28WALK.html?tntemail1; Jennifer Sullivan, *Who's Gonna Own the Music?* (Oct. 8, 1999) (quoting one technology CEO as predicting the extinction of ASCAP and BMI as technology ensures a reliable means for compensating artists), *at* http://www.wired.com/news/culture/0,1284,31682,00.html.

banner advertisement driven commerce. Somewhat like the failure of the Edison Company's attempt to monopolize the early film business[392] and Matsushita Electrical Industrial's failed attempt to run MCA Universal Studios,[393] many technology companies have overlooked or at least downplayed the challenge of building successful content enterprises. The failure of AOL-Time Warner to produce any significant synergy between the largest Internet Service Provider and one of the largest content companies evidences the difficulties of merging the diverse competencies and cultures of successful content and technology companies.[394]

Nonetheless, a gradual tempering and melding of the opposing perspectives and cultures can be expected to occur through a variety of internal and external processes. The content and technology sectors have begun to change through merger, diversification, and conglomeration. A growing number of companies now have feet in both sectors. Following its costly legal battles over the VCR in the early 1980s, Sony Corporation acquired CBS Records in 1988 and Columbia Pictures in 1989. It has since developed a large entertainment empire, which has gradually been integrated within a larger technology and consumer electronics business.[395] Through its entertainment divisions, Sony has become a key player in content industry associations such as the MPAA and RIAA, bringing a nuanced perspective to the challenges facing the entertainment sector. AOL/Time Warner reflects another set of cross-industry interests. Vivendi, which owns the Universal entertainment companies, also has investments in satellite broadcasting. It is not sur-

392. *See supra* note 372.

393. *See* Ken Belson, *Sony Looks Golden, by Comparison*, N.Y. TIMES, July 25, 2002 (quoting a Japanese technology business executive stating that "[i]t may have been arrogant of us to believe we could control Hollywood as an outsider."), *available at* http://www.nytimes.com/2002/07/25/business/25SONY.html.

394. *See* David Kirkpatrick with Jim Rutenberg, *A Search for Harmony Within a Feuding AOL*, N.Y. TIMES, July 21, 2002 ("[B]itter executives from the Time Warner side of the house say that some of the plans to synchronize their business with AOL's were flawed from the beginning. They say that so far many of the merger's promised synergies have cramped their businesses, including empty announcements about cooperation between Time Warner magazines and television networks; a proposal, still unfulfilled, to broadcast shows made by the Warner Brothers studio on Turner Broadcasting networks; and even a failed companywide push to switch to AOL e-mail accounts."), *available at* http://www.nytimes.com/2002/07/21/business/21TIME.html; Rob Walker, *Creating Synergy Out of Thin Air*, N.Y. TIMES, July 28, 2002, *available at* http://www.nytimes.com/2002/07/28/opinion/28WALK.html.

395. *See* Belson, *supra* note 393.

prising, therefore, that reports have surfaced indicating that the traditionally monolithic and unified MPAA has became more fractured.[396] Bertelsmans' investment in and ultimate acquisition of Napster no doubt tweaked the RIAA's governing body.[397]

The development of and acquisition of Internet ventures by traditional content companies can also be expected to alter their perception of business opportunities. While many of these activities merely augment the content company's principal business models at the present time, any such moves bring new people and ideas into a company. Furthermore, joint ventures and collaborative projects, such as TiVo's Advertainment initiative[398] and EMusic's development of a subscription service in conjunction with Gateway Computer,[399] expand the boundaries of both industry sectors.[400]

Over the longer term, the growing opportunity afforded by digital technology and the Internet for independent recording artists, authors, and to a lesser extent, film producers, to produce and promote their own works will play a significant role in reshaping the content industries. These industries have traditionally been highly concentrated as a result of various structural constraints – physical limitations, such as spectrum, in broadcasting and substantial financial requirements to promote and distribute content. Digital technology has loosened these constraints, enabling artists and authors to reach their audiences directly. Artists and eBook authors can now promote their work through their own websites and larger portals – such as MP3.com, ArtistDirect.com, and Garageband.com in the case of music – at minimal cost. A growing number of recording artists – budding and established, but no longer represented by major labels – have begun to

396. *See* Edmunds Sanders, *The Voice of Hollywood Shows Signs of Cracking Entertainment: Media Companies' Competing Interests Threaten a Lobbying Alliance*, L.A. TIMES, Apr. 29, 2002, at A1.

397. *See* Brad King, *Napster Now Bertelmann's Baby* (May 17, 2002), *at* http://www.wired.com/news/business/0,1367,52625,00.html.

398. *See supra* note 381.

399. *See* Gateway, *Emusic Team Up to Promote MP3 Subscription Service; Free 30-Day Trail Includes 100 MP3 Downloads Without Obligation* (Apr. 29, 200) (press release), *at* http://biz/yahoo.com/prnews/020429/lam047_1.html.

400. *See* Simon Avery, *Company to Put Music Library Online* (July 9, 2002), *at* http://www.siliconvalley.com/mld/siliconvalley/news/3625461.htm; Amy Harmon, *Grudgingly, Music Labels Sell Their Songs Online*, N.Y. TIMES, July 1, 2002, at C1; John Borland, *Listen.com Lands Bast Big Five Label* (July 1, 2002), *at* http://news.com.com/2100-1023-940841.html.

derive modest revenue streams through promoting live performances and selling CDs and merchandise.[401]

These various internal and external forces have already begun to shift the ways in which the content and technology sectors operate, although the power struggle between these two sectors can be expected to continue for some time to come. Content industries do not yet perceive a viable transition path for their businesses to a digital platform and the technology sector lacks the motivation and coordination to develop and implement such a platform. Until this gap can be bridged, the two sectors will continue to contest the appropriate role for copyright law.

2. Technology

The rate and direction of technological innovation in content storage, reproduction, distribution, and encryption will significantly affect the path of copyright law. As noted earlier, Moore's law and analogous concepts related to advances in processor speed, data compression, and networking can reasonably be expected to continue to reduce the cost and expand the capability of consumer technology for storing, replicating, and distributing content for the foreseeable future. Focusing just on storage capacity and using the personal video recorder as an example, consumers will be able to store essentially an endless quantity of audiovisual content on affordable devices within the next decade. Purchasers of a TiVo or ReplayTV device (for approximately $400) today can store 60 hours of TV programming in an easily usable and searchable system. Moore's law implies that the same

401. *See* Richard Morin, *New Musical Acts Get Lift from Internet: Downloading Levels Field, Study Finds*, S.F. CHRONICLE, Apr. 17, 2002, *available at* http://sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2002/04/17/DD124027.DTL; Janis Ian, *The Internet Debacle – An Alternative View, Performing Songwriter Magazine* (May 2002), *available at* http://www.janisian.com/article-internet_debacle.html; M.J. Rose, *Self-Publish Stigma Is Perishing* (July 23, 2002) (reporting that "in the last 18 months, thanks in great part to authors' ability to use the Internet to market themselves, more than three dozen self-published novels have been picked up by major houses."), *at* http://www.wired.com/news/culture/0,1284,53996,00.html; *Cf.* Robert von Goeben, *How to Beat the Record Labels on the Web* (June 5, 2002) (opining that entrepreneurs may better be able to break through by developing independent record labels attracting promising artists rather than focusing on building new distribution channels that depend on licensing from the major labels), *at* http://news.com.com/2010-1075-932414.html; Michael Kanellos, *Gateway Tests Waters of Music Business* (Apr. 26, 2002) (describing Gateway Computer's initial forays into music publishing and distribution), *at* http://news.com.com/2100-1040-893463.html.

$400 will provide over 500 hours of storage capacity within five years and 5,000 hours within 10 years. By the same type of extrapolation, a purchaser of a $400 MP3 player today with a storage capacity of 8,000 songs can expect to be able to store more than 64,000 songs on a comparably priced unit in just 5 years and more than half a million songs in 10 years. Advances in wireless technology can be expected to extend the Internet beyond its cable bounds. Therefore, the vulnerability of content to unauthorized reproduction and distribution will likely increase as storage capacity, data compression, reproduction media, bandwidth, and networking technology continue to advance.

In view of this backdrop, the vulnerability of content to unauthorized reproduction and distribution will depend substantially upon whether technological protection measures – more generally referred to as digital rights management (DRM) systems[402] – can keep pace with developments in computing and network technology. DRM systems can control access to content (for example, by regulating the number of times a movie can be viewed or the length of time that a song may be heard), limit the user's ability to alter the work, and prohibit the reproduction, printing, or transfer of a file. Such software locks can be embedded within a computer's operating system, software programs accompanying the content, or the hardware of a device. DRM systems typically secure content by either encrypting information in a protective shell that can only be accessed by authorized users (e.g., through password protection) or by placing a watermark, flag, or XrML tag on content that can only be read by specialized devices.

As demonstrated repeatedly throughout the past decade, technological protection measures do not guarantee protection. All DRM codes can be cracked by those with sufficient technical proficiency. The SDMI watermarks, the DVD Content Scrambling System, RealNetworks' streaming protection measures, and Adobe's eBook Reader are just some of the more prominent examples. Microsoft's highly touted security code for its XBox game console has also been

402. *See generally* Digital Dilemma Report, *supra* note 122, at 152-71, 282-303; Electronic Privacy Information Center, *Internet Digital Rights Management and Privacy Act* (Apr. 16, 2001), *at* http://www.epic.org/privacy/drm/#developers (last visited Sept. 20, 2002).

cracked.[403] Computer experts generally believe that all encryption systems are vulnerable to cracking by skilled programmers.[404] Furthermore, high quality reproductions can be made of any work that a consumer can perceive.[405] Although the DMCA can deter decryption in legitimate organizations and markets, a vast subculture of skilled hackers intent on resisting encryption has developed around the Internet.[406] Therefore, the path of DRM technology has already begun to resemble an arms race in which cracking increasingly sophisticated codes becomes the prize for a growing community of crackers.

The record and film industries have more recently come to see technology not merely as a means for preventing unauthorized reproduction and distribution but also as a means for countering piracy on the Internet. Through a tactic known as spoofing, the record industry has begun flooding peer-to-peer networks with files featuring the names of popular artists and songs, but containing compromised content.[407] The content industries would like to use more aggressive techniques – possibly including the release of computer viruses, denial of service attacks, and domain name hijacking – that would disrupt computers making available unauthorized copies, but have concern that such acts could run afoul of federal or state law.[408] As cover for fur-

403. *See* David Becker, *MIT Student Hacks into Xbox* (June 3, 2002) (noting that it cost the student $50 and took three weeks of work for the student to crack the security code), *at* http://news.com.com/2100-1040-931296.html.

404. *See* Electronic Privacy Information Center, *Digital Rights Management and Privacy* ("According to Professor Ed Felten, [DRM systems] are vulnerable to cracking by individuals with 'moderate' programming skills."), *at* http://www.epic.org/privacy/drm/ (last visited July 26, 2002); Paul Bond, *Expert Says DRM Technology No Cure for Piracy* (Apr. 9, 2002) (quoting Mark Andreesen, co-developer of the Netscape browser, stating that if software companies could not develop successful DRM technology "for their own industry, they can't do it for the entertainment industry"; "DRM is a mere Band-Aid, and always will be." "If a computer can display [content] or play it, it can copy it."), *at* http://www.hollywoodreporter.com/hollywoodreporter/convergence/article_display.jsp?vnu_content_id=1460322.

405. *See* Jennifer Sullivan, *Who's Gonna Own the Music?* (Oct. 8, 1999) (quoting Brian Zisk, a digital music entrepreneur, as stating that "If you can hear audio, you can make a copy. By the laws of physics, [music] cannot be made uncopyable"), *at* http://www.wired.com/news/culture/0,1284,31682,00.html.

406. *See generally* Andrew C. Frank, Reinhold Beutler & Aaron Markham, *The Copyright Crusade* (June 2001), *at* http://www.viant.com/pages2/downloads/innovation_copyright.pdf; Jennifer 8. Lee, *Pirates on the Web, Spoils on the Street: Cracking Codes of Popular Software, A Small Group Can Wreak Havoc*, N.Y. TIMES, July 11, 2002, at E1.

407. *See* Dawn C. Chmielewksi, *Labels Open New Fire on Piracy*, SAN JOSE MERCURY NEWS, June 28, 2002, at 1A.

408. *See, e.g.*, Federal Computer Fraud and Abuse Act, 18 U.S.C. § 1030 (2002).

ther efforts at counter-piracy activities, Representative Howard Berman has introduced the Peer-to-Peer Piracy Prevention Act which would partially immunize copyright holders from federal and state laws for activities that disable, block, or otherwise impair a "publicly accessible peer-to-peer network" distributing protected works without authorization.[409] Under this legislation, no damage actions could be brought against those authorized to engage in such counter-piracy activities unless the damage to a computer exceeded $250 and permission by the U.S. Attorney General is granted.[410] In view of the discussion of the hacking subculture,[411] it is perhaps not surprising that shortly after this legislation was proposed (with the RIAA's strong endorsement), RIAA.org suffered a denial of service attack disabling the site.[412]

This latest move by the content industries is less directly aimed at the technology sector[413] than it is at the Internet community that has spawned over the past decade. It is to that community that we now turn.

3. Social Forces

The past decade has brought about a new social movement (or perhaps, more accurately, a range of social movements) focused on innovation, civil liberties, consumer protection, and artists' rights in cyberspace. Some scholars have analogized this social dynamic to the enclosure movement in pre-industrial England[414] and various parallels

409. *See* Farhad Manjoo, *Sour Notes* (July 30, 2002), *at* http://www.salon.com/tech/feature/2002/07/30/file_trading/print.html; Declan McCullagh, *Could Hollywood Hack Your PC?* (July 23, 2002), *at* http://news.com.com/2100-1023-945923.html; *see also* Howard L. Berman, *Just Desserts for Scofflaws* (July 9, 2002), *at* http://news.com.com/2010-1078-942325.html.

410. *See* McCullagh, *supra* note 409.

411. *See supra* text accompanying notes 304-06; *see infra* note 427.

412. *See* Declan McCullagh, *RIAA Web Site Disabled by Attack* (July 29, 2002) (noting that the proposed law "would allow the RIAA to engage in precisely this kind of denial-of-service attack against peer-to-peer networks where illicit copies of music are traded" that it suffered), *at* http://news.com.com/2010-1023-947072.html.

413. The Computer and Communications Industry Association, which includes among its members AOL Time Warner, Oracle, and Sun Microsystems, has denounced the bill as "vigilante justice." *See* Declan McCullagh, *Hollywood Hacking Hits House* (July 25, 2002), *at* http://news.com.com/2100-1023-946316.html.

414. *See* James Boyle, *Fencing Off Ideas: Enclosure and the Disappearance of the Public Domain*, DEADALUS, Spring, 2002, at 13, *available at* http://www.wcl.american.edu/pub/faculty/boyle/intprop.htm; *cf.* LAWRENCE LESSIG, THE FUTURE OF IDEAS (2001); Yochai Benkler, *Free as the Air to Common Use: First Amendment Constraints on Enclosure of the Public Domain*, 74 N.Y.U. L. REV. 354 (1999); Hannibal Travis, *Pirates of the Information Infra-*

can certainly be drawn. Professor Boyle compares the disappearance of the public domain (as a result of expanding intellectual property, contractual limitations, and DRM) to the privatization (and fencing off) of the commons. While both shifts in property governance achieve some social benefits (promoting more productive land use by overcoming the "tragedy of the commons" and providing incentives for creation), they impose social costs and contribute to economic inequality (by removing resources and ideas from the common pool and controlling their use). In another essay, Professor Boyle analogizes the new social activism surrounding the Internet to the formation of the environmental movement of the 1960s.[415] Parallels to the civil rights movement can also be drawn. Like these movements, the various components of the "digital freedom" movement rely upon a mix of protest, advocacy, litigation, grassroots organizing, and membership and foundation support to bring about social change. These emerging organizations and coalitions can be grouped loosely under a few general themes – open software, civil liberties, preserving balance in copyright law, consumer protection, artists' rights, and copyright education – although it is important to recognize that many of the organizations cut across multiple areas.

Open Software. The open software movement traces its origins to the early 1970s and the culture of collaborative research on computer software that existed in many software research environments. In an effort to perpetuate that model in the face of increasingly proprietary software, Richard Stallman, a former professor in MIT's Artificial Intelligence Laboratory, established the Free Software Foundation (FSF) to promote users' rights to use, study, copy, modify, and redistribute computer programs. Such rights obviously conflict with the default bundle of rights of copyright law. For that reason, FSF developed the GNU General Public License (GPL),[416] a complex licensing agreement designed to prevent programmers building proprietary limitations into "free" software.[417] Stallman set forth a task list for the development of

structure: Blackstonian Copyright and the First Amendment, 15 BERKELEY TECH. L.J. 777 (2000).

415. *See* JAMES BOYLE, A POLITICS OF INTELLECTUAL PROPERTY: ENVIRONMENTALISM FOR THE NET? (1997); *see also* Pamela Samuelson, *Toward A New Politics of Intellectual Property*, 44 COMMUNICATIONS OF THE ACM, Mar. 2001, No. 3, at 98.

416. GNU is an acronym for "Gnu's not UNIX," signifying that it is a non-proprietary UNIX-compatible (or interoperable) operating system.

417. *See generally* David McGowan, *The Legal Implications of Open Source Software*, 2001 ILL. L. REV. 241 (2001); Yochai Benkler, *Coase's Penguin, or Linux and the Nature of the*

a viable UNIX-compatible open source operating system.[418] Many programmers throughout the world contributed to this effort on a voluntary basis and by the late 1980s, most of the components had been assembled. The project gained substantial momentum in 1991 when Linus Torvalds developed a UNIX-compatible kernel, which he called "Linux." Torvalds structured the evolution of his component on the GNU GPL "open source" model. The integration of the GNU and Linux components resulted in a UNIX-compatible open source program (referred to as GNU/Linux) and has since become widely used throughout the computing world.[419] In the process, it has spawned a large community of computer programmers and service organizations committed to the principles of open source development. The growth and success of Linux has brought the open source movement into the mainstream of the computer software industry. Today, a variety of vendors, such as Red Hat, Caldera, and Debian, distribute open source software and it has an estimated 17 to 20 million users worldwide.[420]

The open software movement has itself contributed to other commercial and research endeavors. As noted in Part I, a central issue in the early microcomputer was whether copyright protection extended to the interoperability components of software programs. The American Committee for Interoperable Systems (ACIS) was formed in 1991 by a coalition of computer companies seeking to promote competition in their industry through limits on copyright protection for interface specifications. Although not committed in any way to the GNU GPL

Firm, 112 YALE L.J. 369 (2002), *available at* http://www.benkler.org/CoasesPenguin.html.

418. UNIX was initially developed by researchers at Bell Laboratories in 1969 in an effort to provide a general purpose operating system that was simple and elegant, written in a high level (human programmer readable) language (rather than assembly language), and allowed for re-use of code. The project largely succeeded, with most of the code written in the high level language C. A small amount of code, referred to as the kernel, was composed in assembly language. It became widely used because of its portability across multiple vendor hardware platforms, vendor independent networking, and the strength of its application programming interface. *See generally* Charles Severence, *A Brief History of UNIX, available at* http://vertio.hsrl.rutgers.edu/ug/unix_history.html. As Stallman discovered, however, computer manufacturers adapted it to their particular hardware. This interfered with the free computing environment that Stallman and other programmers valued. *See* Richard Stallman, *The GNU Project,* OPEN SOURCES (Mark Stone, et al. eds., 1999), *available at* http://www.gnu.org/gnu/thegnuproject.html.

419. Torvalds and a small group of programmers oversee the evolutionary process.

420. *See* Richard Stallman, *Web Databases: Science Must "Push Copyright Aside"* (June 8, 2001), *at* http://www.nature.com/nature/debates/e-access/Articles/stallman.html.

model, ACIS has pursued the more limited goal of promoting the legality of reverse engineering of computer software.[421] It has supported efforts to ensure that copyright law does not interfere with the functional enterprise of developing interoperable systems. As explained in Part I, the courts have adopted this interpretation of copyright law. Furthermore, as noted above, Congress has written a limited reverse engineering exemption for developing interoperable computer programs into the DMCA.

The open source movement has reinforced the freedom of computer scientists to engage in research into encryption and security systems – cryptography. The Center for Democracy and Technology and the Electronic Privacy Information Center have projects supporting this type of research as a means of improving security of communication and hence privacy on the Internet.[422] The Association for Computing Machinery (ACM), while not necessarily endorsing the open source movement, has generally supported the freedom of computer programmers to engage in research.[423] The defense of Professor Edward Felten and a more recent action lodged on behalf of encryption researcher Ben Edelman by the American Civil Liberties Union[424] seek to vindicate these research, privacy, and First Amendment interests as well.

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421. *See generally* Samuelson & Scotchmer, *supra* note 58.

422. *See* Center for Democracy and Technology Principles, *at* http://www.cdt.org/mission/principles.html (last visited Aug. 18, 2002); Electronic Privacy Information Center, *Cryptography Policy* ("Civil liberties and privacy advocates strongly oppose any attempts to require key escrow, key recovery or other means of accessing encryption keys, arguing that they are an unjustified restriction of individuals' fundamental privacy rights, detrimental to security, costly, subject to massive abuse, and ultimately ineffective crime prevention methods. Technology and security experts also oppose any restrictions on encryption, arguing that they would damage consumer trust in e-commerce transactions."), *at* http://www.epic.org/crypto/ (last visited Aug. 18, 2002).

423. The ACM is a scientific and educational organization comprising 80,000 members "dedicated to advancing the arts, sciences, and applications of information technology." *See* Association for Computing Machinery, *Overview of ACM*, *at* http://www.acm.org/about_acm/ov.html (last visited Aug. 18, 2002); *see also* Robert MacMillan, *Lobbying Group Protests Copyright-Protection Proposal*, NEWSBYTES, Oct. 1, 2001 (describing ACM's letter opposing Senator Hollings' proposed legislation calling for the imposition of mandatory anti-piracy controls on all digital media devices). The uproar over the DMCA's constraints on encryption research and publication of scientific results have led Stanford University to offer computer science students a policy course that includes coverage of the DMCA. *See* Lisa Bowman, *Programmers Enroll in Political Training* (June 10, 2002), *at* http://news.com.com/2100-1023-934543.html.

424. *See* Declan McCullagh, *On Trial: Digital Copyright Law* (July 25, 2002), *at* http://news.com.com/2100-1023-946266.html?tag=politech.

The open source philosophy also resonates within the peer-to-peer networking community and the hacker subculture. Although many applications of peer-to-peer technology serve to expand network functionality without undermining copyright protection,[425] the growing acceptance of unauthorized distribution of music and films by millions of high school and college students (among other Internet users) threatens to produce a new generation of citizens who question the legitimacy of copyright protection.[426] Over time, this growing segment of the population could play a significant role in electoral politics surrounding copyright law.

The hacker subculture represents a more immediate challenge for the content industries. This subculture manifests outright animus toward copyright protection as well as a more general defiance of authority.[427] Although less likely to play a public role in the debate over

425. Tim O'Reilly has become a focal point for this community. His website and press provide a clearinghouse for Linux, Open Source, and peer-to-peer networking. *See generally About O'Reilly* (2001), *at* http://www.oreilly.com/oreilly/about.html (last visited Sept. 20, 2002).

426. *See* John Schwartz, *Trying to Keep Young Internet Users From a Life of Piracy*, N.Y. TIMES, Dec. 25, 2001.

427. Richard Stallman proudly proclaims himself to be a "hacker," although he rejects the connotation of "hacker" as "security breaker." Rather, he interprets the term to mean "[s]omeone who loves to program and enjoys being clever about it.'" *See* Stallman, *supra* note 418. Not surprisingly, Stallman perceives copyright protection (as well as software patents) as antithetical to the progress of science, although in an intellectually rigourous manner. *Id.* Stallman refers to his GNU GPL model as a form of "copyleft," a clever inversion of "copyright." *See* Free Software Foundation, *What is Copyleft?*, *at* http://www.gnu.org/copyleft/copyleft.html; Ira V. Heffan, *Copyleft: Licensing Collaborative Works in the Digital Age*, 49 STAN. L. REV. 1487 (1997).

While Stallman presents a pro-science and libertarian justification for his conception of hacking, other "hackers" portray a darker, anti-social image that reinforces the "security cracker" profile. Eric Corley, the publisher who distributed the DVD decryption code through his online journal, *2600: The Hacker Quarterly*, captures this less enlightened defiance of authority associated with computer "hackers." Corley named his "hacker" journal after the frequency (2600 hertz) that formerly could be used to tap into "operator mode" on the AT&T telephone network so as to make long distance calls without charge. Prior to publishing DeCSS, Corley's journal published articles on "how to steal an Internet domain name, access other people's e-mail, intercept cellular phone calls, and break into the computer systems at Costco stores and Federal Express." Universal City Studios, Inc. v. Remeirdes, 111 F.Supp.2d 294, 308-09 (S.D.N.Y. 2000). Many hackers seem to care significantly more about getting free software and digital content than pushing the frontiers of science. *See* Jennifer 8. Lee, *Pirates on the Web, Spoils on the Street: Cracking Codes of Popular Software, A Small Group Can Wreak Havoc,* N.Y. TIMES, July 11, 2002, at E1; Reuters, *DrinkorDie Leader Pleads Guilty* (Feb. 27, 2002), *at* http://www.wired.com/news/politics/0,1283,50715,00.html.

copyright, the more extreme elements of the hacker community represent a substantial impediment to the distribution of encrypted content. Members of this community are motivated by the challenge or defiant thrill of defeating technological protection measures and use their substantial knowledge of computer systems to evade detection.[428] Their efforts to derail both the content and technology sectors' efforts to protect entertainment products, computer software, and computer games escalates the demand for stronger copyright protection and more intrusive enforcement efforts.

Civil Liberties. The relationship between civil liberties and intellectual property protection has become a contentious philosophical debate in the digital age.[429] Whereas many traditional libertarians view protection of intellectual property as part of a more general right to own property,[430] a new generation of thinkers have come to see such protection, particularly in the medium of cyberspace, as anathema to the freedom to think and innovate. Drawing upon Thomas Jefferson's natural rights insight that "ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature,"[431] John Perry Barlow's essay "The Economy of Ideas"[432] has emerged as a manifesto for the new libertari-

428. *See* Lee, *supra* note 427; Associated Press, *Feds Zero In on Piracy Ring* (Dec. 11, 2001), *at* http://www.wired.com/news/print/0,1294,49026,00.html; Michelle Delio, *Inside Russia's Hacking Culture* (Mar. 12, 2001) (describing the sophistication of Russian and Ukrainian hacking groups), *at* http://www.wired.com/news/culture/0,1284,42346,00.html.

429. *See generally* COPYRIGHTS: THE FUTURE OF INTELLECTUAL PROPERTY IN THE INFORMATION AGE (Adam Thierer & Clyde Wayne Crews, Jr. eds., 2002).

430. *See* James V. DeLong, *Defending Intellectual Property,* COPYRIGHTS: THE FUTURE OF INTELLECTUAL PROPERTY IN THE INFORMATION AGE 17 (Adam Thierer & Clyde Wayne Crews, Jr. eds., 2002).

431. *See* 13 THE WRITINGS OF THOMAS JEFFERSON 333-35 (Andrew A. Lipscomb & Albert Ellery Bergh eds. 1905) (Document 12, letter from Thomas Jefferson to Isaac McPherson, 13 Aug. 1813), *available at* http://press-pubs.uchicago.edu/founders/documents/a1_8_8s12.html.

432. *See* WIRED, Mar. 1994. Professor Lawrence Lessig expands upon this framework in his books, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD (2001) and CODE AND OTHER LAWS OF CYBERSPACE (1999). *See also* Benkler, *supra* note 417; *cf.* Russ Roberts, *Napsternomics: What's the Most Effective Way to Protect Intellectual Property?* (June 3, 2002) (suggesting, based on successful innovation of effective anti-theft vehicle protections in response to difficulty of enforcing automobile theft laws, that exposing the content industry to the risk of widespread piracy will produce better results (through strong market incentives for development of effective protec-

anism that resists intellectual property protection in cyberspace. Barlow questions whether a right of property can or should exist in a medium (digital networks) lacking physical structure or any significant cost of distribution.[433]

Inspired by, although not necessarily fully subscribing to this insight, a growing cadre of organizations have taken up the cause of advocating protection of civil liberties in the digital age. Some of these organizations, such as the Electronic Frontier Foundation (EFF) (on which John Perry Barlow serves on the Board) and Public Knowledge, focus their attention on the various ways in which copyright law limits access to and use of content and constrains the freedom of programmers and technology companies to innovate. Other organizations, such as the Center for Democracy and Technology and the Electronic Privacy Information Center, focus on protecting privacy. In particular, they see DMCA restrictions on cryptography research and dissemination of research as a threat to digital privacy. Such restrictions hinder the advancement of encryption and related privacy protections. Other organizations, such as the American Civil Liberties Union "Cyber-Liberties Project" and the Free Expression Network, fear that the expanding domain of copyright law threatens free expression. Some of these privacy advocacy organizations have begun to work with technology firms to resist intrusive means of combatting unauthorized distribution of content.[434]

These organizations have been particularly effective at using litigation to raise public awareness of civil liberty issues. They have been active in many of the high profile copyright cases noted above, both as counsel and amicus curiae. In addition, some of these organizations have mobilized online communities in efforts to affect law reform and

tion technologies) than other government mandates), *at* http://www.econlib.org/library/Columns/robertsnapster.html.

433. While recognizing that the Internet has substantially reduced the cost of disseminating information, traditional intellectual property theorists continue to value the role of intellectual property in motivating investment in intellectual creativity. *See* DeLong, *supra* note 430.

434. *See* Electronic Frontier Foundation, *Verizon Guards Client Privacy* (Aug. 23, 2002) (press release noting that 13 privacy and consumer advocacy groups have filed an amicus brief on behalf of Verizon, a major ISP, asking the judge to take into account a user's privacy rights and deny the RIAA's request for data on the activities and identity of Verizon's customers), *at* http://www.eff.org/Cases/RIAA_v_Verizon/20020830_eff_riaa_pr.html (last visited Sept. 26, 2002); Declan McCullagh, *Why Telecoms Back the Pirate Cause* (Aug. 27, 2002), *at* http://news.com.com/2102-1082-955417.html.

enforcement.[435] These organizations have also prepared policy papers,[436] assembled books and conference volumes,[437] and authored op-ed pieces articulating their views.

Preserving Balance in Copyright Law. The rapid expansion of copyright law during the past decade led in 1995 to the formation of the Digital Future Coalition (DFC), comprising educational, scholarly, library, and consumer groups, as well as consumer electronics, telecommunications, computer, and ISP industry organizations, to provide balance in litigation and policy discussions about copyright law's future.[438] This coalition, as well as its many constituent organizations, has advocated that copyright's limiting doctrines (fair use, first sale doctrine, preemption of state law, library exemptions) not be overridden in the push to safeguard copyrighted works in the digital age. In addition, various copyright professors have become active, submitting amicus curiae briefs in prominent cases.[439]

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435. Computer Professionals for Social Responsibility's Privacy and Civil Liberties Project (which was reorganized as the independent organization EPIC) successfully organized an electronic petition submitted by 50,000 Internet users ("netizens") urging the Clinton Administration to abandon a surveillance technology proposed by the FBI that carried strong overtones of Big Brother. The proposal would have mandated the use of a Clipper Chip, a cryptographic device purportedly intended to protect private communications while at the same time permitting government agents access to keys. *See* CPSR's Electronic Clipper Petition (Aug. 1995), *at* http://www.cpsr.org/program/clipper/cpsr-electronic-petition.html; *The Clipper Chip*, *at* http://www.epic.org/crypto/clipper/ (last visited Sept. 20, 2002). More recently, EFF successfully organized a campaign pressuring Adobe to drop its support for the prosecution of Dmitry Sklyarov. *See* Robert Lemos, *Adobe: Free the Russian Programmer* (July 23, 2001), *at* htttp://news.com.com/2100-1001-270440.html. EFF also led a campaign to permit Professor Edward Felten to present his encryption research concerning the SMI watermarking technology. *See* Stephanie Olsen & Lisa M. Bowman, *Free-speech Lawsuit Targets Record Industry* (June 6, 2001), *at* http://news.com.com/2100-1023-267940.html.

436. *See, e.g.,* Electronic Frontier Foundation, *Unintended Consequences: Three Years Under the DMCA* (May 3, 2002), *available at* http://www.eff.org/IP/DMCA/20020503_dmca_consequences.pdf; Jerry Berman & Paula Bruening, *Is Privacy Still Possible in the Twenty-first Century?,* SOCIAL RESEARCH, Spring 2001.

437. *See, e.g.,* MARC ROTENBERG, THE PRIVACY LAW SOURCEBOOK 2001: UNITED STATES LAW, INTERNATIONAL LAW, AND RECENT DEVELOPMENTS (2001); Michael J. O'Neil & James X. Dempsey, *Critical Infrastructure Protection: Threats to Privacy and Other Civil Liberties and Concerns with Government Mandates on Industry*, 12 DEPAUL BUS. L. J. 97 (1999).

438. *See* About the DFC, *A Description of the Digital Future Coalition*, *at* http://www.dfc.org/dfc1/Learning_Center/about.html (last visited Sept. 20, 2002).

439. *See, e.g.,* Amicus Brief from Law Professors for the Plaintiffs in MPAA v. 2600 Case (officially Universal v. Reimerdes) (Mar. 12, 2001), *available at* http://

Consumer Protection. A range of organizations have begun focusing on the implications of copyright law for consumers. Over the past two decades, several organizations have sought to protect consumer interests in the technology and copyright sphere. With strong support from the consumer electronics industry, the Home Recording Rights Coalition has sought to ensure that consumers have broad rights to use VCRs, DATs, MP3 players, and other technology for enjoying music and video content. The HRRC has also opposed any laws seeking to constrain the development of consumer electronic products. EFF also considers protection of consumer rights to be an important part of its mission. It recently filed a lawsuit on behalf of consumers seeking to establish the legality of using digital video recorders to record television content and use various features, such as the AutoSkip button for skipping advertisements.[440] This past year, DigitalConsumer.org was formed by a former high technology executive to focus specifically upon consumers' interests in the digital age.[441] The organization has established a Consumer Technology Bill of Rights to guide its advocacy projects and has become active on various fronts in which content industries seek to limit the use of consumer technology.

Artists' Rights. The battle over copyright's digital future has brought to the surface growing discontent within the recording artists' community concerning the contractual and licensing practices of the major record labels and their role in representing the diverse interests of the industry's many participants.[442] Although many recording artists ultimately supported the music industry's efforts to shut down Napster,[443] a few successful artists came out in support of Napster[444] while

www.eff.org/IP/Video/MPAA_DVD_cases/20010312_ny_law_profs_amicus_for_op.html.

440. *See* Joanna Glasner, *ReplayTV Users Sue Hollywood* (June 6, 2002), *at* http://www.wired.com/news/digiwood/0,1412,53019,00.html.

441. *See* DigitalConsumer.org, *at* http://www.digitalconsumer.org.

442. *See generally* Charles Mann, *The Heavenly Jukebox*, ATLANTIC MONTHLY, Sept. 2000, at 39, 50-51 (noting that most recording artists never cover their advances from record labels and hence do not typically receive royalties on their recordings); Courtney Love, *Courtney Love Does the Math* (June 14, 2000), *at* http://www.salon.com/tech/feature/2000/06/14/love/print.html. Recording artists have also become incensed by the duration of record contracts. *See* Mark Allwood, *Artists Gather to Protest Recording Contracts: California's 7-Year Rule* (Jan. 2002), *at* http://www.bet.com/articles/0,,c3gb1503-2162,00.html.

443. *See* John Borland, *Musicians Launch National Anti-Napster Campaign* (July 11, 2000), *at* http://news.com.com/2100-1023-243021.html.

others embraced the new digital environment.[445] A growing number of artists have questioned whether the major record labels and the RIAA adequately represent their interests in the debates over copyright law.[446]

Don Henley and Sheryl Crow formed the Recording Artists Coalition in 2000 to lobby for artists' rights.[447] It now includes more than 100 well-known artists and has focused its energies on securing a fair share of revenues from digital rights and loosening restrictions of the duration of recording contracts, among other issues. The Future of Music Coalition (FMC) was formed around the same time to provide an alternative voice for lesser known musicians and participants in the music industry in the transition to a digital platform.[448] While recognizing the importance of compensating creators, the FMC believes that RIAA focuses narrowly on the interests of the major labels to the detriment of song writers, artists, and smaller scale enterprises within the music industry.[449]

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444. *See* John Borland, *Rapper Chuck D Throws Weight Behind Napster* (May 1, 2000) (seeing Napster as a unique promotional tool for lesser known artists), *at* http://news.com.com/2100-1023-239917.html.

445. *See* Beth Lipton Krigel, *Tom Petty Joins MP3 Bandwagon* (Mar. 1, 1999) (noting the RIAA's fear that the MP3 format will fuel unauthorized distribution), *at* http://news.com.com/2100-1023-222361.html.

446. *See* John Borland & Patrick Ross, *Desperado Storms Capitol Hill* (Apr. 3, 2001) (quoting Alanis Morrisette as testifying that "for the majority of artists, this so-called 'piracy' may have actually been working in their favor"), *at* http://news.com.com/2100-1023-255228.html; Steve Morse, *Burned?*, BOSTON GLOBE, Apr. 21, 2002, at L1 (quoting rock artist Elvis Costello stating that the record labels "loaded the game so the house has been winning for a long time. Now it's time maybe for the house not to win for a while. Maybe they have to take some losses."); Janis Ian, *The Internet Debacle – An Alternative View,* PERFORMING SONGWRITER MAGAZINE, May 2002, *available at* http://www.janisian.com/article-internet_debacle.html; Music Revolt, The Newshour with Jim Lehr, Newshour (July 4, 2002) ("Don Henley, co-founder of the Eagles, is one of the leaders of the talent revolt. Although his band is one of the most successful groups in pop music history, selling over 100 million albums and climbing, Henley has emerged as an outspoken critic of the music business, arguing that its exploration of performers has run amok."), transcript *available at* http://www.pbs.org/newshour/bb/entertainment/July-dec02/musicrevolt_7-4.html.

447. *See generally* Recording Artists' Coalition Website, *at* http://www.recordingartistscoalition.com/ (last visited Sept. 20, 2002).

448. *See* Future of Music Coalition, *at* http://www.futureofmusic.org/fmcnews.cfm (last visited Sept. 20, 2002).

449. *See* Future of Music Coalition, *Future of Music Manifesto, The History of the Music Industry vs. The Future of Music* (June 1, 2000), *at* http://www.futureofmusic.org/manifesto/ (last visited Sept. 20, 2002).

A few artists have questioned the viability of existing music industry structures in the digital age. For example, David Bowie, one of the most successful recording artists, offers this perspective about the future of copyright law and the music industry:

> I don't even know why I would want to be on a label in a few years, because I don't think it's going to work by labels and by distribution systems in the same way. The absolute transformation of everything that we ever thought about music will take place within 10 years, and nothing is going to be able to stop it. I see absolutely no point in pretending that it's not going to happen. I'm fully confident that copyright, for instance, will no longer exist in 10 years, and authorship and intellectual property is in for such a bashing.
>
> Music itself is going to become like running water or electricity. So it's like, just take advantage of these last few years because none of this is ever going to happen again. You'd better be prepared for doing a lot of touring because that's really the only unique situation that's going to be left. It's terribly exciting. But on the other hand it doesn't matter if you think it's exciting or not; it's what's going to happen.[450]

Copyright Education. It also bears noting that the content industries themselves have recognized the importance of counteracting the emerging cultural norm supporting unauthorized distribution of content and building public support for strong copyright protection. The RIAA and MPAA have developed consumer education programs. In addition, the Copyright Society of the USA inaugurated Copyright Awareness Week in April 2002 with a series of events targeted principally at college students.[451]

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Whether the "digital freedom" movement will have the impact on public attitudes and law reforms that the environmental or civil rights movements achieved remains to be seen. The new wave of political

450. *See* John Pareles, *David Bowie, 21st-Century Entrepreneur*, N.Y. TIMES, June 9, 2002, *available at* http://www.nytimes.com/2002/06/09/arts/music/09PARE.html?todaysheadlines (last visited Sept. 20, 2002).

451. *See* The Copyright Society of the U.S.A., *Ways to Participate in Copyright Awareness Week 2002*, *at* http://www.law.duke.edu/copyright/html/events/CAWparticipate.pdf (last visited Sept. 20, 2002).

battles – centered on government imposition of anti-piracy controls in all digital devices and deputizing content industries to engage in aggressive self-help measures to curb digital piracy – will provide an important test of these organizations' ability to mobilize political support.[452] Even if they fall short, however, a range of legal and constitutional constraints – privacy law,[453] First Amendment jurisprudence,[454] and antitrust constraints[455] – may constrain copyright's further expansion.

D. The Next Chapter in Copyright Law's Digital Evolution

The next chapter of copyright law is currently being composed in the courts, the marketplace, and the political arena, where the forces described in the prior section actively vie to shape the governance of content and technology. Due to the high threshold for gaining political saliency, legislative change typically comes about only after interested parties have failed to reach satisfactory resolution through legal action, negotiation, and market solutions. The inability of content industries to plug the many points of intellectual property leakage through legal action or collaboration with the technology sector has generated significant pressure for political action. But unlike the political climate surrounding the passage of the DMCA just five years ago – in which the content and technology industries shared significant common ground and other interest groups lacked significant clout – the current political landscape affecting copyright reform is far less cohesive. Furthermore, the dramatic implications of peer-to-peer technology, the rapid pace of technological change, and the limited effectiveness of the DMCA raise serious questions about legislators'

452. Declan McCullagh, *Bring in the Geeks* (July 15, 2002) (describing an initiative by Public Knowledge, a "public-interest advocacy organization dedicated to fortifying and defending a vibrant 'information commons,'" to develop a database of 100,000 "geektivists" over the next six months, what is viewed a particular challenge given the reserved and generally apolitical profile of many compute geeks), *at* http://news.com.com/2010-1074-943785.html.

453. *See, e.g.*, Electronic Privacy Information Center, *In the Matter of Digital Entertainment and Rights Management, Before the Technology Administration, Department of Commerce* (July 17, 2002), *at* http://www.epic.org/privacy/drm/tadrmcomments7.17.02.html.

454. *See, e.g.,* Declan McCullagh, *On Trial: Digital Copyright Law* (July 25, 2002), *at* http://news.com.com/2100-1023-946266.html.

455. *See, e.g.,* Brad King, *And Now: Assault on Music Labels* (Oct. 19, 2001) (DOJ antitrust investigation into major-label-backed digital music services), *at* http://www.wired.com/news/mp3/0,1285,47698,00.html; Mark Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, __ CAL. L. REV. __ (forthcoming 2002).

ability to mandate effective copyright protection. These factors suggest that the copyright law will remain contentious and unsettled well into the future. Nonetheless, it is apparent that digital technology will push the development of copyright law in three significant new directions: enforcement, antitrust, and regulation.

1. Copyright Enforcement in the Digital Age: A War of Attrition

Whereas the first two waves of technology propelling copyright law – mechanical reproduction and broadcasting – focused principally upon establishing the basic contours of copyright protection and the division of new markets for exploiting works of authorship, digital technology brings the problem of enforcement to the fore.[456] The ability to distribute works over the Internet as well as the ability to mass produce high quality CDs and DVDs with inexpensive and widely available computer technology has made domestic enforcement of copyright a prime concern of content companies. They have devoted tremendous resources to enforcing their rights on the Internet, yet this effort, while growing, appears unlikely to stem the rising tide of unauthorized reproduction and distribution of copyrighted works. The inexorable advance of digital technology – faster chips, greater memory, larger and less physically constrained networks, more powerful software – and the large and entrenched hacker community will continue to open up new channels of distribution.

This process fuels an escalating war of attrition between content companies and those participants in unauthorized distribution of content. Although a successful outcome in the pending lawsuit against decentralized file-sharing technologies (such as KaZaa, Morpheus, and Grokster) could slow the financial harm to the record labels and forestall comparable losses to the film industry, it seems probable that decentralized technologies will continue to evolve that enable Internet users to access content through unauthorized channels. The content owners perceive that they must, however, wage this war if only to bolster the need for further legislation. As noted earlier, content owners have also begun to target ISPs (through DMCA take-down notices) and are considering going after individual Internet users, both through

456. Although copyright enforcement has long been a problem in some foreign markets, *see* MICHAEL P. RYAN, KNOWLEDGE DIPLOMACY: GLOBAL COMPETITION AND THE POLITICS OF INTELLECTUAL PROPERTY (1998), it has not been a core problem in the United States.

lawsuits and self-help measures. These measures will produce countermeasures, which will fuel pressure for stronger enforcement tools, such as the immunity for self-help measures contained in the proposed Peer-to-Peer Piracy Prevention Act. It seems unlikely, however, that file sharing can be pushed sufficiently underground to open up satisfactory opportunities for legitimate commerce in content through enforcement alone. Although enforcement will undoubtedly play a large role in copyright's future, pressure will continue to mount to implement some means of widescale technological measures to protect content.

2. Private Solutions, Antitrust Concerns

The ability of any single content company or even a broad coalition of content companies to address the growing piracy problem through unilateral action seems doubtful. Such a strategy risks consumer backlash and is unlikely to succeed in the face of clever hackers.[457] Once such protected content is decrypted, it will find its way into the same stream of shared content as other works. Thus, a collective solution – either through a broad consortium cutting across the content and technology sectors or public mandate – will be necessary to bring about effective protection of content in the digital age. Notwithstanding the failure of the SDMI consortium, congressional pressure and new opportunities could well produce a more successful effort. Any such consortium, however, would necessarily generate significant public oversight, either through antitrust scrutiny of the stan-

457. The few experiments that content companies have attempted with distribution of encrypted content have produced consumer complaints or proved ineffective. *See* Andy Patrizio, *A Sour Note for Mac Users* (May 14, 2002) (playing encrypted disks on Apple computers can cause the computer to crash), *at* http://www.wired.com/news/mac/0,2125,52513,00.html; Reuters, *CD Crack: Magic Marker Indeed* (May 20, 2002) (describing how consumers circumvented Sony's encryption for CDs by running a felt tip pen around the edge), *at* http://www.wired.com/news/technology/0,1282,52665,00.html. The software industry encountered similar problems in the mid-1980s when they introduced copy-protection into their products. *See* Julie A. Mark, *Software Copying Policies: The Next Step in Privacy Prevention*, 2 J.L & TECH. 43, 44-46 (1987); David M. Homik, *Combating Software Piracy: The Shoplifting Problem*, 7 HARV. J.L & TECH. 377, 413-14 (1994); Kory D. Christensen, *Fighting Software Piracy in Cyberspace: Legal and Technological Solutions*, 28 LAW & POL'Y INT'L BUS. 435, 466-71 (1997). The industry quickly moved on to alternative strategies.

dard setting process and licensing terms or through legislation substituting regulatory approval for antitrust review.[458]

Another possibility is the emergence of an effective *de facto* content protection standard from within the technology sector. The only company capable of implementing such a standard anytime soon is the Microsoft Corporation. As the developer of the operating system used by approximately 90% of microcomputers,[459] Microsoft could potentially build content protection into future editions of its Windows operating system. Along these lines, Microsoft has joined forces with Intel and Advanced Micro Devices, the leading two chip makers for microcomputers, to develop "Palladium," a microcomputer hardware and software system that would protect encrypted data inside microcomputers running Microsoft's operating system.[460] Data protected using the Palladium system could not be read or written to by other software running on the computer. This multi-purpose system could be used to protect users from computer viruses, safeguard security information, and enable digital rights management. While this new system may well provide a reasonably secure platform for distributing encrypted content, it will certainly raise antitrust concerns about Microsoft and the leading chip makers' efforts to leverage their market power into new markets.

3. The Shift from Property Rights to Regulation: Copyright as a Regulatory Regime

Given the urgency of the content industries' demand for new legislative protections, the pressure for new strategies appear unlikely to await the introduction of Palladium (tentatively slated for 2004).[461] At a minimum, the content sector seeks to use the threat of new legislation as a cudgel to motivate the technology sector toward a more secure platform and as a means to achieve universal adoption of antipiracy technology. Content owners are beginning to discover, however, that the political landscape surrounding copyright law has be-

458. *Cf.* Lemley, *supra* note 455 (describing the complex governance issues surrounding standard setting bodies).

459. *See* United States v. Microsoft Corp., 253 F.3d 34 (D.C. Cir. 2001).

460. *See* Paul Boutin, *Palladium: Safe or Security Flaw?* (July 12, 2002), *at* http://www.wired.com/news/antitrust/0,1551,53805,00.html; *see also* Ross Anderson, *TCPA/Frequently Asked Questions*, *Version 1.0*, *at* http://www.cl.cam.ac.uk/~rja14/tcpa-faq.html (last visited Aug. 6, 2002).

461. *See* Boutin, *supra* note 460.

come substantially more complicated since the passage of the DMCA, their last major legislative initiative. As noted earlier,[462] some commentators have analogized the growing array of interests focused upon copyright reform to the environmental movement of the 1960s. The parallel carries over to the expansion and polarization of political interest groups, the complex role of technology, and the emergence of regulation as an important mode of governance.

During prior eras of copyright reform, the players represented at the copyright legislation negotiating table largely shared a common interest in protecting content.[463] The principal disputes concerned how the spoils would be divided. In the present political climate, the principal economic forces – the music, film, and television industries on the one hand and the computer, ISP, telecom, and related technology industries on the other – hold somewhat differing views on the importance of protecting content and strongly opposing views on the means for achieving such protection — the former favoring government-imposed technology standards, the latter market-driven protections. Both sets of interests have strong incentives to invest in the legislative process due to the high stakes involved. Furthermore, various social groups have formed which see expansive copyright protection as a problematic governance regime. Political economists characterize this "conflictual demand pattern" for new legislation[464] as conducive to an outcome in which Congress delegates resolution of the problem to a regulatory agency.[465]

The DMCA applied such an approach to diffuse some of the controversy surrounding the anticircumvention provisions. Congress delegated to the Librarian of Congress authority to exempt any classes of copyrighted works where persons making noninfringing uses are likely to be adversely affected by the anticircumvention ban.[466] The DPR-

462. *See supra* text accompanying notes 414-15.

463. Broadcasters were a notable exception.

464. Political economists model the legislative process as an economic transaction in which interest groups form the demand side of the market and legislators form the supply side. *See generally* MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS (1965); J. BUCHANAN & G. TULLOCK, THE CALCULUS CONSENT (1962).

465. *See* Willaim F. Eskridge, Jr., *Politics Without Romance, Implications of Public Choice Theory for Statutory Interpretation*, 74 VA. L. REV. 275, 285-88 (1988).

466. *See supra* note 230.

SRA and the DMCA also used a regulatory framework for the setting (and adjusting) of compulsory license rates for webcasting.[467]

As in the environmental law field, such a regulatory model provides a means for promoting new technology, responding to the changing technological landscape, and balancing competing core principles. Just as the Clean Air Act Amendments of 1970 used the threat of regulatory mandates and legislatively-determined deadlines to foster the development of less polluting technologies,[468] the proposed Consumer Broadband and Digital Television Promotion Act would subject the content and technology sectors to regulation if they cannot develop satisfactory anti-piracy technology standards within a designated time frame (one year). Similarly, any standards – whether privately agreed or publicly dictated — would have to meet lofty goals set forth in the legislation (such as effectiveness in preventing piracy, reasonable cost, and accommodation of fair use), not unlike the lofty goals of environmental statutes (use of best available technology subject to availability and cost constraints, protection of human health). The proposed Peer-to-Peer Piracy Prevention Act also features both regulatory and technology-based provisions. Content companies engaging in self-help would be subject to oversight by the Attorney General and would be required to provide advance disclosure of the interdiction technology that they intended to use. This would provide the government with an early warning system for assessing how far self-help measures may go and for staying up to date on the latest in counter-piracy technology. The Federal Communications Commission has become a focal point in the development of standards for digital television.[469]

In prior debates over copyright reform, the protection of works of authorship occupied center stage. The Constitution's grant to Congress of the power "to promote the Progress of Science and useful Arts, by securing for Limited Times to authors and inventors the exclusive

467. *See* 17 U.S.C. § 114; David Nimmer, *Ignoring the Public, Part I: On the Absurd Complexity of the Digital Audio Transmission Right*, 7 UCLA ENT. L. REV. 189 (2000).

468. *Cf.* John E. Bonine, *The Evolution of "Technology-Forcing" in the Clean Air Act*, 5 BNA ENV'T RPTR., no. 13, July 25, 1975 (Monograph No. 21); Richard B. Stewart, *Regulation, Innovation, and Administrative Law: A Conceptual Framework*, 69 CAL. L. REV. 1256 (1981).

469. *See* Amy Harmon, *Lawmakers Seek Rules to Stop Redistribution of Digital TV*, N.Y. TIMES, July 23, 2002, *available at* http://www.nytimes.com/2002/07/23/technology/23DITI.html.

Right to their respective Writings and Discoveries"[470] was perceived as cutting solely in the direction of strong protection for the exclusive rights to make copies. Relatively modest exemptions for nonprofit organizations and "fair use" served to moderate the law, but few questioned the primacy of content protection. The effort to curtail piracy in the digital age has revealed an inherent conflict in Congress' mission "to promote of Progress of Science and the useful Arts": regulating digital devices in the name of content protection hinders progress of digital technology. Similarly in environmental policy, legislators came to see that pollution controls could impair economic growth. Regulation provided a means for balancing competing goals. As efforts to secure copyright protections increasingly collide with progress in the technology sector, we can expect regulatory institutions to evolve to balance these competing interests as well.

Copyright law has entered a new phase in which the government will play a more central and ongoing role in the implementation of copyright protection. As the broad array of groups interested in copyright law become more politically active and as technology advances, Congress will increasingly delegate authority to regulatory bodies and administrative officials will take on important roles in the implementation of complex standards as technology evolves. Content and technology industry associations will need to learn the art of compromise and copyright lawyers will need to learn a lot more about administrative law as this new era unfolds.[471]

Concluding Remarks

This article began with the equivocal omen "May you live in interesting times." Given the tense state of affairs surrounding copyright law, perhaps all that the divergent interests joining the debate can agree upon is that we live in such times. Following the printing press and the wireless, the digital age represents the third great wave of technology justifying, challenging, and, ultimately, reshaping copyright law. For Judge Newman and the rest of us who tend this field, the soils could not be more rocky.

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470. U.S. Const., art. 1, § 8, cl. 8.

471. *Cf.* Bonneville Int'l Corp. v. Peters, 153 F.Supp.2d 763 (E.D. Pa. 2001) (deferring to and upholding the Copyright Office's administrative "final ruling" that AM and FM radio broadcasting transmissions over the Internet are not exempt "nonsubscription broadcast transmission," and thus have to pay a public performance royalty).

Not knowing the precise meaning of this widely quoted phrase, I turned to the Internet for an explanation. Thanks to its enormous reach and searchability,[472] I quickly discovered that the origins of the phrase reinforce its sense of mystery and uncertain portent, and hence applicability to the future of copyright law. It apparently entered common parlance through a speech by Robert F. Kennedy in Cape Town, South Africa, on June 7, 1966, in which he said: "There is a Chinese curse which says, 'May he live in interesting times.' Like it or not, we live in interesting times. . . ." The phrase has since become a common expression, although its Chinese roots have proven difficult to trace. Some have speculated that it may be a liberal paraphrase of the Chinese proverb, "It's better to be a dog in a peaceful time that be a man in a chaotic period."[473] Professor Stephen E. DeLong[474] traces the phrase (and allusion to a Chinese curse) to a story by Duncan H. Munro (a pseudonym for Eric Frank Russell) entitled *U-Turn* published in the April 1950 issue of *Astounding Science Fiction:*

> For centuries the Chinese used an ancient curse: "May you live in interesting times!" It isn't a curse any more. It's a blessing. We're scientific and civilized. We've got so many rights and liberties and freedoms that one can yearn for chains for the sheer pleasure of busting them and shaking them off. Reckon life would be more livable if there were any chains left to bust.

Regardless of its origins, the phrase, especially in Russell's usage, embodies important elements of the contemporary challenges confronting content industries, technology companies, computer programmers, recording artists, legislators, jurists, and the public at large. It also anticipates the interplay of cyberspace, rights, and liberties that have come to dominate the battle over copyright's future. Whether such times represent a curse or a blessing remains to be seen. In the

472. The Internet's enormous reach and ease of search (with the use of various search engines) highlight one of the great tensions of surrounding the future of copyright law. Efforts to tame the Internet so as to reduce unauthorized distribution of copyrighted works may impair the development of even wider ranging and more accessible troves of information. Yet failure to protect works of authorship effectively may reduce the flow of new works.

473. *See* NOBLE (North of Boston Library Exchange), Reference File, *May You Live in Interesting Times*, *at* http://www.noblenet.org/reference/inter.htm (last visited Sept. 20, 2002).

474. *See* Stephen E. DeLong, *Sidebar: Get a(n Interesting) Life?* (June 12, 1996), *at* http://www.hawk.fab2.edu/sidebar/sidebar.htm (last visited Sept. 20, 2002).

vortex of "interesting times," it is often difficult to see the road ahead clearly.

In contrast to the largely surmountable difficulties posed by according copyright protection for computer software, digital reproduction and distribution technologies represent a profound challenge to the efficacy and role of copyright law. By reducing the costs of reproduction and distribution to levels enabling substantially anyone to reproduce and distribute works of authorship, often with little risk of detection, digital technology has eclipsed the effective limits of traditional copyright law. Notwithstanding recent amendments to copyright aimed at keeping pace with the new technological landscape, more recent innovations have quickly outstripped these enhanced protections. The effort to reform copyright to reflect the broad array of societal interests implicated in the face of rapid technological change will challenge legislators, jurists, the content and technology industries, the public, and copyright enthusiasts for many years to come.