

11-2004

Re-Reifying Data

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Recommended Citation

James Gibson, *Re-Reifying Data*, 80 Notre Dame L. Rev. 163 (2004).

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| | |
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| INTRODUCTION | 164 |
| I. EXISTING BEHAVIORAL CONSTRAINTS IN THE DATABASE MARKET | 172 |
| A. <i>Market Modalities: The Public Goods Problem</i> | 172 |
| B. <i>Legal Modalities: Maps, Charts, and Databases</i> | 174 |
| C. <i>Architectural Modalities: Exacerbating the Problem</i> | 179 |
| 1. Information Architecture and Transaction Costs .. | 179 |
| 2. Disincentivizing Utility | 181 |
| II. ARCHITECTURAL MODALITIES AND PRIVATE ORDERING OF DATABASE RIGHTS | 184 |
| A. <i>Focusing the Debate</i> | 184 |
| B. <i>Obviating the Legal</i> | 190 |
| C. <i>Technological Measures for the Pro-Expansionists</i> | 198 |
| 1. Existing Technological Measures | 199 |
| 2. Proposed Technological Measures | 203 |
| D. <i>Price Discrimination</i> | 204 |
| III. A TECHNOLOGICAL TOOLBOX | 215 |
| A. <i>The Sole-Source Problem</i> | 216 |
| B. <i>The Re-Reification Solution</i> | 230 |
| CONCLUSION | 241 |

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INTRODUCTION

Intellectual property is usually portrayed as the law's solution to the market's problem. Information is expensive to produce but cheap to copy, so left to its own devices the market will fail to yield a socially optimal volume of information goods. To overcome this underproduction problem, intellectual property offers a legal entitlement that allows information producers to prevent unauthorized copying and see a return on their investment. The law is thus the instrument that corrects market failure, steering society toward an optimal, welfare-enhancing output of information goods and striking the proper balance between private incentive and public benefit.

This understanding of intellectual property is certainly accurate, as far as it goes. But in the last several years, astute observers have recognized that the law is not the only instrument that one can use to solve the underproduction problem for information goods.¹ The law and the market do govern behavior, but so do other modalities. Indeed, the behavioral constraints that have recently garnered the most attention in the intellectual property field are not legal or economic, but "architectural"—i.e., imposed by the physical and technological characteristics, capabilities, and limitations of a given good.²

Architecture has always played an important role in the development of intellectual property law, because the market failure problem for information goods intensifies as technology reduces the cost of reproducing and disseminating information. In other words, the architectural medium in which information is reified makes all the difference. When information technology consisted of Sanskrit and stone tablets, an author could take comfort in the knowledge that the

1 See, e.g., Lawrence Lessig, *The Law of the Horse: What Cyberlaw Might Teach*, 113 HARV. L. REV. 501 (1999) [hereinafter Lessig, *Law of the Horse*] (exploring non-legal possibilities for defining intellectual property rights); Joel R. Reidenberg, *Lex Informatica: The Formation of Information Policy Rules Through Technology*, 76 TEX. L. REV. 553 (1998) (recognizing that technology can form a non-legal rule structure); see also LAWRENCE LESSIG, CODE AND OTHER LAWS OF CYBERSPACE (1999) [hereinafter LESSIG, CODE] (expanding on themes from Lessig, *Law of the Horse*, *supra*).

2 Lawrence Lessig coined the term "architectural" in his seminal essay *The Law of the Horse*, *supra* note 1. Lessig divided constraints on behavior into four categories: laws, social norms, market forces, and architecture; the latter refers to "the physical world as we find it, even if 'as we find it' is simply how it has already been made." *Id.* at 507. Lessig and others focus on one subset of architectural constraints: "code"—the technology of cyberspace. *Id.* at 509–10; Reidenberg, *supra* note 1 (discussing code as behavioral constraint). Code plays a significant part in my analysis as well, but I also examine the use of other, broader architectural modalities, such as physical possession of an object. Cf. Neal Kumar Katyal, *Architecture as Crime Control*, 111 YALE L.J. 1039 (2002) (discussing broad architectural constraints on crime).

amount of effort required to copy the information in his or her “book” approached the amount of effort required to write it in the first place—an architectural fact that would deter copying. As technology advanced, however, stone tablets and chisels gave way to printing presses and ink, and the physical res in which information was recorded became less of an impediment to copyists. Intellectual property law then stepped in, substituting a legal constraint on copying for the diminishing architectural constraint. Indeed, one can plausibly view the development of copyright law as a never-ending rearguard action against technology’s relentless reduction in copyists’ transaction costs.³

Intellectual property therefore solves a problem that is not purely a result of market forces. To be sure, information’s underproduction problem manifests in the marketplace, and has traditionally found its solution in the law, but it originates in architecture. In a pre-industrial world, we hardly see the problem at all. In the information age, we see it in spades.⁴ Today information is almost completely “de-reified”—i.e., released from the architectural constraints of a physical medium—giving rise to the shibboleth: “Information wants to be free.”⁵ Producers of information goods, of course, would disagree; in their view, not all information wants to be free. Free information wants to be free. Expensive information wants to make a profit.

Recognizing the threat posed by these developments in information architecture, producers of information goods have fought fire

3 For a thorough account of the interaction between technological advances and copyright law, see PAUL GOLDSTEIN, *COPYRIGHT’S HIGHWAY: FROM GUTENBERG TO THE CELESTIAL JUKEBOX* (rev. ed. 2003).

4 “[T]hese new technologies have enabled the liberation of information from its embodiment in worker or object. . . . [D]igitisation and the Internet [have] made possible the separation of pure information from embodiment, allowed its transmission through a variety of media and thus offered the potential of information itself as a commodity.” Paula Baron, *Databases and the Commodification of Information*, 49 J. COPYRIGHT SOC’Y U.S.A. 131, 142 (2001); see also *id.* at 153 (“Information embedded in old technologies, once published, was public, irrevocable, and provided a fixed copy. With the new technologies, privatised information, liberated both from object and any particular media, would become a service, not a product.”); cf. L. Ray Patterson, *Copyright Overextended: A Preliminary Inquiry into the Need for a Federal Statute of Unfair Competition*, 17 U. DAYTON L. REV. 385, 392–95 (1992) (calling copyright in compilations a “performance/service” copyright).

5 This saying is usually attributed to author, environmentalist, Merry Prankster, and technophile Stewart Brand. See R. Polk Wagner, *Information Wants to Be Free: Intellectual Property and the Mythologies of Control*, 103 COLUM. L. REV. 995, 999 n.14 (2003). For an online etymology of the expression, see Roger Clarke, *Information Wants to be Free*, at <http://www.anu.edu.au/people/Roger.Clarke/II/IWtbF.html> (last visited Sept. 9, 2003).

with fire. They have capitalized on an aspect of digital technology that makes it unique among the architectural developments in the history of intellectual property law: digital technology can both liberate information and enclose it. Thus digital goods are laden with code that constrains one's ability to access them, copy them, and use them: anticopying technology in DVDs,⁶ password requirements for online content,⁷ and so forth. The architectural problem has found an architectural solution, one that does not depend on the legal entitlements of intellectual property law.⁸ Technology is politics by other means.⁹

At the same time, producers of information goods have not relied on technology alone to protect their investment. They have also pursued an expansion of non-architectural modalities of constraint. Pro-expansionist publicity campaigns on the evils of digital piracy—complete with quotes from famous pop stars—seek to constrain behavior by changing social norms.¹⁰ Pro-expansionist lobbyists pressure fed-

6 See, e.g., *Universal City Studios, Inc. v. Reimerdes*, 111 F. Supp. 2d 294, 308 (S.D.N.Y. 2000) (discussing the Content Scramble System technology used to prevent digital duplication of DVD content).

7 For example, the popular online services Lexis and Westlaw require users to establish an account and use a password to access their news and legal databases. See Lexis, at <http://www.lexis.com> (last visited Oct. 1, 2004); Westlaw, at <http://www.westlaw.com> (last visited Oct. 1, 2004). Several prominent print publishers impose similar conditions on online access to content more than a few days old. See, e.g., *N.Y. TIMES ON THE WEB*, at <http://query.nytimes.com/search/advanced> (last visited Sept. 9, 2004); *WALL ST. J. ONLINE*, at <http://online.wsj.com/public/us> (last visited Sept. 9, 2004).

8 See Julie E. Cohen, *Copyright and the Jurisprudence of Self-Help*, 13 *BERKELEY TECH. L.J.* 1089, 1093 (1998) (“The same technologies that can be used to propagate information can also build fences around it.”).

9 This expression originates with Clausewitz: “[W]ar is simply a continuation of political intercourse, with the addition of other means.” *CARL VON CLAUSEWITZ, ON WAR* 605 (Michael Howard & Peter Paret trans., 1976).

10 See, e.g., Tim Wu, *When Code Isn't Law*, 89 *VA. L. REV.* 679, 743 (2003) (discussing recording industry's “Sound-Byting” publicity campaign to change attitudes of college students towards copyright); Frank Ahrens, *Stars Come Out Against Net Music Piracy in New Ads*, *WASH. POST*, Sept. 26, 2002, at A22 (reporting on Recording Industry Association of America anti-piracy advertising campaign that features quotes from Britney Spears, Stevie Wonder, Luciano Pavarotti, Eminem, and others). Social norms are one of the four categories of behavioral constraints that Lawrence Lessig identified in *The Law of the Horse*, along with laws, market forces, and architecture. See Lessig, *Law of the Horse*, *supra* note 1, at 507. An example of a social norm is plagiarism: no rule of law prohibits me from using a fellow professor's idea without attribution, but social pressure—in the form of academic contempt for plagiarists—nonetheless keeps me from doing so. To prove that this social norm does in fact constrain my behavior, I shall now give the citation for the plagiarism example: William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 *J. LEGAL STUD.* 325, 331 (1989); see also Stuart P. Green, *Plagiarism, Norms, and the Limits of Theft*

eral and state legislatures for enhanced legal entitlements in the form of lengthened copyright terms,¹¹ favorable changes to contract law,¹² and new intellectual property rights in databases and other collections of information.¹³

The most controversial aspect of the pro-expansionists' reaction to the digital dilemma, however, has been a combination of the technological and the legislative—an approach one might call “technological,” as it involves the legislative regulation of technological behavior in the market for information goods.¹⁴ Realizing the importance of technological access controls, anticopying software, and the

Law: Some Observations on the Use of Criminal Sanctions in Enforcing Intellectual Property Rights, 54 HASTINGS L.J. 167, 195–235 (2002) (discussing constraints on plagiarism and exploring their meaning for intellectual property law).

11 This lobbying effort was successful. See Sonny Bono Copyright Term Extension Act, Pub. L. No. 105-298, 112 Stat. 2827 (1998) (extending the copyright term for future and existing works by twenty years).

12 The pro-expansionists have met with mixed success in their efforts to reform contract law. They have secured several favorable judicial opinions, e.g., *Hill v. Gateway 2000, Inc.*, 105 F.3d 1147 (7th Cir. 1997) (holding that terms sent inside the packaging of a computer, which stated that they governed sale unless computer was returned within thirty days, were binding on the buyer, who did not return the computer); *ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447, 1449 (7th Cir. 1996) (holding that shrink-wrap licenses are enforceable unless the terms are objectionable on grounds applicable to contracts in general), but attempts to achieve an advantageous uniformity in state law on the licensing of digital information goods have instead polarized the debate, with two states enacting the pro-expansionist Uniform Computer Information Transactions Act (UCITA), see MD. CODE ANN., COM. LAW I §§ 22-101 to -816 (2003); VA. CODE ANN. § 43 (Michie 2003), and four others passing legislation that makes voidable any choice-of-law provision that seeks to have a contract interpreted under UCITA, see IOWA CODE § 554D.104(4) (2003); N.C. GEN. STAT. § 66-329 (2003); W. VA. CODE § 55-8-15 (2003); 2003 Vt. Acts & Resolves 44 (to be codified at VT. STAT. ANN. tit. 9, § 2463a). Indeed, the drafters of UCITA have signaled their pessimism about the legislation's future: in August 2003 they decided to “not expend any additional . . . energy or resources in having UCITA adopted.” Letter from K. King Burnett, President, National Conference of Commissioners on Uniform State Laws, to his Fellow Commissioners 2 (Aug. 1, 2003), available at http://www.nccusl.org/nccusl/ucita/KKB_UCITA_Letter_8103.pdf.

13 These efforts are still ongoing: in early 2004, two rival database bills emerged from two congressional committees, although neither proceeded any further in the 108th Congress. See 150 CONG. REC. D175 (daily ed. Mar. 3, 2004) (ordering reporting of Consumer Access to Information Act of 2004, H.R. 3872, 108th Cong. (2004), from House Energy and Commerce Committee); 150 CONG. REC. D11 (daily ed. Jan. 21, 2004) (ordering reporting of Database and Collections of Information Misappropriation Act, H.R. 3261, 108th Cong. (2003), from House Judiciary Committee). These bills were the latest in a long line of legislative attempts to regulate databases and other collections of information. See *infra* Part II.A.

14 Some of my colleagues have asked me how this new term “technological” is to be pronounced. My first reaction is always to answer: “Rarely.” But if one does want

like, the pro-expansionists have sought legal protection for these architectural constraints. Thus we have “technological” enactments like the Digital Millennium Copyright Act (DMCA), which imposes civil and criminal liability on those who circumvent technological measures designed to control access to a copyrighted work.¹⁵

Those opposed to this pro-expansionist campaign have not remained silent. They have strongly (although rarely successfully) objected to the establishment of new intellectual property entitlements like the extension of the copyright term¹⁶ and strong sui generis database rights.¹⁷ These anti-expansionists have also resisted and criticized the enactment of pro-expansionist technological measures like the DMCA.¹⁸ Yet despite their clear understanding of architecture’s

to say it out loud, I suggest pronouncing it just like “technological” except with “ledge” in the middle rather than “lodge”—i.e., tek-no-LEDGE-i-cull.

15 Digital Millennium Copyright Act, Pub. L. No. 105-304, § 103(a), 112 Stat. 2860, 2863–76 (codified at 17 U.S.C.A. § 1201(a) (West 2003)). A more recent example of a pro-expansionist technological measure is the Federal Communication Commission’s “broadcast flag” rule, which requires certain consumer electronics devices to incorporate technology designed to work with anti-piracy code built into digital broadcasts. Digital Broadcast Content Protection, 68 Fed. Reg. 67,599 (Dec. 3, 2003) (to be codified at 47 C.F.R. pts. 73, 76).

16 The anti-expansionists lost this battle in the Supreme Court. *Eldred v. Ashcroft*, 537 U.S. 186 (2003) (upholding the constitutionality of the copyright term extension for existing works).

17 See, e.g., 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, 440–46 (1999) (criticizing the Collections of Information Antipiracy Act); Jessica Litman, *After Feist*, 17 U. DAYTON L. REV. 607, 612 (1992) (arguing that even given strong sui generis rights, database owners would still seek to control access to data); Malla Pollack, *The Right to Know?: Delimiting Database Protection at the Juncture of the Commerce Clause, the Intellectual Property Clause, and the First Amendment*, 17 CARDOZO ARTS & ENT. L.J. 47, 99–111 (1999) (criticizing the DMCA on grounds that it favors copyright owners over users); J.H. Reichman & Pamela Samuelson, *Intellectual Property Rights in Data?*, 50 VAND. L. REV. 51, 113–36 (1997); J.H. Reichman & Paul F. Uhler, *Database Protection at the Crossroads: Recent Developments and Their Impact on Science and Technology*, 14 BERKELEY TECH. L.J. 793, 799–821 (1999) (arguing that new sui generis database rights would be damaging to science and education).

18 See, e.g., Benkler, *supra* note 17, at 414–29 (criticizing the DMCA); Glynn S. Lunney, Jr., *The Death of Copyright: Digital Technology, Private Copying, and the Digital Millennium Copyright Act*, 87 VA. L. REV. 813 (2001) (opposing the DMCA on the grounds that it serves private rather than public interests); David Nimmer, *A Riff on Fair Use in the Digital Millennium Copyright Act*, 148 U. PA. L. REV. 673, 726–42 (2000) (questioning the viability of the fair use doctrine under the DMCA). *But see* Jane C. Ginsburg, *Copyright and Control over New Technologies of Dissemination*, 101 COLUM. L. REV. 1613, 1619 (2001) (“The technological measures that reinforce legal control may enable and encourage authorial entrepreneurship, because authors may be able to rely on these measures to secure the distribution of and payment for their works.”).

importance as a behavioral constraint in the information age, anti-expansionists offer almost no affirmative technological measures of their own. They decry attempts to use architecture as an instrument of enclosure, but make few efforts to bolster its use as an instrument of liberation. They recognize the threat of technological enactments, but not their promise. Anti-expansionists play defense.¹⁹

It is hard to say why anti-expansionists are not more aggressive in using the law to produce architectural results that favor their policy outcomes. They have no trouble understanding the importance of architectural constraints to intellectual property law; indeed, it was an anti-expansionist who first articulated the distinction between law and architecture.²⁰ The more likely explanation is that anti-expansionists are simply reluctant to regulate technology, even in the service of their policy goals. They are willing to remove legal impediments to freedom of information, but not architectural ones. Using the law to regulate technology smells too pro-expansionist.

Another possibility is that anti-expansionists believe that a world of unregulated technology will yield a socially optimal outcome. Implicit in this belief is the assumption that, as long as there are no pro-expansionist technological measures like the DMCA in place, intellectual property law's public/private balance of legal entitlements will have its intended effect. This is hardly certain, and in fact is probably not true. In the absence of technological measures, digital architecture becomes a Wild West of technological one-upmanship that favors

19 A notable exception is Dan Burk's and Julie Cohen's *Fair Use Infrastructure for Rights Management Systems*, 15 HARV. J.L. & TECH. 41 (2001), which proposes a technological framework designed to give meaning to copyright's fair use doctrine. And Jessica Litman has recently suggested that the law should enforce a default rule favoring online music sharing by giving legal status to a particular digital file format. Jessica Litman, *Sharing and Stealing* 39–42 (Apr. 13, 2004) (unpublished manuscript, on file with author), available at <http://www.law.wayne.edu/litman/papers/sharing&stealing.pdf>. Cohen has also suggested technological measures that would limit the information that content providers can collect about those reading their goods, but her proposal is designed to protect online privacy rather than preserve intellectual property law's balance between private incentive and public benefit. See Julie E. Cohen, *A Right to Read Anonymously: A Closer Look at "Copyright Management" in Cyberspace*, 28 CONN. L. REV. 981, 1031–38 (1996) (advocating legislation to "outlaw intrusive, anonymity-destroying practices by copyright owners"); see also Julie E. Cohen, *DRM and Privacy*, 18 BERKELEY TECH. L.J. 575, 613–16 (2003) [hereinafter Cohen, *DRM*] (suggesting that the law should encourage technological standards that protect privacy); cf. Jack M. Balkin, *Digital Speech and Democratic Culture: A Theory of Freedom of Expression for the Information Society*, 79 N.Y.U. L. REV. 1 (2004) (arguing that technological regulation is key to promoting free-speech values in the digital era).

20 See Lessig, *Law of the Horse*, *supra* note 1, at 507–08 (explaining the difference between law and architecture).

the better technologist. If it is easier to enclose than liberate, information producers prevail, and public entitlements fall by the wayside. If it is easier to liberate than enclose, hackers prevail, and private incentive is undermined. In either case, legal modalities—no matter how carefully constructed—will have a reduced impact, or none at all.

In this Article, I argue that this reluctance on the part of anti-expansionists to embrace technological measures is a mistake and represents a missed opportunity. Technological regulation is critical to giving true meaning to intellectual property law's legal entitlements. In making this point, I focus on one front in the current battle over the expansion of intellectual property rights: whether databases and other collections of information should be the subject of a new set of legal entitlements. The database debate is an instructive case study for several reasons. First, it is a clean slate—an area in which intellectual property entitlements do not yet exist²¹ and direct technological measures have yet to be implemented.²² It is accordingly an area in which policymakers have a great deal of flexibility, and in which pro-expansionists might be willing to trade technological restrictions for new legal rights.²³ Second, digital architecture affects databases in a

21 One might argue that because facts are excluded from copyright's coverage, see *Feist Publ'ns., Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 344–46 (1991) (stating that facts are not copyrightable because they are not original), intellectual property law has created an implicit entitlement here, i.e., that legal rights in factual data default to the public. Assuming this is the case, it simply illustrates the need for technological measures: if database developers place technological obstacles in the public's path, so that it cannot access the facts in the databases, its legal entitlement to those facts is meaningless. (In any event, no one in the database debate has suggested any private entitlement in facts themselves; the focus is on protecting the effort expended in compiling facts in a database. See *infra* notes 178–81 and accompanying text.) In some instances state misappropriation law also protects factual compilations, but its narrow scope and susceptibility to federal preemption renders it relatively ineffective as an intellectual property regime. See *Nat'l Basketball Ass'n v. Motorola, Inc.*, 105 F.3d 841, 848–54 (2d Cir. 1997) (analyzing partial preemption and holding that “only a narrow ‘hot-news’ misappropriation claim survives preemption for actions concerning material within the realm of copyright”).

22 Although no existing technological measure was specifically designed to buttress a database entitlement, there are two technological statutes on the books that might nonetheless aid database developers. See *infra* Part II.C.1.

23 Reichman & Samuelson, *supra* note 17, at 156 (noting that “database publishers . . . have now staked a claim to subject matter that world intellectual property law had left unprotected as a building block of scientific and technological progress” and should therefore be willing to give “a measure of support for the public-good uses” of their products); see also Jane C. Ginsburg, *Copyright, Common Law, and Sui Generis Protection of Databases in the United States and Abroad*, 66 U. CIN. L. REV. 151, 152 (1997) (“[E]xtra-copyright protection may be so effective that *sui generis* regulation [of databases] may afford a desirable readjustment of the balance between incentives to

unique way. When a collection of data assumes digital form, it becomes simultaneously more valuable to society, more vulnerable to market failure, and less viable as a subject of existing legal modalities. This means that there is a good case for database rights in the digital world. Indeed, even most anti-expansionists support the enactment of some entitlement; the question is scope, not subsistence.²⁴ Finally, the database market is new and diffuse enough that social norms do not significantly constrain behavior.²⁵

Part I of this Article demonstrates how market forces, intellectual property law, and digital architecture have conspired to make the case for a new intellectual property entitlement for database developers. Part II discusses how digital architecture threatens to obviate any entitlements that are enacted, describes existing and proposed pro-expansionist technological measures that already pose threats to sound database policy, and rebuts the notion that these architectural and technological measures will result in welfare-enhancing price discrimi-

produce initial compilations, and access to create new, and especially derivative, information products.”); Jacqueline Lipton, *Balancing Private Rights and Public Policies: Reconceptualizing Property in Databases*, 18 BERKELEY TECH. L.J. 773, 787 (2003) (“Designing a new database model that uses property rights to *limit* a database producer’s ability to create market monopolies may be the most effective way to prevent database makers from using contractual and technological measures to create property rights that are impervious to any competing uses of the information.”).

24 See, e.g., Patterson, *supra* note 4, at 407–10 (asserting that factual collections should be afforded protection for a limited time, against competitors only, not encompassing the contents of the work, and “subject to forfeiture for predatory pricing”); Pollack, *supra* note 17, at 123–44 (advocating statutory protection that would protect only databases at risk of market failure); Reichman & Samuelson, *supra* note 17, at 137–51 (suggesting unfair competition and modified liability approaches to database protection). Of course, sometimes the best legislative solution to market failure is to pass no legislation at all. See R. H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 18 (1960) (“All solutions have costs and there is no reason to suppose that government regulation is called for simply because the problem is not well handled by the market or the firm.”). In this case, however, architecture (if left unregulated) will solve the problem itself, and not in a way that serves social welfare. See *infra* Part II.B. Some regulation of architecture through technological measures is therefore necessary, and the most plausible way to enact that regulation is as part of a database entitlement. See *infra* Part III.

25 Some segments of the database market do follow important social norms, such as the tradition of sharing data freely among scientists and researchers. See J.H. Reichman & Paul F. Uhlir, *A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment*, 66 LAW & CONTEMP. PROBS. 315, 322–24 (2003) (describing the scientific community’s “sharing ethos”). The technological tool of re-reification, however, might allow such communities to opt out of new legal entitlements and technological restrictions and instead continue to govern themselves. See *infra* Part III.B.

nation. Finally, Part III evaluates how various anti-expansionist technological tools can be used to resolve the main issues in the database debate. The most promising tool in the technological toolbox is what I call re-reification: requiring each database developer to reduce its database to a technologically unfettered, freestanding medium—an accessible, physical res—and to deposit a copy of the database in that form with a central clearinghouse. The timing and breadth of public access to this re-reified copy would vary depending on the legal entitlements that emerge from the database debate, but in every case the independent existence of the freestanding version would act as a check on the developer's ability to use architectural constraints to override those entitlements. Re-reification is thus a technological tool flexible enough to give meaning to whatever legal rights—strong or weak—policymakers adopt. It merely impedes the ability of database developers to achieve technologically what they are not given legally.

I. EXISTING BEHAVIORAL CONSTRAINTS IN THE DATABASE MARKET

In the last dozen years, a confluence of economic, legal, and architectural forces has given rise to a debate over whether databases and other organized compilations of information should be the subject of a new regime of intellectual property protection. Understanding the interaction of these diverse and discrete behavioral constraints is necessary to understanding how a coherent resolution of the database debate must include direct regulation of the architectural aspects of databases. The following discussion therefore examines the market problem that databases face, the absence of any existing legal solution, and the exacerbating effect that the modern architecture of databases has had on the problem.

A. *Market Modalities: The Public Goods Problem*

The case for database protection rests on the notion that market forces alone will produce a suboptimal number of database products from the standpoint of overall social welfare.²⁶ This market failure results because information is a public good. Public goods have two

²⁶ See, e.g., H.R. REP. NO. 106-349, at 9–10 (1999) (articulating a legislative need to “protect developers against piracy and unfair competition, and thus encourage continued investment in the production and distribution of valuable commercial collections of information”); GOLDSTEIN, *supra* note 3, at 197–99 (advocating for a sui generis law to “achieve a desired level of innovation” in databases); Reichman & Samuelson, *supra* note 17, at 137 (stating that legal protections are required to avert market failure and yield net social benefits).

defining characteristics. First, they are nonexcludable: once they are made public, their producer cannot readily control who can and cannot use them. Second, they are nonrival: one user can enjoy a public good without depleting any other user's ability to do so as well.²⁷ The light from a lighthouse is a common example of a public good.²⁸ Once the light is publicly available—i.e., once it is turned on—the lighthouse owner will be unable to prevent any given ship from using the light in its navigation. The light is therefore nonexcludable. And one ship's use of the light does not diminish the light available for the next ship to use. The light is therefore nonrival.

Nonexcludability poses problems for the production of public goods. If the lighthouse owner lacks the ability to exclude ships from using the light, he or she lacks the ability to demand fees from those ships, and therefore cannot recoup the expense of building the lighthouse in the first place. So even if the cost of building and maintaining the lighthouse is less than the value it provides to local shipping—i.e., even if its construction would increase overall social welfare—the lighthouse's nonexcludability will prevent its construction. A socially inefficient result obtains.

The nonrival nature of public goods also leads to market inefficiencies. A perfectly nonrival good's marginal cost of production (and therefore its socially efficient price) is zero, because its producer incurs no cost in making the good available to an additional user. Charging a price greater than zero will thus result in suboptimal production—yet the producer will have to charge a price greater than zero if it is to recoup the initial cost of creating the good. So even if

27 Thomas Jefferson eloquently explained these concepts in a discussion of the ephemeral nature of ideas:

If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of everyone, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me.

Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813), in *THE COMPLETE JEFFERSON* 1011, 1015 (Saul K. Padover ed., 1943).

28 See, e.g., MICHAEL PARKIN, *MICROECONOMICS* 372 (6th ed. 2003). For a detailed discussion of the real-world economics of lighthouses, see R. H. Coase, *The Lighthouse in Economics*, 17 *J.L. & ECON.* 357 (1974) (focusing on historical practice and challenging conventional wisdom that public construction and maintenance is the only viable solution to this public goods problem).

our lighthouse owner can somehow make the light excludable and collect fees, some ships that would benefit from the light will be unwilling or unable to pay the price the owner charges. From the standpoint of social welfare, excluding such ships from the use of the nonrival good represents an inefficient “deadweight loss.”²⁹

Data pose the same public goods problem as our hypothetical lighthouse. The developer of a database may expend substantial time and effort in researching and assembling the data. Once a single copy of the database is published, however, the developer has little ability to exclude anyone from making and distributing competing copies, and the price it can demand will therefore quickly be driven down toward the marginal cost of producing copies.³⁰ Yet at that price, the developer may not be able to recover the investment made in the initial compilation, and will therefore have no incentive to produce the database in the first place. A database—or, more precisely, the information contained therein—is also the sort of good that one user can enjoy without depleting the supply available for others.³¹ Any price much above zero will result in suboptimal production and deadweight loss, even though the developer may have to charge a higher “recoupment price” in order to recover its compilation costs.

B. *Legal Modalities: Maps, Charts, and Databases*

The preceding discussion shows that the market alone fails to bring about the efficient production of public goods, whether we are talking about lighthouses or databases. For information goods, the primary solution to this underproduction problem has been a system

29 A deadweight loss is a reduction in social welfare resulting from a market inefficiency. See STEVEN E. LANDSBURG, *PRICE THEORY AND APPLICATIONS* 253 (5th ed. 2002). Part II.D of this Article discusses the extent to which architectural modalities can empower producers to use price discrimination to remedy the problem of deadweight loss.

30 “Because the demand for accuracy usually makes the cost of producing information works high while modern technology tends to make the effort in copying them low, the profits of first-movers are at considerable risk, absent some form of legal protection.” Rochelle Cooper Dreyfuss, *A Wiseguy’s Approach to Information Products: Muscling Copyright and Patent into a Unitary Theory of Intellectual Property*, 1992 SUP. CT. REV. 195, 197; see also Gideon Parchomovsky & Peter Siegelman, *Towards an Integrated Theory of Intellectual Property*, 88 VA. L. REV. 1455, 1458–59 (2002) (“The cost of copying innovative products and original expressive works is invariably lower than the cost of producing them initially, and in a competitive market the price will be driven down to the marginal cost of copying.”) (footnote omitted).

31 It is for this reason that I use the term “user” rather than “consumer” when discussing information goods; their nonrival nature means that they are not “consumed” upon use.

of private legal entitlements—intellectual property rights. These entitlements allow the producer of an information good to prohibit certain uses of the good while the right lasts. For example, anyone who copies a novel without the author's permission will be subject to a judgment for damages and an injunction under copyright law.³²

In other words, intellectual property uses a legal modality to convert a nonexcludable good into a partly excludable good, thus giving the producer the power to inhibit competition from copyists. It is accordingly the instrument with which the law achieves the improvement in social welfare that nonexcludability obstructed.³³ With information goods rendered partly excludable, private parties have an incentive to produce and disseminate them, secure in the knowledge that the law will support their efforts to recoup the expense they incurred in creating the goods. And the public at large benefits from valuable products that would otherwise not be available.³⁴ This system of entitlements also partly solves the problem of nonrival goods and deadweight loss, as those who value the information good at less than

32 Assuming that the threshold requirements for copyright law are met, *see* 17 U.S.C. § 102(a) (2000), making an unauthorized copy of the novel would violate the copyright owner's exclusive right of reproduction, *id.* § 106(1). As to remedies, *see id.* §§ 502 (injunctive relief), 504 (damages).

33 *See* Yochai Benkler, *Constitutional Bounds of Database Protection: The Role of Judicial Review in the Creation and Definition of Private Rights in Information*, 15 *BERKELEY TECH. L.J.* 535, 577 (2000) ("The economic function of intellectual property rights is to provide the legal entitlement that makes information goods partly excludable.").

34 This description of intellectual property law follows the American model, which focuses on improving social welfare, and which is enshrined in the Constitution's Intellectual Property Clause. *See* U.S. CONST. art. I, § 8 (granting Congress the power "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries"). Intellectual property law in other countries, and particularly in Europe, tends to derive more from Lockean labor theory and notions of authors' rights than from the utilitarian approach described here. *See* PAUL GOLDSTEIN, *INTERNATIONAL COPYRIGHT* 3–4 (2001) ("The tradition of author's rights is rooted in the civil law system and prevails in the countries of the European continent and their former colonies in Latin America, Africa, and Asia."). *But see id.* at 4 (finding similarities between the two approaches in practice on important points); Jane C. Ginsburg, *A Tale of Two Copyrights: Literary Property in Revolutionary France and America*, 64 *TUL. L. REV.* 991 (1990) (examining origins of French and American copyright systems and concluding that their underlying principles have much in common). And even within the United States, commentators disagree about how extensive intellectual property rights need to be in order to maximize social welfare. *See* Neil Weinstock Netanel, *Copyright and a Democratic Civil Society*, 106 *YALE L.J.* 283, 308–11 (1996) (contrasting the traditional economic incentive approach with the newer and more expansive neoclassicist approach).

the recoupment price may acquire it in the aftermarket,³⁵ may use it in a way that is not covered by the entitlement,³⁶ or may wait until the right expires and then obtain it for free.³⁷

This system of private legal entitlements originally covered factual works like databases. Indeed, the first federal copyright legislation, enacted in 1790 by the First Congress, extended to only three kinds of works, two of them factual: maps, charts, and books.³⁸ Copyright therefore initially protected the explorer's careful surveying and the mariner's painstaking soundings as much as it protected the novelist's creative efforts. A mapmaker could legally make a map through independent authorship—i.e., by independently conducting a survey, through the sweat of his or her own brow—but copyright law prohibited making a map by copying an existing map.³⁹ Free-riding on the efforts of another (at least without consent) was forbidden.

Beginning in the nineteenth century, however, copyright law embraced a new paradigm, one that did not focus on the labor necessary to produce a work. Under this new paradigm, protection could be acquired merely by expressing one's singular individuality in a work. The manifestation of creative, subjective judgment brought the work within the scope of copyright law, regardless of the effort expended in

35 Copyright's first sale doctrine, for example, prohibits the producer of a copyrighted good from controlling the downstream distribution of that good. 17 U.S.C. § 109(a) (2000). This allows libraries, used book stores, and other aftermarket outlets to supply certain deadweight customers—those who lacked the ability or willingness to pay the price that the producer charged.

36 Examples from copyright law include making a "fair use" of a copyrighted work, *id.* § 107, or copying the idea contained within the work, *id.* § 102(b).

37 Depending on the nature of the entitlement, the low-value user might have to wait a long time. Copyright protection for individually authored works currently expires seventy years after the author's death, with a similarly lengthy term for institutionally authored works. 17 U.S.C.A. § 302 (West 2004). Patent protection, in contrast, usually lasts only twenty years. 35 U.S.C. § 154(a)(2) (2000).

38 See Act of May 31, 1790, ch. 15, § 1, 1 Stat. 124, 124.

39 *E.g.*, *Banks v. McDivitt*, 2 F. Cas. 759, 760 (C.C.S.D.N.Y. 1875) (No. 961) ("The compiler of a digest, a road book, a directory, or a map can search and survey for himself in the fields which all laborers are permitted to occupy, but cannot adopt as his own the products of another's toil."); *Emerson v. Davies*, 8 F. Cas. 615, 624 (C.C.D. Mass. 1845) (No. 4436).

[T]he true test of piracy or not is to ascertain whether the defendant has, in fact, used the plan, arrangements, and illustrations of the plaintiff . . . or whether his work is the result of his own labor, skill, and use of common materials and common sources of knowledge, open to all men.

Id.

creating it.⁴⁰ Even a momentary, inadvertent feat of personal expression—such as that caused by “bad eyesight or defective musculature”—made the resulting work uniquely the author’s own, and thus qualified it for copyright protection.⁴¹ At first, this new “high authorship” paradigm coexisted with the paradigm that protected factual, “low authorship” works like maps and charts, and each independently provided a basis for invoking copyright.⁴² Over time, however, creative authorship became the primary justification for copyright protection, and the notion of gaining protection through mere “sweat of the brow” fell into disfavor.

The culmination of this trend was the Supreme Court’s 1991 decision in *Feist Publications, Inc. v. Rural Telephone Service Co.*,⁴³ a case

40 See Jane C. Ginsburg, *Creation and Commercial Value: Copyright Protection of Works of Information*, 90 COLUM. L. REV. 1865, 1881–88 (1990) (discussing the evolution of the legal basis for intellectual property rights from labor to individualized creativity). Justice Holmes famously captured this new paradigm in *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 250 (1903).

The copy is the personal reaction of an individual upon nature. Personality always contains something unique. It expresses its singularity even in handwriting, and a very modest grade of art has in it something irreducible, which is one man’s alone. That something he may copyright unless there is a restriction in the words of the act.

Id.

41 *Alfred Bell & Co. v. Catalda Fine Arts, Inc.*, 191 F.2d 99, 105 (2d Cir. 1951).

42 Ginsburg, *supra* note 40, at 1889–93. The terms “high authorship” and “low authorship” are Ginsburg’s. See *id.* at 1866 (using “low authorship” to describe “personality-deprived information compilations such as directories, indexes, and data bases”); *id.* at 1870 (using “high authorship” to describe works that manifest a subjective authorial presence).

43 499 U.S. 340 (1991). By the time the Court granted certiorari in *Feist*, see 498 U.S. 808 (1990), a split had emerged between, on the one hand, the Seventh and Eighth Circuits, which continued to use copyright law to protect the effort involved in compiling factual works, and, on the other, the Second, Ninth, and Eleventh Circuits, which rejected this “sweat of the brow” doctrine in favor of a requirement that all copyrighted works exhibit creative choice. Compare *W. Publ’g Co. v. Mead Data Cent., Inc.*, 799 F.2d 1219, 1223–27 (8th Cir. 1986) (holding that the exercise of “intellectual labor” may earn a work copyright protection), and *Schroeder v. William Morrow & Co.*, 566 F.2d 3, 5 (7th Cir. 1977) (holding that “only ‘industrious collection’ . . . is required for copyright protection”), with *Worth v. Selchow & Righter Co.*, 827 F.2d 569, 573–74 (9th Cir. 1987) (rejecting the “sweat of the brow” theory and finding that the defendant did not infringe when it used a copyrighted fact book as a source of questions for its Trivial Pursuit board game), *Fin. Info., Inc. v. Moody’s Investors Serv., Inc.*, 808 F.2d 204, 207 (2d Cir. 1986) (holding that copyright protection does not depend on “the amount of effort the author expends”), and *S. Bell Tel. & Tel. Co. v. Associated Tel. Directory Publishers*, 756 F.2d 801, 809–10 & n.9 (11th Cir. 1985) (rejecting notion that “industrious collection” can result in copyright protection).

familiar to every law student who has studied copyright in the last decade. Rural Telephone, the plaintiff in *Feist*, was a local telephone company that had compiled a print database, a typical white-pages directory of its customers. Feist Publications published its own telephone directory, which covered Rural's customer base but also encompassed a broader geographical area. Feist offered to pay Rural for the use of Rural's listings in this directory, but Rural refused. Feist therefore copied some of Rural's listings without permission and integrated them into its wide-area directory.

Rural sued for copyright infringement.⁴⁴ The Court held for Feist, categorically rejecting the "sweat of the brow" doctrine as a basis for copyright protection and fixing instead on subjective, creative authorship alone as the threshold requirement:

The *sine qua non* of copyright is originality. To qualify for copyright protection, a work must be original to the author. Original, as the term is used in copyright, means only that the work was independently created by the author (as opposed to copied from other works), and that it possesses at least some minimal degree of creativity.⁴⁵

According to *Feist*, original efforts were not enough; indeed, they were irrelevant. Rather, original expression, in the sense of creative expression, was the key. Because facts were not subjectively created, but objectively discovered, copyright protection could not subsist in mere facts, no matter how great an investment had been made in their compilation.⁴⁶ The Court grounded its holding not only in the extant copyright statute, but also in the Constitution⁴⁷—an important point, as this meant that Congress thereafter lacked the power to protect factual compilations under the Intellectual Property Clause.⁴⁸

44 *Feist*, 499 U.S. at 342–44.

45 *Id.* at 345 (emphasis added) (citation omitted).

46 *Id.* at 345–48. Some scholars have questioned the validity of distinguishing between objectively discovered facts and individually created expression. *E.g.*, Jane C. Ginsburg, *Sabotaging and Reconstructiong [sic] History: A Comment on the Scope of Copyright Protection in Works of History After Hoehling v. Universal City Studios*, 29 J. COPYRIGHT SOC'Y U.S.A. 647, 657–60 (1982) (debunking the "Platonic fact precept" that facts are objective truths awaiting discovery); Jessica Litman, *The Public Domain*, 39 EMORY L.J. 965, 996–97 (1990) (arguing that "facts are no more 'out there' than are plots, words, or sculptural forms"); *cf.* WILLIAM WORDSWORTH, *THE PRELUDE, OR GROWTH OF A POET'S MIND* 53 (Ernest de Selincourt ed., Oxford Univ. Press 1926) (1850) ("[W]e multiply distinctions, then / Deem that our puny boundaries are things / That we perceive, and not that we have made.").

47 See *Feist*, 499 U.S. at 346–47.

48 See U.S. CONST. art. I, § 8. In a sense, then, *Feist* did us a favor. By couching its holding in constitutional terms, the Court eliminated the possibility (perhaps the probability) that Congress would simply amend the Copyright Act to cover databases.

The Court's ruling did not mean that every database or other collection of facts was ineligible for copyright protection. But to qualify, the facts had to be *presented* in some creative fashion, and copyright would attach only to the manner of presentation. In other words, creativity inherent in the "selection or arrangement" of the facts in the compilation would be protected, but not the facts themselves or the effort expended in compiling them.⁴⁹ This sealed Rural's fate, as the data in its listings (name, town, and telephone number) evinced no subjectivity in their selection, and the arrangement of the listings (alphabetically by surname) was likewise "devoid of even the slightest trace of creativity."⁵⁰ Feist was thus free to copy the listings, individually or in their entirety.⁵¹

C. Architectural Modalities: Exacerbating the Problem

Together, the public goods problem and the *Feist* decision mean that current economic and legal modalities may not provide for the optimal production of databases. At the same time, two architectural aspects of databases, both prompted by the digitization of data products, have made the underproduction threat worse.

1. Information Architecture and Transaction Costs

The first effect of digital technology on database protection relates to the costs of accessing, copying, and disseminating information

As it now stands, in order to protect databases Congress must create a new entitlement outside the bounds of any existing intellectual property regime, which gives it and us an opportunity to think more deeply about the proper balance of legal entitlements, to evaluate the behavioral constraints that bear on the issue, and to demand more of the pro-expansionist supplicants. See Reichman & Samuelson, *supra* note 17, at 156 (noting that "database publishers . . . have now staked a claim to subject matter that world intellectual property law had left unprotected as a building block of scientific and technological progress" and should therefore be willing to give "a measure of support for the public-good uses" of their products).

49 *Feist*, 499 U.S. at 350–51 ("A factual compilation is eligible for copyright if it features an original selection or arrangement of facts, but the copyright is limited to the particular selection or arrangement."); *id.* at 358 ("Facts are never original, so the compilation author can claim originality, if at all, only in the way the facts are presented.")

50 *Id.* at 362–63.

51 As noted *supra* text accompanying note 39, even if the Court had embraced the "sweat of the brow" doctrine, Feist would have had no copyright exposure if, instead of copying Rural's listings, it had conducted its own independent collection efforts. Feist's directory, however, contained four fictional listings that Rural had inserted into its white pages—proof positive that Feist had engaged in at least some wholesale copying. *Feist*, 499 U.S. at 344.

goods. Although information in its pure, de-reified form is nonexcludable and nonrival, and is thus vulnerable to the public goods problem, the real-world architectural constraints of the medium in which information is presented—the res in which it is reified—tend to limit the extent of the problem.⁵² Consider information stored in a book. Before invention of the printing press, the amount of effort required to copy the book's information approached the amount of effort required to write it in the first place. The investment the copyist would have to make thus acted as a built-in, architectural disincentive against copying; although the information in the book was nonexcludable and nonrival, the high transaction costs of copying the book itself—the reified information—made the good moderately excludable. The architectural limitations of the early print medium thus helped to avert market failure, even in the absence of legal entitlements.

Since Gutenberg, however, technology has steadily reduced the transaction costs of copying books, through such innovations as moveable type, stereotypy, linotype, photocopying, and so forth. The information in a book becomes less excludable and less rival as technology makes it less expensive to access, copy, and disseminate. Digital technology has had this effect across the range of information goods, bringing them ever closer to perfect nonexcludability and nonrivalrousness. In the digital realm, information is almost completely de-reified, freed from any architecturally restrictive medium. The negligible cost of reproducing and disseminating digital information makes exclusion difficult, and perfect, durable digital copies make information goods nonrival in a way that relatively impermanent paper, celluloid, and vinyl never could.⁵³ And although this ar-

52 Adam R. Fox, *The Economics of Expression and the Future of Copyright Law*, 25 OHIO N.U. L. REV. 5, 11 (1999) (“[I]nformation’s relative exclusivity depends upon the nature of the selected medium responsible for its communication, because that actually determines the cost of access to the information.”).

53 Of course, digital architecture does not represent the first time that information has been effectively de-reified. The first major technological assault on the reification paradigm was radio and television broadcasting. The broadcasting challenge, however, was met by an economic model that has not proved suitable to digital goods: information was provided to the end-user at no charge, but was “bundled” with advertising that provided the payback. See James Boyle, *Cruel, Mean, or Lavish? Economic Analysis, Price Discrimination and Digital Intellectual Property*, 53 VAND. L. REV. 2007, 2016 (2000) (“By moving the business model from sale of content to viewers, to sale of eyeballs to advertisers, the excludability problem is ‘solved.’”). Only when broadcasting gave way to distribution of public programming by hard-wired cable networks did it become possible to charge directly for the delivery of copyrighted television content—i.e., to make television an excludable information good. Despite some initial

chitectural problem affects all information goods, it has had a particular impact on those that, like databases, do not have available many legal means to increase excludability.

2. Disincentivizing Utility

The impact of reduced transaction costs is felt by all information goods, but the other pertinent effect of digital technology is particular to databases. The natural tendency for database producers in the post-*Feist* world is to design their products so as to take advantage of what little copyright law now offers them. If copyright protection only attaches when data in factual works are selected and arranged in a creative fashion, then database developers will seek to select and arrange their data in a way that reflects creative, subjective authorship (or will at least argue in court that their selection and arrangement are creative). Not surprisingly, this is what has happened in the dozen years since *Feist* was handed down.⁵⁴

Even if subjective authorship were not necessary for copyright protection, however, the developer of a database in print form might exercise some subjectivity in designing its product. Because the architecture of the print medium forces data into a static organization, the print compiler must necessarily engage in some guesswork as to the assortment and presentation of facts that its audience will find most useful. A telephone directory organized alphabetically by surname is all well and good for the homebody who wants to find a friend's number, but the door-to-door salesman might want it organized by street address. The fundraiser would like a telephone book that includes data on income and assets. The demographer wants to know age and gender. A print database that attempted to satisfy all these disparate

optimism, however, advertising has not been able to perform the same function in the online environment as it did in broadcasting; instead, direct commodification of digital content has become the norm. See, e.g., Pamela Samuelson, *Mapping the Digital Public Domain: Threats and Opportunities*, 66 LAW & CONTEMP. PROBS. 147, 168 (2003) ("While some have hoped that advertising would provide a sustainable revenue stream through which digital content providers could recoup investments, this seems a less viable long-term strategy after the dot.com bust."); *The Internet Sells Its Soul*, ECONOMIST, Apr. 20, 2002, at 65, 65 ("As the many dotcoms that have already gone bust discovered, making money on the web is not easy—especially from advertising.").

54 See, e.g., *Warren Publ'g, Inc. v. Microdos Data Corp.*, 115 F.3d 1509, 1517–18 (11th Cir. 1997) (en banc) (rejecting an argument for creative selection in a print directory of communities served by cable television); *EPM Communications, Inc. v. Notara, Inc.*, 56 U.S.P.Q.2d (BNA) 1144, 1147–48 (S.D.N.Y. 2000) (accepting a claim of creative selection in a sourcebook's choice of what information would be of interest to the licensing industry).

demands would quickly prove unwieldy, as it would contain an excess of data, arranged over and over in multiple permutations.

Some subjective selection and arrangement of data can therefore be a useful feature in a print directory—and if it happens to make copyright protection more likely, so much the better for the compiler. Yet in many cases, the most advantageous selection and arrangement will be the least subjective, and thus the least likely to garner copyright protection. This was the case in *Feist*, which found insufficient originality in white pages that selected the name and phone number of everyone in a given geographical area and arranged that information alphabetically by surname.⁵⁵ Such a presentation of data was “so commonplace that it has come to be expected as a matter of course. . . . It is not only unoriginal, it is practically inevitable.”⁵⁶ What *Feist* does for databases, then, is create a tension between making a directory intuitive, thorough, and user-friendly on the one hand, and making it amenable to copyright protection on the other.

Digital architecture greatly exacerbates this tension. Computer technology de-reifies data, freeing them from the static mold of the print directory; the end-user, not the compiler, determines the arrangement.⁵⁷ Digitization also makes data products both more architecturally compact and more manageable, thereby encouraging the inclusion of all remotely relevant information.⁵⁸ And because a digital database’s end-users can so easily filter out information that they consider irrelevant to their purposes, the developer has no reason not to be overinclusive. Thus static arrangement is replaced by dynamic manipulation, and subjective selection by comprehensive inclusion. In digital form, our telephone directory can include all available information—name, number, address, income, assets, age, gender, etc.—and leave it to the homebody, door-to-door salesman, fundraiser, and

55 *Feist*, 499 U.S. at 362–63.

56 *Id.* at 363.

57 Information in a database “can be arranged and retrieved in variations limited only by the capabilities of the computer and the sophistication of the retrieval program. In such a context there is no particular arrangement to protect.” Robert C. Denicola, *Copyright in Collections of Facts: A Theory for the Protection of Nonfiction Literary Works*, 81 COLUM. L. REV. 516, 531 (1981).

58 A four-and-three-quarter-inch CD can store the equivalent of 300,000 typed pages, or up to 4.8 billion characters, depending on the compression technology used. Sarah Laidlaw Tilevitz, *Reconciling Space and Access Needs in a Small Law Firm Library: A “Modest Proposal,”* 88 LAW LIBR. J. 96, 107 (1996). A single DVD can have twenty-five times that storage capacity. Tom R. Halfhill, *CDs for the Gigabyte Era*, BYTE, Oct. 1996, at 139, 139.

demographer to decide individually how to select and arrange the data.⁵⁹

These architectural aspects of digital databases are a good thing from the standpoint of overall social welfare. A database that includes more information, while at the same time giving the end-user greater control and discretion in extracting and using that information, is much more valuable to society than its comparatively ineffectual print predecessor.⁶⁰ But as databases become de-reified, they also become even less likely to meet *Feist's* originality standards. It is difficult to portray a comprehensive database as subjectively selective,⁶¹ and it is nearly impossible to claim that data stored in ones and zeros have any inherent arrangement, let alone a creative one.⁶² Digital technology thus takes the thin copyright protection that factual works could aspire to after *Feist* and renders it downright anorexic.⁶³

59

In a data base, such as a catalogue of all holdings of the Library of Congress, or an unannotated compendium of all federal appellate court decisions, the compiler aims to be exhaustive, not selective. The utility of the data base is its comprehensiveness; selection according to subjective criteria or intuition would defeat the purpose. Moreover, since individual users interrogate the data base according to their own search criteria, arrangement of data would appear irrelevant.

Ginsburg, *supra* note 40, at 1900–01 n.138.

60 In fact, when a print database “goes digital,” it essentially allows the creation of a near-infinite number of derivative works. If one were to take a print directory organized by name and reorganize it by street address, the result would be a new, derivative compilation. Yet in the digital medium, the same database—as long as it was sufficiently architecturally unfettered—would allow both manners of organization, without the creation of a separate work. This both calls into question the need for strong derivative rights in databases and shows how architectural constraints can inhibit innovation.

61 See, e.g., *Warren Publ’g, Inc. v. Microdos Data Corp.*, 115 F.3d 1509, 1518 (11th Cir. 1997) (en banc) (holding that selection of data in factual compilation was not original because compiler had selected “the entire relevant universe known to it”). Interestingly, both *Warren* and *EPM* involved defendants who had converted a plaintiff’s print database into digital form. See *id.* at 1512; *EPM Communications, Inc. v. Notara, Inc.*, 56 U.S.P.Q.2d (BNA) 1144, 1146 (S.D.N.Y. 2000).

62 This has not kept commentators from gamely trying to find ways to bring digital databases within *Feist's* requirements. See, e.g., Jack B. Hicks, Note, *Copyright and Computer Databases: Is Traditional Compilation Law Adequate?*, 65 TEX. L. REV. 993, 1014, 1022–23 (1987) (arguing that the design of digital databases involves creative arrangement because designers physically locate more popular data on that part of the digital medium from which it can be retrieved with minimal access time).

63 Cf. *Key Publ’ns, Inc. v. Chinatown Today Publ’g Enters., Inc.*, 945 F.2d 509, 514 (2d Cir. 1991) (noting with regard to print directory that “[w]hile, as the Court pointed out in *Feist*, the ‘copyright in a factual compilation is thin,’ we do not believe

The implications are troubling. The more logical and intuitive the organization of the data, the less likely it is to secure a copyright. The more comprehensive the assemblage of facts, the less likely it is to receive any legal protection. The law discourages the very data products that are the most useful and valuable to the public.⁶⁴ It disincentivizes utility.

II. ARCHITECTURAL MODALITIES AND PRIVATE ORDERING OF DATABASE "RIGHTS"

A. *Focusing the Debate*

The foregoing discussion demonstrates that the current legal modalities of intellectual property law do not provide an adequate solution to the market failure problem that databases face, and that certain architectural aspects of digital databases serve only to exacerbate the problem. The reaction of database developers to this conundrum, not surprisingly, has been to pursue an expansion of legal entitlements, a new public ordering of database rights. This lobbying

it is anorexic" (quoting *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 349 (1991)).

64 See *Collections of Information Antipiracy Act: Hearing on H.R. 354 Before the Subcomm. on Courts and Intell. Prop., House Comm. on the Judiciary*, 106th Cong. 214 (1999) [hereinafter *H.R. 354 1999 Hearing*] (statement of Michael K. Kirk on behalf of Am. Intell. Prop. L. Ass'n) ("Surely the adequacy of the existing regime for protecting databases under copyright must be questioned when it presumably grants greater protection to a smaller, highly selective database of arguably less general utility than to a large, all inclusive database of more general utility."); U.S. COPYRIGHT OFFICE, REPORT ON LEGAL PROTECTION FOR DATABASES 74-75 (1997).

[I]t is precisely those databases that require the greatest amount of investment and may be the most valuable to users whose copyright status is most doubtful: the massive, comprehensive database covering the entire universe of a given field, produced in electronic form with the arrangement of the data not fixed by the producer but chosen by each individual user.

Id.; Michael Steven Green, *Copyrighting Facts*, 78 IND. L.J. 919, 920 (2003) ("By dispensing with conventional modes of presentation, selection, and arrangement, [databases] can easily fail to satisfy traditional standards for copyrightability, leaving them with virtually no legal protection against copying."); John F. Hayden, Recent Development, *Copyright Protection of Computer Databases After Feist*, 5 HARV. J.L. & TECH. 215, 230 (1991) ("This leads to the troubling result that a more useful database is less likely to be protected than its less useful counterpart."); Lipton, *supra* note 23, at 808-09 ("[T]he more commercially valuable the database is, the less likely it is to achieve copyright protection."); Jeffrey C. Wolken, Note, *Just the Facts, Ma'am: A Case for Uniform Federal Regulation of Information Databases in the New Information Age*, 48 SYRACUSE L. REV. 1263, 1276-79 (1998) (noting that *Feist's* selection and arrangement requirements functionally prevent most databases from achieving meaningful copyright protection).

campaign was energized by the European Union's 1996 passage of a directive that instructed its member countries to establish a strong *sui generis* database right—one that would apply to American databases only if equivalent legislation were enacted in the United States.⁶⁵

The immediate result of the U.S. lobbying effort was a series of three federal bills, none of which was enacted.⁶⁶ The bills varied somewhat, but each conditioned its grant of rights on an investment of substantial resources in the making of the compilation⁶⁷ and provided a remedy against the unauthorized extraction of “all or a substantial part” of the data if the extraction harmed the compiler's actual market or a potential or related market.⁶⁸ These proposals essentially sought a broad *sui generis* entitlement that, like copyright, would reach far into downstream derivative markets.⁶⁹

65 See Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the Legal Protection of Databases, 1996 O.J. (L 77) pmb1. 56 [hereinafter *E.U. Database Directive*]. For an analysis of the impact of the E.U. directive on internationalization of database protection, see J.H. Reichman, *Database Protection in a Global Economy*, 2002 REVUE INTERNATIONALE DE DROIT ECONOMIQUE [R.I.D.E.] 455.

66 Collections of Information Antipiracy Act, H.R. 354, 106th Cong. (1999); Collections of Information Antipiracy Act, H.R. 2652, 105th Cong. (1998); Database Investment and Intellectual Property Antipiracy Act of 1996, H.R. 3531, 104th Cong. (1996). H.R. 3531 never made it out of committee; the last official action consisted of introductory remarks on the House floor. 142 CONG. REC. 12,483–84 (1996). H.R. 2652 passed the House twice, once on its own, 144 CONG. REC. 9,681 (1998), and once as Title V of the Digital Millennium Copyright Act, 144 CONG. REC. 18,783 (1998), but it failed to reach the Senate floor. The House Judiciary Committee reported H.R. 354 to the full House, which took no action on it. 145 CONG. REC. 23,423 (1999). A fourth bill, the Consumer and Investor Access to Information Act of 1999, H.R. 1858, 106th Cong. (1999), was offered by opponents of the more expansive approach and was accordingly narrower in scope; it made it out of the Commerce Committee to the House floor, but advanced no further. 145 CONG. REC. 23,423 (1999).

67 The first bill required “a qualitatively or quantitatively substantial investment of human, technical, financial or other resources in the collection, assembly, verification, organization or presentation of the database contents.” H.R. 3531 § 3(a); see also *E.U. Database Directive*, *supra* note 65, art. 7 (using similar language). The two subsequent bills made the entitlement contingent on the “investment of substantial monetary or other resources.” H.R. 354 sec. 2, § 1402(a); H.R. 2652 § 1202.

68 H.R. 354 § 1402(a); H.R. 2652 § 1202; H.R. 3531 § 4(a)(1). The fourth bill, which did not have widespread support within the database industry, merely gave the Federal Trade Commission the power to prevent and punish a competitor's sale of a duplicate database as an illegal trade practice. H.R. 1858 §§ 102, 107.

69 Two of the bills purported to use misappropriation or unfair competition principles, see H.R. 354, sec. 2; H.R. 2652, sec. 2, but the breadth of conduct that they proposed to regulate made it look as if they were in fact pursuing a *sui generis* intellectual property right rather than a mere ban on unfair competition. H.R. REP. NO. 106-349, at 11 (1999) (admitting that H.R. 354 offered protection “comparable” to a *sui generis* right); Benkler, *supra* note 33, at 537–38 (“House Bill 354 . . . creat[es] a

In contrast, the more recent legislative offerings derive from “hot news” and misappropriation models that are inherently narrower in scope.⁷⁰ The misappropriation proposal would apply to any database that results from a substantial expenditure of resources and would forbid unauthorized distribution of a quantitatively substantial part of the database—but only when the distribution occurs “in a time sensitive manner,” threatens the needed incentive to produce the database, and displaces the developer’s sources of revenue.⁷¹ The database industry has been surprisingly supportive of this approach, given its comparatively limited coverage.⁷² Probably less popular with database developers is the “hot news” approach, which applies only to

property right in raw information in all but name”); Ginsburg, *supra* note 23, at 171–76 (characterizing proposals as sui generis legislation). And these two bills were to become part of title 17 of the U.S. Code, where the Copyright Act resides, which suggests that they were establishing property rights and not an unfair competition tort. In contrast, the first bill to be introduced, H.R. 3531, was to be placed in Title 15, where federal unfair competition statutes like 15 U.S.C. § 1125(a) are codified. For more on the significance of placing any new database legislation in Title 17, see *infra* Part II.C.2 (discussing relevance to database debate of precise wording of technological provisions of the DMCA).

70 See Consumer Access to Information Act of 2004, H.R. 3872, 108th Cong. (2004) (“hot news” model); Database and Collections of Information Misappropriation Act, H.R. 3261, 108th Cong. (2003) (misappropriation model). Calling only one of these bills a “hot news” model is perhaps a bit inaccurate, as both bills’ liability standards are clearly based on the “hot news” case of *National Basketball Ass’n v. Motorola, Inc.*, 105 F.3d 841 (2d Cir. 1997). *National Basketball Ass’n* allowed a private right of action under New York law where:

(i) a plaintiff generates or gathers information at a cost; (ii) the information is time-sensitive; (iii) a defendant’s use of the information constitutes free riding on the plaintiff’s efforts; (iv) the defendant is in direct competition with a product or service offered by the plaintiffs; and (v) the ability of other parties to free-ride on the efforts of the plaintiff or others would so reduce the incentive to produce the product or service that its existence or quality would be substantially threatened.

105 F.3d at 845. *National Basketball Ass’n* in turn derives from *International News Service v. Associated Press*, 248 U.S. 215 (1918), which recognized an unfair competition claim based on a defendant’s “taking material that has been acquired by complainant as the result of organization and the expenditure of labor, skill, and money, and which is salable by complainant for money” and “appropriating it and selling it as its own.” *Id.* at 239. The important differences between the bills are that only H.R. 3261 provides for a private right of action, and H.R. 3872 applies to a narrower range of data. Compare H.R. 3872 §§ 2, 4 with H.R. 3261 §§ 3, 7.

71 H.R. 3261 § 3.

72 See *Database and Collections of Information Misappropriations, Joint Hearing Before the Subcomm. on Courts, the Internet and Intell. Prop., House Judiciary Comm., and the Subcomm. on Commerce, Trade, and Consumer Prot., House Comm. on Energy and Commerce*, 108th Cong. 21–22 (2003) (testimony of Keith Kupferschmid on behalf of Coalition

“highly time-sensitive” data (and which in its latest incarnation would be enforceable only by the Federal Trade Commission, rather than by an aggrieved individual database developer itself).⁷³

These proposals have given rise to a great deal of scholarly comment on the merits and proper form of any legal entitlement that implicates compilations of data. This scholarship questions the need for any added incentive for database development,⁷⁴ raises doubts about the constitutionality of a database entitlement under *Feist* and the First Amendment,⁷⁵ and expresses concern about impeding access

Against Database Piracy), available at <http://energycommerce.house.gov/108/Hearings/09232003hearing1086/Kupferschmid1712.htm>.

73 H.R. 3872 § 2(b)(2). Neither H.R. 3872 nor H.R. 3261 advanced beyond committee approval, a failure probably occasioned by their rivalry. Indeed, the House Energy and Commerce Committee took the unusual step of unfavorably reporting H.R. 3261 on the same day that it favorably reported H.R. 3872. See 150 CONG. REC. D175 (daily ed. Mar. 3, 2004). In contrast, the House Judiciary committee favorably reported H.R. 3261, see 150 CONG. REC. D11 (daily ed. Jan. 21, 2004), and did not consider H.R. 3872 at all.

74 See, e.g., Benkler, *supra* note 33, at 595–96 (questioning the empirical evidence supporting a bill to provide protection to real-time market data providers); Benkler, *supra* note 17, at 445 (“[T]here is little evidence to suggest that the database industry is suffering, or that the proposed law will address such a problem without doing more harm than good.”); Litman, *supra* note 17, at 611–12 (noting that the database industry is “burgeoning, dynamic, and immensely profitable” even without clear legal protection); Richard A. Posner, *Misappropriation: A Dirge*, 40 Hous. L. Rev. 621, 635–37 (2003) (reasoning that existing law provides adequate protection to database owners); Reichman & Samuelson, *supra* note 17, at 123 (noting that the U.S. database industry dominates the world market for databases); Reichman & Uhler, *supra* note 25, at 408 (asserting that “there is no credible evidence that the market for databases has been under-supplied or under-invested in the United States, even though the share of U.S. commercial databases in the world market has declined somewhat in the last ten years”); Reichman & Uhler, *supra* note 17, at 814 (stating that “[p]ractically all databases developed in the pursuit of basic research and education are motivated by non-economic incentives such as the desire to create knowledge, the thrill of discovery, and the enhancement of professional status”).

75 See, e.g., Benkler, *supra* note 33, at 575–600 (concluding that the Intellectual Property Clause limits Congress’s power to create intellectual property rights); Jane C. Ginsburg, *No “Sweat”? Copyright and Other Protection of Works of Information After Feist v. Rural Telephone*, 92 COLUM. L. REV. 338, 367–87 (1992) (discussing Congress’s constitutional authority to create protections for compiled information); Paul J. Heald, *The Extraction/Duplication Dichotomy: Constitutional Line-Drawing in the Database Debate*, 62 OHIO ST. L.J. 933, 944–45 (2001) (questioning the constitutionality of legislation denying public use of facts in published works on an original meaning basis); Thomas B. Nachbar, *Intellectual Property and Constitutional Norms*, 104 COLUM. L. REV. 272, 280 (2004) (noting that “as a result of *Feist*, [databases] probably cannot be granted protection pursuant to the copyright power”); Pollack, *supra* note 17, at 61 (concluding that Congress has authority to protect databases under the Commerce Clause only if the act is limited to situations of market failure); Reichman & Samuelson, *supra* note

to and use of data by downstream users, such as scientific researchers and value-adding competitors.⁷⁶ But scholars have paid scant attention to the role of architecture in database regulation. When the scholarship does mention the architectural, it often conflates it with or subsumes it within the issue of legal entitlements.⁷⁷

17, at 144–45 (asserting that an unfair competition approach would be viable under the First Amendment and *Feist*); Reichman & Uhler, *supra* note 17, at 833–36 (arguing that facts that copyright law places in the public domain “cannot constitutionally be withdrawn from public use under the First Amendment by a database law that protects against extraction and use on both primary and derivative markets”); *see also* Memorandum from Jonathan Band, Morrison & Foerster LLP, to NetCoalition 12–17 (Jan. 15, 2004) (on file with author) [hereinafter Band Memorandum] (discussing H.R. 3261’s constitutional infirmities).

76 *See, e.g.*, Benkler, *supra* note 33, at 569–74 (discussing the constitutional importance of “Progress” and the impact of altering the strength of intellectual property rights thereupon); Pollack, *supra* note 17, at 115–20 (expressing concern that strong database protections would impede scientific progress); J.H. Reichman, *Saving the Patent Law from Itself: Informal Remarks Concerning the Systemic Problems Afflicting Developed Intellectual Property Regimes*, in PERSPECTIVES ON PROPERTIES OF THE HUMAN GENOME PROJECT 289, 297 (F. Scott Kieff ed., 2003) (“The unresolved problem of how to avoid a kudzu-like proliferation of strong exclusive rights controlling slivers of innovation has recently given rise to a cancerous deviant regime that threatens to attack the integrity of the upstream commons through which all scientific and technical information had previously been filtered.”); Reichman & Samuelson, *supra* note 17, at 113–30 (arguing that sui generis rights for databases would retard scientific progress and competition in value-added data services); Reichman & Uhler, *supra* note 25, at 396–410 (predicting that intellectual property in data collections would reduce the level of sharing among researchers of data compiled by governments and academic institutions); Reichman & Uhler, *supra* note 17, at 799–821 (arguing that new sui generis database rights would be damaging to science and education).

77 This happens most often with regard to the distinction between contractual and technological constraints. *See, e.g.*, Benkler, *supra* note 17, at 429–35 (analyzing the effectiveness and enforceability of “shrink-wrap” licenses); William W. Fisher III, *Property and Contract on the Internet*, 73 CHI.-KENT L. REV. 1203, 1231–40 (1998) (asserting that certain contractual or technological rearrangements of entitlements should be permitted, but others should be proscribed); Lipton, *supra* note 23, at 802 (addressing contract and technology protection measures concurrently); Michael J. Madison, *Reconstructing the Software License*, 35 LOY. U. CHI. L.J. 275, 287–90 (2003) (arguing that the DCMA’s anti-circumvention provisions encourage licensing); Netanel, *supra* note 34, at 382–85 (criticizing digital protections as promoting contractual limitations on the use of intellectual property to the detriment of the public); *see also* Mark Stefik, *Shifting the Possible: How Trusted Systems and Digital Property Rights Challenge Us to Rethink Digital Publishing*, 12 BERKELEY TECH. L.J. 137 *passim* (1997) (using term “rights” to refer to architectural rather than legal constraints on behavior). *But see* Burk & Cohen, *supra* note 19, at 51–52 (distinguishing between code and contractual constraints); Cohen, *supra* note 8, at 1115 (observing that a freedom of contract argument against electronic regulation of performance “conflates digital code with ‘contract,’ and calls the result a purely private form of ordering exempt

The database debate, however, will not be settled by (or only by) the enactment *vel non* of a new intellectual property entitlement. Indeed, traditional legal modalities may well be a sideshow. Rather, a primary constraint on the use of databases will be architectural. Digital architecture exacerbates the public goods problem, but it is also an instrument of enclosure. Technology can now do as much as or more than the law to regulate the market for databases.⁷⁸ The participants in the database debate—and particularly those opposed to the expansion of intellectual property rights—thus need to focus on and take advantage of the law's potential to shape architecture. They need to get technological.

To understand why architecture can and should play a vital role in database regulation, and how the law can further this role, one must first explicitly recognize what was implicit in the foregoing discussion of technology's effect on information goods: the characteristics of a public good (nonexcludability and nonrivalrousness) are—at least in the first instance—architectural, a function of the state of technology.⁷⁹ The existence of a significant public goods problem varies with the excludability and rivalrousness of the information *medium*, an architectural determinant. Intellectual property law's regulation of information is a response to a market failure that arises only when certain architectural conditions obtain. In other words, the public goods problem depends on the extent to which information can be and has been de-reified. The solution, whether it favors stronger property rights or not, will have to partake of the technological as well, because architectural modalities govern access to and use of databases at least as much as traditional intellectual property entitlements.

from public policy limits—although 'contract' is not and never has been exempt from such limits"); Lessig, *Law of the Horse*, *supra* note 1, at 528–30 (distinguishing between code and contractual constraints).

78 The potential for architectural modalities (in the form of computer code) to supplant or obviate the law was first articulated in Lawrence Lessig's *The Law of the Horse*, *supra* note 1, at 507–08, and Joel Reidenberg's *Lex Informatica*, *supra* note 1, at 554–55.

79 Intellectual property law also affects excludability; indeed, that is its purpose. See Benkler, *supra* note 33, at 543 n.23 (explaining that excludability spurs private production of nonrivalrous goods such as intellectual property, which have an optimal demand price of zero and would therefore otherwise not be produced). But at the outset, excludability is determined by the architecture of the information medium alone. *Id.*; see also Fox, *supra* note 52, at 11 (“[I]nformation's relative exclusivity depends upon the nature of the selected medium responsible for its communication, because that actually determines the cost of access to the information.”).

If architecture is to play a key role in resolving the database debate, however, we must first know what role architecture currently plays in the database market. This is the focus of the following three sections. First, I show how database developers can impose (and have imposed) architectural constraints on access to and use of their products, constraints that have the potential to render irrelevant the debate over the merits and proper form of a legal entitlement for databases. Next, I discuss existing and proposed technological measures that directly and indirectly buttress these architectural constraints. Finally, I rebut the argument that the enhanced control that these architectural constraints provide to database developers will result in welfare-enhancing price discrimination.

B. *Obviating the Legal*

As discussed in Part I, digital technology has exacerbated the public goods problem for databases. At the same time, however, digital technology has created opportunities for an unprecedented level of architectural control on the part of developers of databases and other information goods.⁸⁰ This control depends not on the enactment of an intellectual property entitlement, or indeed on any public ordering of rights, but rather only on the ever-expanding capabilities and ever-diminishing limits of digital technology. It is a truly private ordering of behavioral constraints.

Developers can use technological means to prevent or limit access and use of their digitized products in a number of ways, thereby solving the public goods problem without recourse to legal modalities. A detailed, technical review of these measures is unnecessary here, both because they have been discussed in detail elsewhere⁸¹ and because the pace of technological progress would quickly render obso-

80 “Thus, with regard to databases, digital technology challenges existing legal structures in two opposing ways. Digital technologies aggravate market failure in some cases, because they facilitate piracy. In other cases, they endow the originator with abnormal market power.” Paula Baron, *Back to the Future: Learning from the Past in the Database Debate*, 62 OHIO ST. L.J. 879, 893 (2001); see also Cohen, *supra* note 8, at 1093 (“The same technologies that can be used to propagate information can also build fences around it.”).

81 See, e.g., Brian W. Esler, *Protecting the Protection: A Trans-Atlantic Analysis of the Emerging Right to Technological Self-Help*, 43 IDEA 553, 555–561 (2003) (providing an overview of existing technological protection measures); Michael J. Meurer, *Price Discrimination, Personal Use and Piracy: Copyright Protection of Digital Works*, 45 BUFF. L. REV. 845, 876–94 (1997) (outlining technological measures available to prevent profit erosion for copyright holders); Stefik, *supra* note 77, at 139–44 (suggesting a system of specific technologies to enable secure digital publishing); Symposium, *The Law & Technology of Digital Rights Management*, 18 BERKELEY TECH. L.J. 487 (2003).

lete any such review. For present purposes, the following examples will suffice.

Suppose the developer of a digital database decides that releasing the database on a freestanding medium makes it too susceptible to unauthorized access, use, or copying. The developer consequently chooses to de-reify the data completely by making it available only over an online network, such as the Internet. Those who wish to use the database then have to access it through a software program chosen and adapted by the developer to bar unauthorized persons from using the database. The software could impose restrictions even on authorized users, such as preventing them from accessing all the data at once, keeping them from copying data to their own computers without prior permission (i.e., without paying a fee), and monitoring what data they use and how long they use them. This example is hardly hypothetical; the popular legal and news databases offered by Lexis and Westlaw use such a model. It is the digital equivalent of a print publisher's requiring customers to use its white pages only under the publisher's watchful eye, where unauthorized uses can be quickly curtailed. The difference is that marketing a digital database under such conditions can be cost-efficient, using the same technology that exacerbated the public goods problem to solve the problem.⁸²

If online-only access is infeasible for marketing or other reasons, then the database could be released on a freestanding medium like CD or DVD, but subject to copy protection measures embedded in the software. The purchaser of the database might be technologically barred from making a comprehensive copy of the data, or copying them more than a few times, or even accessing all of them at once—whatever restrictions the developer fancies. (As Lawrence Lessig has observed, this is the digital equivalent of a bookseller who attached a

82 This is not to say that using architectural means to increase the cost of copying digital information goods is itself a cost-free proposition. Monitoring of online database users, like copy protection software and similar technological controls, imposes costs, as does restricting customers' means of access and permitted uses. Yet leaving digital databases technologically unprotected would impose costs as well. An architecturally unfettered database is vulnerable to an infinite amount of unauthorized copying, use, and dissemination; the cost of releasing the database without technological controls is therefore likely to be much higher than the cost of imposing technological controls that eliminate or severely reduce those threats. In the end, this is an empirical question that is impossible to answer as a practical matter, but the commercial viability of architecturally controlled databases like those offered by Lexis and Westlaw shows that in at least those contexts the costs are not too high. There is no reason to believe the costs would be prohibitive for other database developers either.

police officer to each book sold, "so that the officer followed you around and made sure that you used the book as you promised.")⁸³ Encryption of the database contents could provide another means of access control.⁸⁴ In short, digital developers have at their disposal any number of extralegal means of making their products excludable.

Digital architecture can thus allow database developers to bypass the law entirely and engage instead in a purely private ordering of behavioral constraints, without any concern for the balance that we find (or at least aspire to) in the carefully designed structure of intellectual property law. Developers concerned with private gain and not public benefit would render ineffective the mechanisms that the law traditionally uses to strike that balance.⁸⁵ Take copyright law, the closest existing analog to the proposals for database protection. Copyright law is full of safeguards against the threat of excessive private market power that comes with its grant of exclusive rights.⁸⁶ Copy-

83 Lessig, *Law of the Horse*, *supra* note 1, at 525.

84 See U.S. COPYRIGHT OFFICE, *supra* note 64, at 26 (reporting that "some [database] companies believe that encryption is an option whose time is just around the corner"); Yochai Benkler, *An Unhurried View of Private Ordering in Information Transactions*, 53 VAND. L. REV. 2063, 2065 (2000) ("Encryption technology makes it possible, at least in principle, for owners of information goods perfectly to control access to, and use of, their products."). Certain restrictions on the export of encryption technology might, however, limit the use of encryption as content control for transnational products. See *Bernstein v. U.S. Dep't of State*, 974 F. Supp. 1288, 1310–11 (N.D. Cal. 1997) (concluding that export controls and compulsory licensing for encryption and decryption software violate the First Amendment on grounds of prior restraint), *aff'd*, 176 F.3d 1132, *withdrawn and reh'g granted*, 192 F.3d 1308 (9th Cir. 1999); *Karn v. U.S. Dep't of State*, No. 96-5121, 1997 WL 71750, at *1 (D.C. Cir. Jan. 21, 1997) (noting that the Department of Commerce has regulatory authority over non-military cryptographic computer source code).

85 Of course, we have known since the time of Adam Smith that we can advance social welfare by promoting the pursuit of private gain through the use of perpetual, alienable, and exclusive property rights. But the nonrival nature of information means that we run the risk of deadweight loss if we blindly follow this model for information goods. See Richard A. Epstein, *The Dubious Constitutionality of the Copyright Term Extension Act*, 36 LOY. L.A. L. REV. 123, 125–26 (2002) (discussing the importance of the "limited periods" constitutional directive for patents and copyrights). There are also other reasons not to adopt a pure free-market model for databases. See *infra* notes 162–73 and accompanying text.

86

The monopoly privileges that Congress may authorize are neither unlimited nor primarily designed to provide a special private benefit. Rather, the limited grant is a means by which an important public purpose may be achieved. It is intended to motivate the creative activity of authors and inventors by the provision of a special reward, and to allow the public access to the products of their genius after the limited period of exclusive control has expired.

right's entitlements exist only so long as necessary to provide the needed incentive to create and disseminate a copyrighted work.⁸⁷ Even while the rights last, certain aspects of the work pass into the public domain.⁸⁸ And those aspects of the work that remain protected are nonetheless subject to certain privileged uses that do not result in liability.⁸⁹

Database developers, like other producers of information goods, can and will use technology to override the public interests that inform these safeguards. A developer concerned with maximizing profits will not forgo architectural protections simply because it already has a sufficient incentive to create the database.⁹⁰ Neither will it limit the duration of its architecturally secured "rights"—e.g., by removing existing copy protection measures—once enough time has passed for it to recoup its investment in compilation. Nor will a developer willingly share its database in architecturally unfettered form with researchers or other putative fair users without some expectation of profit.⁹¹ Architecture overrides law.

Sony Corp. of Am. v. Universal City Studios Inc., 464 U.S. 417, 429 (1984).

87 Whether the length of the current copyright term is excessive in light of this incentivizing goal is a matter of some debate. See, e.g., Dennis S. Karjala, *The Term of Copyright*, in *GROWING PAINS: ADAPTING COPYRIGHT FOR EDUCATION AND SOCIETY* 33, 36–39 (Laura N. Gasaway ed., 1997) (arguing that extending the copyright term is unwise); see also *Eldred v. Ashcroft*, 537 U.S. 186, 242–43 (2003) (Breyer, J., dissenting) (challenging the economic argument for extension of the copyright term for existing works); William M. Landes & Richard A. Posner, *Indefinitely Renewable Copyright*, 70 U. CHI. L. REV. 471, 473 (2003) (proposing a copyright term indefinite in length but subject to periodic renewals as a means of achieving the incentivizing goal).

88 "Some aspects of copyrighted works are thought to be so important to the public that society demands unrestricted access to them immediately, without waiting for the copyright to expire. Ideas and works of the federal government are said to possess these qualities." Litman, *supra* note 46, at 1013; see also 17 U.S.C. § 102(b) (2000) ("In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery . . ."); *id.* § 105 ("Copyright protection under this title is not available for any work of the United States Government . . .").

89 17 U.S.C. § 107 (setting forth the fair use defense).

90 Lipton, *supra* note 23, at 787 ("Strengthened by these laws [that support technological and contractual protections of electronically stored information], market players that tend to have their own commercial interests at heart are unlikely to spend time and resources to implement systems to protect competing interests.").

91 See Samuelson, *supra* note 53, at 161 ("Under existing law, technical measures do not need to be designed to enable privileged uses, and few thus far deployed do so."). In the classic terminology of Hohfeld, fair use is a mere "privilege," not a "right," and therefore imposes no Hohfeldian "duty" on information producers to refrain from architecturally interfering with fair use opportunities. See Wesley New-

Of course, whenever someone builds a better mousetrap, the mice get smarter. Architectural measures of any kind are vulnerable to counteracting architectural measures. In this case, hackers—i.e., those with the technological sophistication to circumvent a developer's protective efforts—could potentially evade the architectural restrictions and thus destroy the attendant excludability.⁹² Indeed, the conventional wisdom is that hackers will inevitably overcome any technological protection implemented by information producers.⁹³ This conventional wisdom, however, should be of little comfort to those concerned about the information industry's efforts to exert effective architectural control over its products, for three reasons.

First, developers do not have to eliminate the threat of hacking entirely. They merely have to reduce it to a level that allows them to recoup the costs of their architectural measures and secure the incentive to compile the data in the first place.⁹⁴ As long as it is cost-effective

comb Hohfeld, *Some Fundamental Legal Conceptions as Applied in Judicial Reasoning*, 23 YALE L.J. 16, 30–33 (1913) (defining rights, duties, and privileges). Fair use thus only comes into play as a defense, after the fair user has engaged in some unauthorized use of a copyrighted work. It has no role to play if architectural restrictions have denied the putative fair user any chance to engage in such use in the first place. *See id.* at 35 (observing that even if X has a privilege to eat a salad A may still “hold[] . . . fast to the dish”).

92 *See* Posner, *supra* note 74, at 635–36 (noting the “arms-race” nature of any database regime that relies on technological protections). *Compare, e.g.*, Alex Veiga, *New Copy-Protected CDs to Hit U.S. Stores*, SEATTLE TIMES, Sept. 22, 2003, at A3 (describing MediaMax copy-protection technology for music CDs), *with* Kevin Coughlin, *CD Technology Isn't so Protected*, STAR-LEDGER (Newark, N.J.), Oct. 8, 2003, at 4 (describing how a college student defeated MediaMax technology merely by holding down the Shift key as a CD was inserted into the computer).

93 “Any electronic on-line system is vulnerable to attack. That is close to an axiom in the field of computer security. So too, therefore, are self-help systems vulnerable.” Kenneth W. Dam, *Self-Help in the Digital Jungle*, 28 J. LEGAL STUD. 393, 401 (1999) (footnotes omitted); *see also* David A. Sklansky, *Back to the Future: Kylo, Katz, and Common Law*, 72 MISS. L.J. 143, 200–01 (2002) (noting that “each new level of security seems inevitably to be defeated by a loose, worldwide network of computer-savvy adolescents”); Mary M. Calkins, Note, *They Shoot Trojan Horses, Don't They? An Economic Analysis of Anti-Hacking Regulatory Models*, 89 GEO. L.J. 171, 198 (2000) (“No security system is perfect and hackers will eventually find a way around even the best security.”); Michael Lee et al., Comment, *Electronic Commerce, Hackers, and the Search for Legitimacy: A Regulatory Proposal*, 14 BERKELEY TECH. L.J. 839, 864 (1999) (“History and experience have shown that no system can be made perfectly secure. ‘Secured systems’ employing code-based solutions will always remain vulnerable to unexpected attacks exploiting overlooked flaws in design, implementation, or operation.”).

94 For example, the film industry has managed to reduce to a tolerable level the copying of movies released on DVD by using a combination of software and hardware controls called ACP to cause “VCRs to make distorted copies, devoid of entertainment value.” MACROVISION CORP., PRESERVING AN EFFECTIVE DVD COPY PROTECTION SYSTEM

tive to stay one step ahead of the hackers, developers will not mind occasionally being outdueled. And at least in some instances concentrated industry resources will triumph over disparate and diffuse technophiles.

Second, social norms may assist database developers in keeping hacking down to an acceptable level. Unlike the established music industry, the nascent database industry does not have to fight deeply rooted and widespread expectations about freedom of access to (and use of) its products.⁹⁵ And a number of statutes that outlaw hacking—i.e., technological laws that favor producers of information goods—are already in place to reinforce these social norms and act as a further disincentive.⁹⁶

Third, and most important, hacking only helps those with the means and inclination to hack. Most of the public lacks one or the other, or both. Developers' architectural protections are therefore likely to be effective against all but a small segment of the mass market.⁹⁷ Perhaps some hackers will become information Samaritans, giv-

(2003), available at http://www.macrovision.com/pdfs/Preserving-an-effective-DVD-Copying-System_0303.pdf; see also *Universal City Studios, Inc. v. Reimerdes*, 111 F. Supp. 2d 294, 308 (S.D.N.Y. 2000) (discussing the Content Scramble System technology used to prevent digital duplication of DVD content); Julie E. Cohen, Lochner in *Cyberspace: The New Economic Orthodoxy of "Rights Management"*, 97 MICH. L. REV. 462, 526 (1998) (noting that despite the existence of devices for circumventing videotapes' copy-protection measures, "there is no evidence suggesting that substantial numbers of ordinary consumers use them"); May Wong, *DVD Copy Control Group Sues Maker of Copying Programs*, CHI. TRIB., Feb. 15, 2004, § 5, at 2 (describing series of suits by Macrovision and the film industry against "321 Studios Inc., the maker of popular DVD-copying programs").

95 As noted *supra* note 25, there is a subset of the database industry that has normative expectations. And one might argue that *Feist* has given rise to social norms regarding access to and use of databases. But *Feist* was decided only a dozen years ago, and the two hundred years of U.S. copyright law that preceded it were actually quite friendly to claims of proprietary rights in factual compilations. See Ginsburg, *supra* note 40, at 1873–93 (discussing the history of copyright law). It is therefore unlikely that the person on the street has preexisting expectations regarding his or her access to and use of databases.

96 See *infra* Part II.C.

97 Note that Julie Cohen's famous "right to hack"—the right to circumvent architectural constraints on access to information when they inhibit the exercise of a legal entitlement—is not a technological measure. See Cohen, *supra* note 8, at 1141 (discussing a "right of fair breach"); see also Robert A. Kreiss, *Accessibility and Commercialization in Copyright Theory*, 43 UCLA L. REV. 1, 59 (1995) (arguing that fair use "should be used to privilege otherwise infringing acts that give the public and competitors the kind of access [to technologically restricted works] that normally exists for mass-market and other commercialized copyrighted works"). Both Cohen's right to hack and Kreiss's expanded fair use defense relieve hackers of liability if the hacking succeeds,

ing the rest of us access to protected material.⁹⁸ But this possibility hardly allows those who fear the market power of technologically enclosed products to rest easy, as the technologically inept would have no assurance that the choices a hacker would make about which products to liberate and distribute would coincide with their own preferences.⁹⁹

In any event, even if hackers do routinely defeat developers and share their booty with the rest of us, we are still left with an arms race whose outcome bears no necessary relation to intellectual property's goals. A Wild West in which hackers triumph is still a Wild West. Some hackers may hack only to obtain data to which they have a legal right, such as fair use, but others will undoubtedly hack simply to get for free data that a sensible information policy would require them to pay for. And while the latter form of hacking might expose its perpetrators to infringement liability, the transaction costs inherent in suing and recovering damages from such a scattered universe of infringers are likely to render toothless any legal entitlement. Allowing hackers to copy and disseminate whatever information products they see fit is therefore little better than allowing information producers to engage in unregulated architectural enclosure of their goods. Although information producers tend to have legal entitlements on their side, in both instances architecture plays the greater role in controlling the outcome.

This notion that technology threatens to displace law as the primary constraint on behavior in the digital world is not new. Lawrence Lessig provided the best articulation of this danger in his 1999 essay

but they do not return us to a world of reified "mass-market and other commercialized copyrighted works" unless we are all hackers and are all guaranteed success in our hacking. See Nimmer, *supra* note 18, at 739–40 ("If the courts apply section 1201 [of the DMCA] as written, the only users whose interests are truly safeguarded are those few who personally possess sufficient expertise to counteract whatever technological measures are placed in their path."). Cohen and Kreiss thus offer defensive means of counteracting pro-expansionist technological measures, but they do not propose affirmative anti-expansionist technological measures. See also Thomas Heide, *Copyright, Contract and the Legal Protection of Technological Measures—Not "The Old Fashioned Way": Providing a Rationale to the "Copyright Exceptions Interface,"* 50 J. COPYRIGHT Soc'y U.S.A. 315, 334–38 (2003) (suggesting a model that allows circumvention of pro-expansionist technological protections but does not necessarily make such circumvention possible).

98 The term "information Samaritan" appears to have been coined by G.M. Hunsucker in his article *The European Database Directive: Regional Stepping Stone to an International Model?*, 7 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 697, 702 & n.5 (1997).

99 See Burk & Cohen, *supra* note 19, at 82 ("Even the most user-friendly circumvention technologies will require some threshold level of technological competence.").

The Law of the Horse,¹⁰⁰ and several commentators have observed this potential in the database industry as well.¹⁰¹ Yet too often the discussion of legal modalities subsumes the discussion of architectural/technological modalities, even though the former are a form of public ordering and the latter represent purely private ordering. This is particularly true when commentators examine the uses of contract law in information transactions.¹⁰² Contractual agreements resemble architectural measures in that individuals may use both to render excludable otherwise nonexcludable goods, and neither method requires a preexisting, statutory legal entitlement in the information.¹⁰³ Because contracts ultimately depend on an exercise of state power for their enforcement, however, they are subject to policies designed to promote the public interest in a way that architectural measures are not.¹⁰⁴ To be sure, “private” contracts can challenge the balance that intellectual property law strikes in the same way that technological

100 “And to the extent that architectures of law are balanced between private and public values, we should worry if architectures of code become imbalanced. We should worry, that is, if they respect private values but displace public values.” Lessig, *Law of the Horse*, *supra* note 1, at 529. Lessig expanded on this notion in CODE, *supra* note 1; see also Reidenberg, *supra* note 1; Mark Gimbel, Note, *Some Thoughts on the Implications of Trusted Systems for Intellectual Property Law*, 50 STAN. L. REV. 1671, 1672 (1998) (“The danger is not that copyright law will be infringed but that it will be supplanted—replaced by technological mechanisms of protection that strike a far less benevolent balance between the rights of the property owner and the good of the public.”). *But see* Wagner, *supra* note 5, at 1015–16 (arguing that digital technology provides less architectural control over information goods than scholars have presumed).

101 See, e.g., Baron, *supra* note 80, at 893 (arguing that digital technologies may facilitate piracy or produce “abnormal market power”); Litman, *supra* note 17, at 611–12 (noting that a lack of meaningful intellectual property protection would limit public access to information); Reichman & Samuelson, *supra* note 17, at 153 (discussing the effects of a database owner’s monopoly on scientific users).

102 See *supra* note 77 and accompanying text.

103 As we will see *infra* Part II.D, contractual measures and technological measures also both allow producers of information goods to engage in price discrimination, which in theory can solve the deadweight loss problem.

104 Cohen, *supra* note 8, at 1115; Lessig, *Law of the Horse*, *supra* note 1, at 528–30. The use of contracts to achieve optimal protection for databases and other information goods is beyond the scope of this article, and in any event has been discussed at length elsewhere. See, e.g., Benkler, *supra* note 17, at 429–40 (information goods in general); Fisher, *supra* note 77, at 1204–12 (same); Ginsburg, *supra* note 23, at 164–71 (databases); Maureen A. O’Rourke, *Drawing the Boundary Between Copyright and Contract: Copyright Preemption of Software License Terms*, 45 DUKE L.J. 479, 479–82 (1995) (software); J.H. Reichman & Jonathan A. Franklin, *Privately Legislated Intellectual Property Rights: Reconciling Freedom of Contract with Public Good Uses of Information*, 147 U. PA. L. REV. 875, 876–84 (1999) (information goods in general); Reichman & Uhler, *supra* note 25 (databases).

controls can. But restoring that balance for the former implicates the familiar issue of preemption, whereas restoring the balance for the latter leads us into the new and unfamiliar territory of anti-expansionist technological regulation.¹⁰⁵ More fundamentally, contract law presupposes a certain level of architectural control on the part of the database developer: the only reason anyone would agree to restrictive contractual terms is because he or she lacks any less costly means to obtain access to the product.

In short, architectural protections threaten to allow database developers to control access to and use of their products with no regard for whether this control serves the public interest. Developers would in effect unilaterally decide the issues raised in the database debate. They would put and keep the protections in place regardless of the need for a compilation incentive. They would encounter no constitutional impediment, because their actions would be completely private. And they would enable downstream and other fair uses, if at all, only as a voluntary (and thus desultory) act of largesse. Hacking would provide an insufficient safeguard, and the solution to the parallel problem of contractual restrictions—preemption—would be inapplicable in the database context. Unfortunately, as we shall now see, the technological measures that already exist or are under consideration enhance, rather than cabin, developers' power to constrain users architecturally.

C. *Technological Measures for the Pro-Expansionists*

Those concerned about the expansion of intellectual property rights and the enclosure of the public domain have been playing defense in the battle over technological measures. They protest the enactment of laws that add legal backing to architectural methods of control, but with few exceptions offer little in the way of affirmative technological measures of their own to counteract the dangers posed by expansive technological protections. Nor have the anti-expansionists played defense very effectively, either in the battle over information goods in general or in the database debate in particular. As a result, the technological measures that already exist or have been proposed exacerbate rather than mitigate the problem of excessive architectural control over databases.

105 Another reason to be vigilant about conflating contract and technology is that contractual means of control face obstacles that technology does not, especially when one considers that contract is a matter of state law and thus can suffer from lack of uniformity. *See supra* note 12 (discussing the checkered history of UCITA).

1. Existing Technological Measures

Although anti-expansionists are very attentive and fervent in their opposition to technological measures in copyright law, they have almost completely failed to consider the relationship between existing technological measures and database protection. Yet two well-known federal statutes already regulate circumvention of certain technologies that protect databases. In the absence of a database enactment that includes an anti-expansionist technological component, then, database developers already have legal as well as architectural advantages.

The first statute is the Computer Fraud and Abuse Act (CFAA),¹⁰⁶ which is the federal government's main anti-hacking statute. When Congress enacted the CFAA in 1984,¹⁰⁷ it targeted for criminal prosecution only those hackers who were after classified government information or financial records, or who tried to impede use of a government computer.¹⁰⁸ The Act was later amended, however, to cover trafficking in computer passwords and the alteration of information in virtually any computer over which Congress could exert Commerce Clause jurisdiction.¹⁰⁹ Congress later added a civil remedy as well, authorizing private parties to secure injunctions and compensation for violations of the statute that cause more than \$5000 in loss.¹¹⁰

Insofar as the CFAA directly regulates attempts to circumvent technological access protections, it is a technological measure. In other words, its provisions give private parties, such as database developers, a legal means of strengthening the architectural fences that enclose their products. The Act does require that a private party suffer \$5000 in losses before it can bring a private right of action, but the losses from even a seemingly harmless hacking can add up quickly when they include "any reasonable cost to any victim, including the cost of responding to an offense, conducting a damage assessment, and restoring the data, program, system, or information to its condition prior to the offense, and any revenue lost, cost incurred, or other

106 18 U.S.C.A. § 1030 (West 2000 & Supp. 2004).

107 Counterfeit Access Device and Computer Fraud and Abuse Act of 1984, Pub. L. No. 98-473, §§ 2102-2103, 98 Stat. 1837, 2190-92 (codified as amended at 18 U.S.C.A. § 1030).

108 Dodd S. Griffith, Note, *The Computer Fraud and Abuse Act of 1986: A Measured Response to a Growing Problem*, 43 VAND. L. REV. 453, 460-61 (1990).

109 Computer Fraud and Abuse Act of 1986, Pub. L. No. 99-474, § 2(d), (g)(4), 100 Stat. 1213, 1213-15 (1984) (codified as amended at 18 U.S.C.A. § 1030(a)(4)-(6), (e)(2)).

110 Computer Abuse Amendments Act of 1994, Pub. L. No. 103-322, § 290001, 108 Stat. 1796, 2097-99 (codified as amended at 18 U.S.C.A. § 1030).

consequential damages incurred because of interruption of service.”¹¹¹ Add to this the market value of whatever data were taken (if that value can be assessed) and the \$5000 threshold can be easily surpassed. At least two scholars have accordingly pointed out that the CFAA could impede online information gathering,¹¹² and two cases have applied the Act to the use of Internet data-mining programs.¹¹³ There is every reason to believe that a database developer concerned with losing control over its database would take advantage of the CFAA.

The second existing statute that gives legal backing to database developers' efforts to protect their products through extralegal means is the DMCA, specifically Titles I and II.¹¹⁴ The DMCA has a number of technological aspects, including provisions that outlaw the removal or falsification of copyright management information¹¹⁵ and that encourage online service providers to adopt technological measures designed to protect copyrighted material against unauthorized use.¹¹⁶ Its most controversial technological provision, however, imposes civil and criminal liability on those who circumvent “technological measures” designed to control access to a copyrighted work.¹¹⁷ The Act

111 18 U.S.C.A. § 1030(e)(11) (West Supp. 2004).

112 Christine D. Galbraith, *Access Denied: Improper Use of the Computer Fraud and Abuse Act to Control Information on Publicly Accessible Internet Websites*, 63 MD. L. REV. 320, 324 (2004) (criticizing use of the CFAA to establish de facto rights in information available to public); Maureen A. O'Rourke, *Common Law and Statutory Restrictions on Access: Contract, Trespass, and the Computer Fraud and Abuse Act*, 2002 U. ILL. J.L. TECH. & POL'Y 295, 307–10 (noting that the CFAA can provide protection against mere data gathering); Maureen A. O'Rourke, *Shaping Competition on the Internet: Who Owns Product and Pricing Information?*, 53 VAND. L. REV. 1965, 1991–92 (2000) (same). Depending on the nature of the information obtained and whether it was stored or in transit when obtained, hackers might also run afoul of the Wiretap Act, 18 U.S.C. §§ 2510–2520 (2000), or the Stored Communications Act, 18 U.S.C. §§ 2701–2710 (2000).

113 *EF Cultural Travel BV v. Explorica, Inc.*, 274 F.3d 577, 584–85 (1st Cir. 2001) (including within the “loss” fees paid to consultants to assess the effect of unauthorized access); *Register.com, Inc. v. Verio, Inc.*, 126 F. Supp. 2d 238, 251–53 (S.D.N.Y. 2000) (including within the “loss” slight diminishment of server capacity and response time); see also *Complaint at 17–18, Computer Info. Network, Inc. v. ESPN, Inc.* (S.D.N.Y. May 17, 2004) (No. 04-CV-3707) (claiming that unauthorized access to real-time sports statistics database violated CFAA), available at <http://pub.bna.com/eclr/04cv3707.pdf>.

114 Digital Millennium Copyright Act, Pub. L. No. 105-304, §§ 101–105, 201–203, 112 Stat. 2860, 2861–86 (1998) (codified in scattered sections of 17 U.S.C.).

115 17 U.S.C.A. § 1202 (West Supp. 2004).

116 *Id.* § 512(i).

117 *Id.* § 1201(a) (creating substantive provision); *id.* § 1203 (providing for civil liability), *id.* § 1204 (providing for criminal liability).

does not define “technological measure,” but one can glean the breadth of the term from the definition of “circumvent,” which includes descrambling, decryption, and other acts that “avoid, bypass, remove, deactivate, or impair” architectural means by which information producers seek to exert control over access to their goods.¹¹⁸ These anti-circumvention provisions have garnered a tremendous amount of criticism, mostly due to their failure to make an exception for unauthorized access that does not lead to copyright infringement.¹¹⁹ Bypassing the technological restrictions on access to a copyrighted work constitutes a DMCA violation even if the subsequent unauthorized use of the work does not infringe copyright.¹²⁰ The statute focuses on the work, not the use.¹²¹

The absence of a DMCA exception for non-infringing access circumvention has important consequences for the database debate. As we have already seen, databases can earn copyright protection when their selection and arrangement of data are sufficiently creative.¹²²

118 *Id.* § 1201(a)(3)(A).

119 *See, e.g.*, JESSICA LITMAN, DIGITAL COPYRIGHT 131–45 (2001) (noting alarm and concern over expanded liability, exemptions, and other modifications of the DMCA prior to enactment); Benkler, *supra* note 17, at 414–29 (discussing the DMCA’s anti-circumvention provision in the context of restricting free speech); Michael Landau, *Has the Digital Millennium Copyright Act Really Created a New Exclusive Right of Access?: Attempting to Reach a Balance Between Users’ and Content Providers’ Rights*, 49 J. COPYRIGHT SOC’Y U.S.A. 277, 282–86 (2001) (discussing the right of the public to have access to and use a copyrighted work); Lunney, *supra* note 18, at 830–44 (discussing the effects of the DMCA’s anti-circumvention provisions on the public interest); Pamela Samuelson, *Intellectual Property and the Digital Economy: Why the Anti-Circumvention Regulations Need to Be Revised*, 14 BERKELEY TECH. L.J. 519, 534–37 (1999) (arguing that the anti-circumvention provisions are overbroad and threaten fair use and the public domain).

120 *See* Lexmark Int’l, Inc. v. Static Control Components, Inc., 253 F. Supp. 2d 943, 969 (E.D. Ky. 2003) (“The DMCA is clear that the right to protect against unauthorized access is a right separate and distinct from the right to protect against violations of exclusive copyright rights such as reproduction and distribution.”). Congress has recently considered amending § 1201 to impose liability only when copyright infringement results from the circumvention. Digital Media Consumers’ Rights Act of 2003, H.R. 107, 108th Cong. § 5 (2003).

121 In contrast, circumvention of an architectural measure that does not control access—such as copy protection software—is not a DMCA violation. However, it is a violation to make or sell certain devices or services that can be used to circumvent copy protection software or other technologies that protect copyright. 17 U.S.C. § 1201(b). And because one could presumably use such devices and services to access wholly uncopyrightable information goods, the DMCA effectively inhibits perfectly legal conduct in the database sphere as well. (I am indebted to Julie Cohen for this observation.)

122 *See supra* notes 49–50 and accompanying text.

While the most valuable and flexible databases are the least likely to meet this standard,¹²³ there will always be some databases that do qualify. The DMCA covers such databases; it thus puts its considerable legal weight behind database developers' efforts to architecturally restrict access. The hypothetical circumventer may be trying to access and use the data only, rather than appropriate the copyrighted selection and arrangement, but the DMCA considers this distinction irrelevant. Civil and criminal liability attach as long as the database as a whole is copyrighted and the circumvention is unauthorized.

The DMCA might not be as great a concern in the database debate if it covered only those few databases whose data are creatively selected and arranged. But a database product can qualify for copyright protection in other ways as well. For example, digital databases cannot function without search and retrieval software. Software is protected by copyright.¹²⁴ If the database developer uses one set of technological access controls to protect both the software and the data, then any circumvention of those controls is a DMCA violation, even if the circumventer is interested in the uncopyrightable data and not the copyrighted software.¹²⁵ Indeed, given copyright law's easily satisfied threshold requirements,¹²⁶ the clever database developer will purposely make the tail wag the dog: write a short but copyrightable poem, stick it behind the same access protections as the database, and rest assured that the copyright in the poem will engage the DMCA machinery for the database.

123 See *supra* Part I.C.2.

124 In fact, a student note written shortly after the *Feist* decision argues that competing databases are distinguished more by copyrightable search and retrieval software than by uncopyrightable data content, and therefore that even without copyright protection developers are "already in a position to protect what is becoming the most distinctive feature of their database systems." Philip H. Miller, Note, *Life After Feist: Facts, the First Amendment, and the Copyright Status of Automated Databases*, 60 *FORDHAM L. REV.* 507, 524 (1991).

125 Ginsburg, *supra* note 18, at 1635 (observing that technological control measures in conjunction with the DMCA "might enable the copyright owner to leverage a 'thin' copyright in informational works to protect public domain information").

126 "To be sure, the requisite level of creativity [for copyright protection] is extremely low; even a slight amount will suffice. The vast majority of works make the grade quite easily, as they possess some creative spark, 'no matter how crude, humble or obvious' it might be." *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 345 (1991) (quoting 1 MELVILLE B. NIMMER & DAVID NIMMER, *COPYRIGHT* § 1.08[C][1] (1990)).

2. Proposed Technological Measures

The CFAA and DMCA therefore reinforce legally what database developers are already capable of achieving architecturally. Neither statute, however, is a perfect fit. The CFAA has the \$5000 loss requirement, and in any event only protects access to computers, which is of little help to developers who release their products in freestanding media rather than in an online client-server format.¹²⁷ Developers can easily co-opt the DMCA's anti-circumvention provisions, but courts might understandably view such bootstrapping with skepticism.¹²⁸

Database developers are therefore likely to seek enactment of pro-expansionist technological measures that directly regulate databases. Indeed, the first database protection bill that surfaced in Congress, the Database Investment and Intellectual Property Antipiracy Act of 1996,¹²⁹ included two such provisions. The first proposed outlawing devices and services whose primary purpose was the evasion of architectural measures that inhibited infringement of the right that the Act established.¹³⁰ The second would have outlawed the removal or falsification of database management information.¹³¹ Although the bill never made it out of committee,¹³² copyright analogs of each technological provision cropped up in the subsequently enacted DMCA.¹³³

127 There is, however, an argument—as yet untested—that even a freestanding data storage medium like a CD or DVD falls within the Act's definition of "computer," which covers "an electronic, magnetic, optical, electrochemical, or other high speed *data processing device performing* logical, arithmetic, or *storage functions*, and includes any *data storage facility* or communications facility directly related to or operating in conjunction with such device." 18 U.S.C. § 1030(e)(1) (2000) (emphasis added).

128 Dan Burk has suggested a framework for evaluating suspect attempts to leverage the DMCA's technological provisions. See Dan L. Burk, *Anticircumvention Misuse*, 50 UCLA L. REV. 1095, 1132–40 (2003).

129 H.R. 3531, 104th Cong. (1996).

130 *Id.* § 10.

131 *Id.* § 11.

132 See *supra* note 66.

133 The DMCA's version of the devices/services restriction is found in 17 U.S.C.A. § 1201(b) (West 1996 & Supp. 2004), and its protection of copyright management information is found in 17 U.S.C.A. § 1202. One of the DMCA's other controversial (but non-technological) provisions gave copyright owners the power to obtain subpoenas compelling an online service provider to identify alleged infringers that use its service, without having to file suit. *Id.* § 512(h); see also *In re Verizon Internet Servs., Inc.*, 257 F. Supp. 2d 244, 248–68 (D.D.C. 2003) (enforcing a § 512(h) subpoena). The discussion draft that formed the basis for one of Congress's two most recent database protection proposals included a similar provision, but it was deleted from the version of the legislation that was formally introduced in the House. Compare

In the two subsequent bills that the database industry supported—both of which came closer to enactment—the original bill's explicit technological measures were absent.¹³⁴ Their absence, however, was illusory, because the new bills' proposed placement in Title 17 of the U.S. Code¹³⁵ would have afforded the new database rights full technological protection under the DMCA's anti-circumvention provisions, which apply not just to copyrighted works but to any "work protected under this title."¹³⁶ That is to say, any new database entitlement codified within Title 17 will automatically receive the DMCA's protections, without the need for any creative selection and arrangement, search software, or cleverly placed poetry.¹³⁷ Indeed, the DMCA would actually give databases more anti-circumvention protection than copyrighted works, because—unlike the *grant* of protection—most statutory *exceptions* to that protection pertain only to copyrighted works.¹³⁸

D. Price Discrimination

Given the CFAA's and DMCA's existing technological provisions, database developers already have legal backing for their architectural protections. The likelihood that a new database enactment would contain technological provisions tailored to the new entitlement or

Database and Collections of Information Misappropriation Act, H.R. ____, 108th Cong. § 7(h) (2003) (draft) (on file with author) (containing subpoena provision) with Database and Collections of Information Misappropriation Act, H.R. 3261, 108th Cong. § 7 (2003) (omitting subpoena provision).

134 See Collections of Information Antipiracy Act, H.R. 354, 106th Cong. (1999); Collections of Information Antipiracy Act, H.R. 2652, 105th Cong. (1998). The House approved H.R. 2652 twice, but the bill never saw a vote in the Senate. H.R. 354 succeeded in reaching the House floor, but went no further. See *supra* note 66.

135 The first line of each bill read: "To amend title 17, United States Code . . ." H.R. 354 pmb.; H.R. 2652 pmb.

136 17 U.S.C.A. § 1201(a)(1)(A). In fact, the second time that H.R. 2652 passed the House was as part of the DMCA. (The first time was as freestanding legislation.) See *supra* note 66. Note that Title 17 is also home to other sui generis intellectual property regimes, such as those covering semiconductor chip design, 17 U.S.C. §§ 901–914 (2000), live musical performances, *id.* § 1101, and vessel hulls, 17 U.S.C.A. §§ 1301–1332 (West 1996 & Supp. 2004). Their intellectual property entitlements therefore also fall within the reach of the DMCA's anti-circumvention protection.

137 Cf. *Quality King Distrib., Inc. v. L'anza Research Int'l, Inc.*, 523 U.S. 135, 147 (1998) (analyzing "under this title" language from 17 U.S.C. § 602(a)).

138 Compare 17 U.S.C.A. § 1201(a)(1)(A) (applying anti-circumvention protection to any "work protected under this title"), with *id.* § 1201(a)(1)(B)–(D) (making exceptions to that protection for certain "copyrighted" works), and *id.* § 1201(d) (same).

would be codified in Title 17 simply adds to the already formidable potential for developers to control and monitor every access and use of their products. Not all aspects of this control, however, are negative. For example, technology is transnational; in contrast, a legislative enactment on database rights would extend only to the jurisdiction's borders, and international protocols govern only those nations that adopt them. Architectural control measures also allow database developers to tailor their products to their customers' needs and desires in ways that would otherwise be prohibitively expensive.

Given these advantages, one response to the perceived database problem is to argue that no response is needed at all—i.e., that it is not a problem. If consumers dislike architectural restrictions on databases, the argument goes, then the invisible hand of the free market will push database developers to offer products without such restrictions. This argument would be appealing in a competitive market for rival goods, but for several reasons it is less convincing when applied to nonrival information products such as databases. First, access to databases, like access to other information products, produces positive externalities that individual consumer transactions do not take into account.¹³⁹ For example, the widespread availability of facts allows citizens to engage in robust, informed political debate, the collective value of which is not necessarily captured by whatever price the citizens would have individually been willing to pay for their facts.¹⁴⁰

139 As Yochai Benkler puts it:

[U]sers would underinvest in buying uses currently in the public domain because these productive uses have high positive externalities. Users who use public domain information as an intermediate product to producing other information goods will buy permission to use newly enclosed information only if their private benefits outweigh the private costs to vendors of permitting the transformative use. This would leave information underutilized in all instances where the social benefits of a transformative use of information outweigh the private costs to the sellers, but the private benefits to transformative users do not.

Benkler, *supra* note 17, at 434; *see also* Cohen, *supra* note 94, at 551–59 (discussing ways in which a purely economic model of social welfare fails to capture important values); Netanel, *supra* note 34, at 311 (criticizing a wholly market-based model that “errantly reduces complex issues of public policy to readily assessable bilateral transactions, glossing over intractably external social benefits and costs of market actor decisions”).

140 *See* Charles Taylor, *Irreducibly Social Goods*, in *RATIONALITY, INDIVIDUALISM AND PUBLIC POLICY* 45, 48–54 (Geoffrey Brennan & Cliff Walsh eds., 1990) (describing social good, the value of which derives from collective decisionmaking rather than the sum of individual preferences); *see also* Cohen, *supra* note 94, at 551 (“[T]he correct question to ask is not whether the proposed changes in digital intellectual property rights will increase the value realized by markets [but] whether the changes will in-

Second, information is nonrival; restrictions on access to it therefore create a welfare-reducing deadweight loss. Finally, owners of information goods often enjoy significant market power.¹⁴¹ They are thus less likely to respond to consumer preferences than producers in a more competitive market would be.¹⁴² For these reasons, intellectual property rights are generally limited in time and scope; they are far different from the comparatively absolute property rights we see in competitive markets for rival goods.

These disadvantages of the purely free-market approach suggest that the notion of encouraging absolute architectural control of databases is a lemon. There is, however, an economic theory that sees this market power as a chance to make lemonade: price discrimination. Under price discrimination theory, absolute architectural control can be a help, not a hindrance, to the optimal production and dissemination of databases and other information goods.¹⁴³ A producer of information goods tends to price its goods above their marginal cost, either because it needs to recover its up-front development expenses or because it is seeking monopoly rents, or both.¹⁴⁴ Such pricing poses a problem for low-value users, those who would pay more than marginal cost but who cannot or will not pay the price that the producer charges—for example, a penurious scientific researcher or a tightfisted law professor. Keeping the good out of such a user's hands constitutes a deadweight loss, a reduction in overall social welfare (particularly when use of the good would produce positive externalities in the form of progress in science or education).

Area *DEF* in Figure 1 represents the deadweight loss under this pricing model. The producer sets a price that maximizes profits, which is the price at which the revenue from making one additional unit would be less than the cost of producing that unit. Consumers who value the good at a price lower than the profit-maximizing price but higher than the marginal cost (i.e., the consumers in Area *DEF*)

crease the overall value realized by society—including the value realized both within and outside markets—under the current system.”).

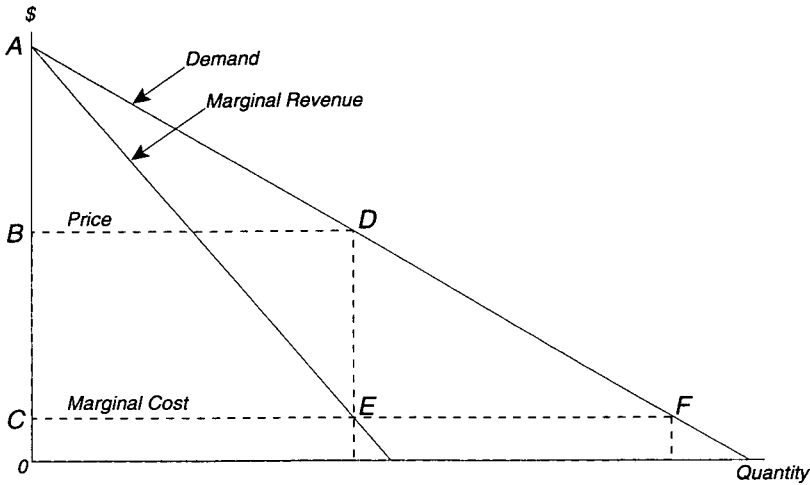
141 See *infra* notes 154–60 and accompanying text.

142 See Julie E. Cohen, *Copyright and the Perfect Curve*, 53 VAND. L. REV. 1799, 1812 (2000) (“Market power . . . decreases the likelihood that irrational, misguided, or rationally self-centered but socially inefficient licensing decisions will be subject to market correction.”); see also Cohen, *DRM*, *supra* note 19, at 614–15 (discussing why market forces alone will not lead to optimal architectural standards for privacy protection). Also, the market for consumer goods corrects price iniquities much better than it protects other aspects of mass-market transactions. Cohen, *supra* note 94, at 488.

143 This explanation derives from Michael Meurer’s article on price discrimination in copyrighted digital goods. See Meurer, *supra* note 81, at 876–93.

144 See Green, *supra* note 64, at 927–29 (discussing monopolization costs).

FIGURE 1. UNITARY PRICING MODEL



do not buy the good. This represents a socially inefficient deadweight loss because those consumers are willing to pay more than the cost of producing the good, yet do not obtain it. On the flip side, Area *ACED* represents a welfare gain, split between consumers who are willing to pay more than the profit-maximizing price (the consumer surplus of Area *ABD*) and the seller (the producer surplus of Area *BCED*).

In a world without significant architectural controls, one could redress the deadweight problem through limits on legal entitlements (contractual or otherwise), such as restricting a producer's rights in the aftermarket, permitting value-adding noncompetitive uses, and setting a time limit on the exclusive rights. This is how copyright law handles deadweight loss.¹⁴⁵ But when a producer is able to employ extralegal constraints to control its information good, limits on legal entitlements are of less consequence.¹⁴⁶ A product that is only available online in de-reified form has no aftermarket. The right to fair use is fairly useless without the means to access. Copy protection software does not expire.

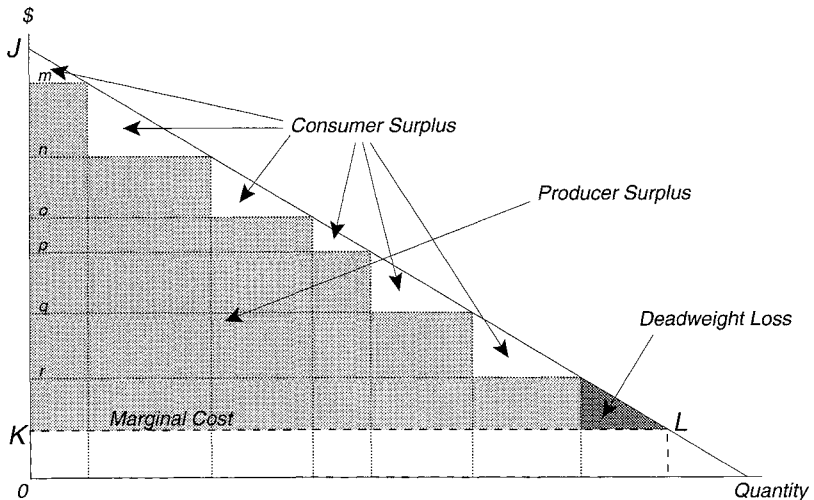
This description of the deadweight problem, however, presumes a unitary pricing scheme. If a database developer were somehow able

145 See 17 U.S.C. §§ 109(a) (2000) (codifying the first sale doctrine); *id.* § 107 (codifying the fair use doctrine); *id.* § 302 (providing for expiration of exclusive rights). The extent to which individual contractual agreements can override copyright's deadweight solutions is an open and hotly contested issue. See, e.g., O'Rourke, *supra* note 104, at 487–500 (discussing distribution models under the Copyright Act).

146 See Cohen, *supra* note 8, at 1140 (noting that a legal right to breach a pro-expansionist contractual term “may count for little in the face of self-enforcing technological protection”).

to charge each user the price that that user would be willing to pay, the deadweight problem would disappear. Our penurious scientist could pay a few dollars for a database that would cost Megabucks Corporation thousands more. Figure 2 depicts such an individualized pricing model.

FIGURE 2. INDIVIDUALIZED PRICING MODEL



In this model, the database developer has set prices m through r for the individual users who are willing to pay those prices. This both reduces the amount of deadweight loss and converts much of what had been consumer surplus into producer surplus.¹⁴⁷ The latter effect is neither here nor there from the standpoint of overall social welfare, except insofar as the added profits give the producer a needed incentive to invest in the creation of the good.¹⁴⁸ The former effect, however, is welfare-enhancing.

Price discrimination of this sort is possible only when three conditions are satisfied. First, the seller must be able to block any attempts

147 In a world of perfect price discrimination, all the consumer surplus and deadweight loss would be eliminated, and the entire Area JKL would be producer surplus.

148 See Green, *supra* note 64, at 928 (noting that an information producer who “charges a price that is no higher than what is necessary to cover production costs . . . is not earning monopoly rents”); Christopher S. Yoo, *Copyright and Product Differentiation*, 79 N.Y.U. L. REV. 212, 226 n.46 (2004) (pointing out that portraying entire producer surplus as profit “overstate[s] the degree of profit by ignoring the role of fixed costs”). But see Stephen Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281, 286 (1970) (“It is not apparent that the producer has any stronger claim to the surplus than the consumer . . .”).

at arbitrage.¹⁴⁹ In other words, if our penurious scientist can sell his or her low-cost copy of the database to Megabucks Corporation, the database developer will not be able to charge Megabucks the significantly higher price that it would otherwise be willing to pay. Second, the seller must obviously have the ability to find out which consumers are willing to pay what price.¹⁵⁰ Database developers can use technology to fulfill both of these conditions. They architecturally constrain arbitrage by controlling access to their databases through an online network (i.e., selling a service rather than a good)¹⁵¹ and by building anti-alienability technologies into those databases that are released in freestanding formats.¹⁵² And online databases are particularly well suited to measuring (or “metering”) consumer valuations, at least when those valuations correlate with frequency and length of usage.¹⁵³

Finally, price discrimination requires sufficient market power on the part of the producer—a lack of competition. A producer in a competitive industry confronts elastic demand and thus a flatter demand curve that does not allow for price discrimination.¹⁵⁴ Scholars typically assume that owners of intellectual property rights have the

149 Meurer, *supra* note 81, at 874–76.

150 *Id.* at 871–74.

151 *Id.* at 875 (discussing limiting arbitrage in copyrighted goods).

152 See Michael Higgins, *Disappearing Data: That CD-ROM May Self-Destruct If You Don't Check the Expiration Date*, 84 A.B.A. J. 30, 30 (1998) (describing a CD-ROM that becomes unreadable after a certain period of time and requires renewal to become readable again).

153 See Meurer, *supra* note 81, at 873–74 (discussing metering for copyrighted goods). Edmund Kitch argues that when a producer switches from selling its information good in freestanding format to selling it online (in order to meter usage per time unit), it is not engaging in price discrimination—i.e., it is not selling the same product to different customers at different prices. Instead, it is selling a different product altogether: a minute (or hour or second) of access to the information good rather than the good itself. Edmund W. Kitch, *Elementary and Persistent Errors in the Economic Analysis of Intellectual Property*, 53 VAND. L. REV. 1727, 1733–34 (2000); see also LANDSBURG, *supra* note 29, at 365–66 (noting that “almost everything that appears to be price discrimination admits at least one alternative explanation” and “economists who are disinclined to believe in substantial monopoly power” tend to believe these alternatives). Kitch is correct that unless the price of the time unit of access varies depending on the willingness of the user to pay more or less for that unit, all the seller has done is change the kind of good represented by the X-axis in Figure 1. But the architecture of the Internet and other computer networks is sophisticated enough to do more than blindly charge each user the same price per minute. Lexis and Westlaw, for example, use sign-on software that is able to distinguish me from a real lawyer, and they consequently engage in price discrimination by giving me free access while charging others considerably more for the same time units.

154 LANDSBURG, *supra* note 29, at 356; Meurer, *supra* note 81, at 870.

market power to price discriminate because of the exclusive nature of their entitlements—they have a monopoly over their information goods.¹⁵⁵ The meaning of the term “monopoly” here, however, is more colloquial than economic.¹⁵⁶ Exclusive rights in a good do not necessarily translate into an absence of competition from near-perfect substitutes.¹⁵⁷ If John Grisham is charging \$30 for his latest legal thriller, his exclusive copyright prevents us from obtaining the book from him for less—but competitor Scott Turow may seize the opportunity to sell us his new novel for \$20.

Nevertheless, one tends to encounter a monolithic, standard-form approach to marketing goods in the information industry, rather than intense competition and flexibility regarding legal and architectural constraints.¹⁵⁸ This is particularly true in markets for latter-day

155 *E.g.*, Cohen, *supra* note 142, at 1801 (noting that access restrictions allow copyright owners to charge higher prices); Fisher, *supra* note 77, at 1234 (describing the owner of a copyright as a monopolist who can price discriminate); Wendy J. Gordon, *Intellectual Property as Price Discrimination: Implications for Contract*, 73 CHI.-KENT L. REV. 1367, 1381–82 (1998) (discussing monopolies in the context of database owners); *see also* Landes & Posner, *supra* note 10, at 327 n.4 (assuming a downward-sloping demand curve).

156

In ordinary speech, to monopolize or to have a monopoly can mean to have exclusive or dominant possession of something—as in “he monopolized the conversation.” This meaning of the term ‘monopoly’ is not the same meaning as economic monopoly—to have the exclusive right to sell into a market without competition.

Kitch, *supra* note 153, at 1735 (challenging the common assumption that intellectual property rights confer monopoly power).

157 Boyle, *supra* note 53, at 2018 (“The question of whether a monopoly exists is one that is determined by the availability of substitute goods, not the shape of the legal entitlement.”); *see also* Yoo, *supra* note 148, at 236–46 (outlining an approach to copyright that focuses on the role of imperfect but economically relevant substitutes in mitigating monopoly effects).

158

Although a copyright does not necessarily guarantee market power, many information goods lack perfectly fungible substitutes. Even absent a commanding market share, market power may inhere in standard-form terms that are widely adopted within an industry. Such terms are increasingly common in information markets, and despite considerable evidence that information consumers want greater freedom, the major copyright owners do not seem to be competing among themselves to offer less restrictive terms.

Cohen, *supra* note 142, at 1811 (footnotes omitted); *see also* Cohen, *supra* note 94, at 530.

[I]t would seem entirely reasonable to hypothesize that once copyright owners have developed reliable technologies and reached sufficiently broad consensus on the level of control to be implemented, consumers may have difficulty using their ‘power to switch’ to obtain substantial or qualitative

information goods, which do not have to battle preexisting consumer expectations about access and use formed in the era before significant de-reification. Perhaps the music industry faces consumers who want their de-reified products to resemble old vinyl records in their portability, if not in their fragility; music marketed over the Internet in architecturally restricted formats has certainly had a rough start, with end-user control over the good a seemingly major determinant of a service's success.¹⁵⁹ But the comparatively young software industry consistently imposes restrictive mass-market click-wrap licenses on its customers, who never learned to expect anything more. The same will probably be true for the equally young digital databases industry. This level of control bespeaks a market that, even if it falls short of pure economic monopoly, has a demand curve that slopes downward sharply enough for price discrimination to be feasible.¹⁶⁰

change—even if many consumers dislike rights management technologies and fractional usage rights and believe that they would derive increased utility from decreased author/owner control.

Id.; *id.* at 521–22 & n.222 (discussing a legal database market characterized by uniformity of, rather than competition over, terms of access). The lack of competition over licensing terms may result in part from consolidation in media ownership; as of 1997, fewer than twenty companies controlled almost all the country's media outlets. Gimbel, *supra* note 100, at 1685 (citing Molly Ivins, *Free Press Isn't Easy in Corporate America*, CHARLESTON GAZETTE, July 22, 1997, at A4); *see also* Yochai Benkler, *Intellectual Property and the Organization of Information Production*, 22 INT'L REV. L. & ECON. 81, 93–95 (2002) (arguing that strong intellectual property entitlements lead to increased concentration and homogenization of information production); Frank Ahrens, *FCC Eases Media Ownership Rules*, WASH. POST, June 3, 2003, at A1 (detailing the Federal Communication Commission's controversial relaxation of rules restricting ownership of multiple media outlets in the same market).

159 The availability of free pirated music via the descendants of Napster may have something to do with the troubles legal music services have experienced. Yet Apple's iTunes online music store, which offers users significantly more downloading and copying freedom than its existing rivals, has been thriving; it produced more music downloads on its first day than had occurred through other legal services in the previous six-month period. Leander Kahney, *Music Biz Buzzing Over iTunes*, WIRED NEWS, May 2, 2003, at <http://www.wired.com/news/digiwood/0,1412,58706,00.html>. This is particularly impressive given that the iTunes service then worked only on computers using the Apple Macintosh platform, *id.*, leaving the far more numerous Microsoft Windows users out in the cold. *See* Peter Lewis, *Apple Puts the Eye in IM*, FORTUNE, July 21, 2003, at 159, 160 (noting that the Windows operating system outsells its Macintosh rival by more than ten to one).

160 *See* Meurer, *supra* note 81, at 870 (noting that “a firm does not have to be a monopolist to price discriminate”). The potential for monopolistic pricing in the database market is particularly high in the case of sole-source databases, which are unlikely to have adequate substitutes. *See infra* notes 175–85 and accompanying text; *see also* Reichman & Samuelson, *supra* note 17, at 70 (observing that anecdotal evidence in the market for scientific databases indicates an absence of competition).

Databases thus appear to be promising candidates for welfare-enhancing price discrimination. If this is true, technological measures that thwart database developers' ability to exercise absolute architectural control over their products would be counterproductive, and even playing defense in the technological wars against the pro-expansionists would be wrongheaded. Indeed, price discrimination's best-known advocate, William Fisher, has suggested that the law governing information goods should encourage the practice, although in his analysis the role of both the technological and the technological was subsumed within an examination of the role of contract law, and he focused on existing intellectual property entitlements.¹⁶¹ Many of the criticisms of Fisher's approach are nevertheless relevant to the question of what technological measures, if any, should be put in place in the database market.

Several of Fisher's critics question price discrimination's effect on information innovation. The cost of information output is partly a function of the cost of information input.¹⁶² The higher producer surplus that price discrimination produces will therefore not necessarily translate into higher producer profits, because the producer may be paying more for the information goods that form the basis for its product. This means that price discrimination may not provide any additional incentive for the discriminator to create its goods, to innovate.¹⁶³ At the same time, the increased producer surplus is generated largely at the expense of a consumer surplus that high-value users would have otherwise enjoyed. But that consumer surplus may have helped those high-value users produce positive externalities, and they

161 See Fisher, *supra* note 77; see also Ginsburg, *supra* note 23, at 170 ("There is a user right to copy facts, but a flexible pricing scheme may make the restriction [of that right] reasonable."); O'Rourke, *supra* note 104, at 545-51 (proposing alienability of fair use rights in software licensing except when it has an anticompetitive effect); Yoo, *supra* note 148, at 270-71 (arguing that promoting price discrimination will encourage the emergence of competing information goods).

162 See Benkler, *supra* note 33, at 553 (discussing input costs in the context of a sui generis database right); Landes & Posner, *supra* note 10, at 336-39 (discussing input costs in the context of copyright law). Proponents of an intellectual property right in data compilations sometimes fail to recognize that such a right could increase the cost of assembling or preparing new compilations. See, e.g., Amy C. Sullivan, *When the Creative Is the Enemy of the True: Database Protection in the U.S. and Abroad*, 29 AM. INTELL. PROP. L. ASS'N Q.J. 317, 319-22 & n.5 (2001) (lamenting the lack of protection for a database of horse-breeding pedigrees and racehorse handicapping information that was itself compiled using information culled from other data compilations).

163 See Boyle, *supra* note 53, at 2031 ("Under price discrimination, after all, producers of information goods might well be paying more for inputs than they do now under the current leaky system, with limited enforceability of contracts of adhesion, first sale, fair use, and so on.").

may have been willing to pay that high value because they had some profitable, value-added use in mind. To the extent that the consumer surplus helped fund value-added information goods, its disappearance will act as a disincentive for innovation.¹⁶⁴

Another problem with the price discrimination model described above is that it focuses only on those transactions that involve the producer of the information good. When one considers secondary markets for such goods, however, the existence of a deadweight loss in Figure 1 is questionable. Under copyright law, for example, low-value users who cannot afford an author's unitary profit-maximizing price might acquire the book in the aftermarket that the first sale doctrine makes possible.¹⁶⁵ Low-value users can buy the latest John Grisham novel at a used book store or borrow it from their local library. The producer of the information good does not participate in (or directly profit from) this transaction, and thus we do not see it in Figure 1, yet it ameliorates the socially inefficient aspect of unitary pricing.¹⁶⁶ Seen in this light, architectural restrictions on alienability and arbitrage might exacerbate, not mitigate, the deadweight loss.

A final internal shortcoming of the model is that it fails to account for the expense of implementing price discrimination, whether through contractual or architectural means. Implementing access and copy protections and monitoring usage involve certain transaction costs.¹⁶⁷ For high-value customers, these transaction costs will probably not be prohibitive. But the potential effect on low-value users is more ominous. The profits to be made from those who value the good at or near its marginal cost of production are likely to be

164 Cohen, *supra* note 142, at 1807; *see also* Boyle, *supra* note 53, at 2032 ("To put it simply, the assumption that increasing the pricing power of the producer increases the amount of innovation and information produced is similar to the assumption that increasing the level of intellectual property rights produces more innovation.").

165 *See* 17 U.S.C. § 109(a) (2000). In other words, the deadweight loss in Figure 1 exists "only if we ignore the social institutions enabled by copyright law that traditionally have provided lower-income consumers with alternative means of access to works that they cannot afford to purchase outright." Cohen, *supra* note 142, at 1806.

166 Cohen, *supra* note 142, at 1806 (noting that price discrimination models "measure only the copyright owner's ability to make a first sale to a particular consumer under different pricing (and legal) regimes"); *see also* Gordon, *supra* note 155, at 1372-75 (pointing out that the balancing and limitation of entitlements in intellectual property law can itself be seen as a form of price discrimination).

167 "Implementing price discrimination is costly. The producer must invest in identifying discrete market categories that would bear different prices. It must also take measures—technical, contractual, marketing, or any combination—to prevent arbitrage of the good from low value users to high value users." Benkler, *supra* note 84, at 2072.

minimal, especially when one considers that the marginal cost of a nonrival information good will be zero. Therefore, no producer will find it financially worthwhile to incur the transaction costs necessary to sell to those low-value customers.¹⁶⁸ This means that many aspects of the good which were non-excludable before access controls were put in place will become excludable but not commodifiable under the price discrimination model; they will simply disappear. The lack of access for this subset of customers is particularly troubling when one considers the positive externalities associated with the activities of certain low-value users traditionally privileged in intellectual property law, such as the penurious scientist, teacher, or parodist.¹⁶⁹

The general theory of price discrimination also suffers from the same limitation as any economic model that determines public policy based on consumer valuation: it does not account for the distributional starting point. Even in an economically efficient world, the initial set of entitlements—the initial distribution of wealth—matters.¹⁷⁰ Again, the impact here on low-value users is the most significant. James Boyle puts it nicely:

Thus, for example, the glass of water is “worth” only \$1 to the person dying of thirst whose wallet holds but a single dollar. Indeed, there would be a social loss of \$3 if we gave him his drink instead of offering it to the slightly overheated rich person who would pay \$4 for it.¹⁷¹

Boyle also points out that information products are essentially experience goods—consumers cannot accurately value information that is completely hidden from them until after they have already paid. Assumptions about consumer valuation are therefore especially suspect when we are dealing with information goods, particularly when

168 *Id.* at 2072–73.

169 See 17 U.S.C. § 107 (listing “criticism, comment, news reporting, teaching, . . . scholarship, [and] research” among favored fair uses); see also Boyle, *supra* note 53, at 2032 (arguing that to assess the benefit of price discrimination one must “study the importance to innovation of that subset of information that content producers cannot currently control, and which is available as a result at its marginal cost of zero, but which they would be able to control under the legally sanctioned price discrimination regime”); Cohen, *supra* note 94, at 498 (“[T]here is no particular reason to believe that a new author’s ability to pay for the right to use an existing work is a good predictor of the quality of the eventual result, whether quality is measured in terms of market success or by some other standard.”).

170 See Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1095–96 (1972) (discussing how transaction costs and the distribution of wealth affect the choice of entitlements).

171 Boyle, *supra* note 53, at 2022 n.30.

architectural controls completely preclude any unauthorized previewing thereof.¹⁷²

Finally, the widespread adoption of price discrimination in the information marketplace would likely produce certain negative externalities. Foremost among these is the effect on privacy interests. A world in which price discrimination is the marketing model for databases and other information goods is a world in which corporations (and possibly the government) are monitoring what each of us reads, listens to, and looks at—and how long we read, listen, and look.¹⁷³ Some loss of privacy might be a price worth paying for increased production of and access to information goods, but only if the price discrimination model could deliver on its promise. Given the flaws in the model identified above, the case for paying that price has yet to be made.

The foregoing discussion makes one thing clear: database developers' extralegal, architectural control over access to and use of their products is likely to play a pivotal role in constraining behavior in the database market. Existing and proposed pro-expansionist technolegical measures serve only to strengthen that control. And the silver lining in the cloud of increased control—price discrimination—proves on closer examination to be tarnished. It is therefore ironic that anti-expansionists cite developers' architectural capabilities as a positive feature of the database market—as a reason not to enact database protection legislation.¹⁷⁴ The better view, as we see in the following section, is that database protection legislation is the best (and perhaps the last) real hope for a sensible policy outcome.

III. A TECHNOLOGICAL TOOLBOX

Database developers have a problem they don't like—market failure—and a solution that the rest of us shouldn't like—architectural

172 *Id.* at 2033–34.

173 “Many of the Internet's attractive features as a speech technology—its openness, its resistance to filtration by both public and private power, its anonymity—seem like bugs rather than features from the point of view of perfect price discrimination.” *Id.* at 2034; *see also* Litman, *supra* note 17, at 611 (“Policing control over access and dissemination . . . requires significant monitoring of who is using the database and what data she is retrieving.”).

174 *See, e.g., H.R. 354 1999 Hearing, supra* note 64, at 158 (statement of Charles Phelps on behalf of Ass'n of Am. Univs.) (“We submit that this concern is likely to be addressed adequately by methods of protection in common use today, including technical restrictions on access and contract.”); U.S. COPYRIGHT OFFICE, *supra* note 64, at 68 (reporting that opponents of database legislation argue that “[t]echnological means of protection are also available and effective”).

controls. A successful database policy must address both the market problem and the architectural solution, so that the entitlements that emerge from the debate on such issues as scope, duration, value-added products, and privileged use will have their intended effect. In other words, any decision to enact database protection entitlements that resemble traditional intellectual property rights must also necessarily take account of extralegal, architectural controls if its policy goals are to be achieved. Even a decision to refrain from enacting a database right will not have its intended effect if policymakers fail to incorporate technological measures into their policymaking.

In this final part of my discussion, I identify several technological tools that policymakers might use in resolving the database debate, and will suggest that one of them—which I call re-reification—provides the best combination of efficacy and flexibility. To show why re-reification is advantageous, I first review in detail one issue in the database debate that vexes the pro-expansionists and anti-expansionists alike and that in fact represents the entire debate writ small: sole-source databases. The sole-source example then serves as a basis for a broader discussion of how technological tools might be used to implement other policy decisions in the database debate and why re-reification is particularly well-suited to the task.

A. *The Sole-Source Problem*

One of the most troubling issues in the database debate is what to do about data that are available from only one source.¹⁷⁵ Examples range from financial market data, such as stock prices, to data on fleeting natural phenomena, such as earthquake measurements cap-

¹⁷⁵ I do not include within this definition data that can be independently compiled by a second compiler, but that have a market capable of handling only one seller. See Reichman & Samuelson, *supra* note 17, at 70 (noting a lack of competition in the market for commercially distributed databases). Such “niche” data are not architecturally restricted in the same way as true sole-source data and thus present entirely different questions. See U.S. PATENT & TRADEMARK OFFICE, REPORT ON RECOMMENDATIONS FROM THE APRIL 1998 CONFERENCE ON DATABASE PROTECTION AND ACCESS ISSUES pt. III.B.2 (1998), at <http://www.uspto.gov/web/offices/dcom/olia/dbconf/dbase498.htm> (arguing that when a niche market can handle only one supplier even though data are available elsewhere, database protection should apply or no one will serve that market at all); see also Michael Freno, Note, *Database Protection: Resolving the U.S. Database Dilemma with an Eye Toward International Protection*, 34 CORNELL INT’L L.J. 165, 206–07 (2001) (“Congress should define ‘publicly accessible’ data as data the public can obtain through reasonable diligence from a printed or electronic source that is open and free to the public or obtainable, as individual items of data, through inexpensive research.”).

tured by only one researcher.¹⁷⁶ Because the data source either is controlled by a single, private party or has disappeared, sole-source data present a more serious market problem than databases incorporating publicly available data—a fact that parties on both sides of the database debate recognize.¹⁷⁷

More specifically, the problem with sole-source data is that they are impervious to one of the safeguards that all participants in the debate acknowledge as crucial: independent collection. Even the most diehard pro-expansionist recognizes that database developers can lay claim only to the effort they put into compiling the data, rather than to the data themselves.¹⁷⁸ A second developer is accordingly free to market a competing database as long as it assembles the data by consulting the original sources, rather than by copying the data from the first database.¹⁷⁹ This notion of independent collection

176 *Collections of Information Antipiracy Act and Vessel Hull Design Protection Act: Hearing on H.R. 2652 and H.R. 2696 Before the Subcomm. on Courts and Intellectual Prop. of the House Comm. on the Judiciary*, 105th Cong. 60 (1997) (statement of J.H. Reichman).

177 See, e.g., *Statutory Protection for Databases: Economic & Public Policy Issues: Hearing on H.R. 2652 and H.R. 2696 Before the Subcomm. on Courts and Intellectual Prop. of the House Comm. on the Judiciary*, 105th Cong. 85 (1997) [hereinafter *Protection for Databases Hearing*] (statement of Laura D. Tyson & Edward F. Sherry, Members, Info. Indus. Ass'n), available at <http://www.house.gov/judiciary/41118.htm>; H.R. REP. NO. 106-349, at 33 (1999); L. Ray Patterson, *Copyright in the New Millennium: Resolving the Conflict Between Property Rights and Political Rights*, 62 OHIO ST. L.J. 703, 711 (2001); Reichman & Samuelson, *supra* note 17, at 70–71.

178 E.g., *Protection for Databases Hearing*, *supra* note 177, at 83–85 (statement of Laura D. Tyson & Edward F. Sherry, Members, Info. Indus. Ass'n) (recognizing that those arguing for statutory database protection would apply it only to the database and not the underlying data); *accord* Database and Collections of Information Misappropriation Act, H.R. 3261, 108th Cong. § 4(a) (2003); Consumer and Investor Access to Information Act of 1999, H.R. 1858, 106th Cong. § 103(a) (1999); Collections of Information Antipiracy Act, H.R. 354, 106th Cong. § 1403(c) (1999); Collections of Information Antipiracy Act, H.R. 2652, 105th Cong. § 1203(b) (1997); Database Investment and Intellectual Property Antipiracy Act of 1996, H.R. 3531, 104th Cong. § 5(b) (1996). No one has suggested that a database right should be modeled on patent law's grant of protection against even those who independently produce the same good. Rather, the models for all the database proposals have been copyright law and misappropriation law. See, e.g., Consumer Access to Information Act of 2004, H.R. 3872, 108th Cong. § 2 (2004); H.R. 3261 § 3; H.R. 1858 § 102; H.R. 354 § 2; H.R. 2652, § 2; H.R. 3531 § 4; Pollack, *supra* note 17, at 123–44 (examining the interplay between copyright and misappropriation law and the Collections of Information Antipiracy Act, H.R. 2652); Reichman & Samuelson, *supra* note 17, at 139–45 (discussing the unfair competition approach); see also *supra* note 69 (discussing copyright-like sui generis proposals posing as misappropriation proposals).

179 The extent to which the second developer could use the first database to verify or guide its efforts is an open question from the pre-*Feist* era. See Robert A. Gorman, *Copyright Protection for the Collection and Representation of Facts*, 76 HARV. L. REV. 1569,

is a direct descendant of the independent authorship defense to copyright infringement actions discussed in Part I.B, and indeed independent collection was a copyright defense in the days when the sweat-of-the-brow doctrine still provided copyright protection to databases.¹⁸⁰ The possibility of independent collection acts as a check on what might otherwise become true monopoly power over information.¹⁸¹

The independent collection safeguard, however, loses its effectiveness when data have only one source and that source is controlled by one database developer.¹⁸² If our penurious researcher is studying

1585–89 (1963) (arguing that “slipping”—the practice of relying on an existing database to verify independently verified facts—should be legal under copyright law); Ginsburg, *supra* note 40, at 1931–32 (discussing how compulsory licensing may address slipping); Ira Lurvey, “Verifying” From Prior Directories—“Fair Use” or Theft? *Delicate Distinctions in the Protection of Copyrighted Compilations*, 13 BULL. COPYRIGHT SOC’Y U.S.A. 271, 271–72 (1966) (suggesting a “graduated” standard for slipping cases); *see also* Nat’l Research Bureau, Inc. v. Kucker, 481 F. Supp. 612, 614 (S.D.N.Y. 1979) (finding that slipping constitutes copyright infringement); *Jewelers’ Circular Publ’g Co. v. Keystone Publishing Co.*, 274 F. 932, 935 (S.D.N.Y. 1921), *aff’d*, 281 F. 83 (2d Cir. 1922) (L. Hand, J.) (“Every one concedes that a second compiler may check back his independent work upon the original compilation, but there has been some dispute whether he may use the original compilation after simply verifying its statements, or whether he must disregard the assistance of the original, except in subsequent verification.”).

180 *See supra* notes 38–43 and accompanying text; *see also* Banks v. McDivitt, 2 F. Cas. 759, 760 (C.C.S.D.N.Y. 1875) (No. 961) (noting that “the subsequent investigator must investigate for himself, from the original sources which are open to all,” in order to avoid copyright liability).

181 *See supra* notes 154–60 and accompanying text (discussing market power in the database industry). In copyright law, this check may be of constitutional significance. *See Eldred v. Ashcroft*, 537 U.S. 186, 219–20 (2003) (noting that the availability of facts in the public domain is one of copyright’s “built-in First Amendment accommodations”). For this reason, some scholars have questioned whether Congress could enact database rights without running afoul of free speech constraints, even if the Intellectual Property Clause does not provide the jurisdictional hook. *See supra* note 75. The constitutional question is, however, irrelevant to private architectural controls on database products; they would not implicate the First Amendment—which regulates only state action—even though they might achieve technologically what the government could not achieve legislatively.

182 Even if multiple sources exist, one source may have an innate advantage that will allow it to monopolize the market despite the possibility of independent collection. For example, the database owner in *Feist*, Rural Telephone Service, collected telephone directory data in the course of running a profitable, government-sanctioned utility. *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 343 (1991). These data were theoretically available for independent collection by rival directory publishers like Feist, which could have gone door-to-door to gather names, addresses, and telephone numbers. But such independent collection would have been prohibitively expensive, given Rural’s much cheaper, government-sanctioned access to the same information. Even staunch advocates of strong database rights concede that Rural is a poor poster child for their cause. *See, e.g., Protection for Databases Hearing*,

daily temperature variances in Seattle, any number of publicly available sources can provide the necessary data. But if he or she is interested in historical hourly variances, or in the influence of sunspots on atmospheric temperature, then there may be only one source through which the data may be accessed.¹⁸³ Sole-source data therefore give rise to monopoly concerns. Because of these concerns, some commentators have questioned whether sole-source databases should be included within a database entitlement.¹⁸⁴ Pro-expansionists respond that sole-source data may go uncollected and thus disappear if database developers do not have a sufficient incentive to collect them, and that an entitlement may be the only way to provide that incentive.¹⁸⁵ But excluding sole-source data from a new entitlement is only

supra note 177, at 71 (statement of Laura D. Tyson & Edward F. Sherry, Members, Info. Indus. Ass'n) ("When data is generated by a government-created monopolist, it is not appropriate to allow the monopolist to control database products building on that data."). So the question is not just whether sole-source data are publicly available—that is, can be independently compiled by another database developer—but whether the data can be independently compiled with approximately the same effort expended by the first developer. The method of collection may be proprietary, even if the data are not.

183 Some defenders of expansive database protection have suggested that the sole-source problem is overstated, because even when certain data are available from only one source, similar data that are "just as good" might be available elsewhere. See, e.g., *Protection for Databases Hearing*, *supra* note 177, at 85–87 (statement of Laura D. Tyson & Edward F. Sherry, Members, Info. Indus. Ass'n) (arguing that new entrants to the market can gather data from the same sources that the original used). The idea that exclusive property rights are contingent on the availability of equivalent property-acquiring opportunities for others is as old as Locke's "as much and as good" proviso. See JOHN LOCKE, *TWO TREATISES OF GOVERNMENT* 288 (Peter Laslett ed., Cambridge Univ. Press 1988) (1690) (defending private appropriation of property "at least where there is enough, and as good left in common for others"). But there will certainly be many instances in which there is no satisfactory alternative to a certain set of sole-source data.

184 E.g., Freno, *supra* note 175, at 206–07 (arguing that statutory protection should require a sole-source proprietor to prove that the extracted information was available from another source in a suit for piracy); Ginsburg, *supra* note 23, at 175 (arguing that the public interest in a variety of information sources may preclude statutory protection for sole-source databases); Reichman & Uhler, *supra* note 17, at 808–09 (noting that statutory protection would prevent new entrants into a market already dominated by a sole-source provider).

185 E.g., *Protection for Databases Hearing*, *supra* note 177, at 85–87 (statement of Laura D. Tyson & Edward F. Sherry, Members, Info. Indus. Ass'n) (noting that the possibility of replication destroys the incentive to collect historical data that would otherwise be lost). Certain sole-source databases may in fact be better candidates for intellectual property protection than databases that draw on publicly available information, because some types of sole-source data will be lost forever absent an incentive to collect them immediately—for example, data that measure and record natural phe-

half the issue; the other half is how the law should regulate architectural constraints that could otherwise undo the entitlement decision.

The problem of sole-source databases, after all, is inherently architectural. Access to the data themselves is physically excludable. Such total excludability results in more serious market monopoly potential because those who want to use sole-source data have no way of physically obtaining the data except through a single database developer. And this problem exists regardless of where the legal entitlement lies—with the public or the developer. Moreover, existing legal modalities reinforce the developer's ability to retain architectural control over the data. For example, trespass law gives legal backing to physical constraints on access that the developer can put in place—fences, safes, and so forth. Trade secret law serves a similar technological function by granting its protection to those who have already taken steps to keep their information secure through architectural measures,¹⁸⁶ much as the DMCA gives legal backing to technological means of controlling copyrighted works.¹⁸⁷ But safes would be safe even without trade secret and trespass law, and copy protection software would protect software against copying even if the DMCA had never been enacted.¹⁸⁸ In both cases the legal protections merely strengthen a preexisting architectural condition of secrecy.

Of course, architectural control that depends on secrecy is compromised if the database is published. For some databases, this is not an issue. If the sole-source data have a commercial value that would be lost upon publication and could not feasibly be recovered through user fees, the developer will not market the database even with the protection of a strong *sui generis* entitlement; the database has more value as an internal secret than as an external commodity.¹⁸⁹ But

nomena. On the other hand, when data (sole-source or otherwise) are acquired in the course of an activity that provides its own incentive, no legal or architectural excludability is needed. The telephone company in *Feist*, for example, collected the names and numbers of its customers in order to provide them with telephone service, not to publish them in a directory. *Feist*, 499 U.S. at 343; see also Pollack, *supra* note 17, at 52 (noting that the telephone company “had not really sweated” and that *Feist* “was a clear case of a government-protected monopolist attempting to prevent a competitor from marketing a value-added product in a downstream market category”).

186 See UNIF. TRADE SECRETS ACT § 1(4)(ii) (amended 1985) (conditioning protection on efforts to maintain secrecy).

187 See *supra* Part II.C.1.

188 See Burk & Cohen, *supra* note 19, at 82 (“Even facial invalidation of anti-circumvention legislation . . . will not prevent private publishers from implementing rights management systems.”).

189 Even if the developer later decides to publish, legal or architectural excludability at that point would be counterproductive because the database's internal value

even for those sole-source databases that the developer develops for the purpose of bringing them to market, publication does not necessarily require forgoing all the architectural constraints that create the sole-source problem. As discussed above,¹⁹⁰ databases can be and are marketed in such a way that comprehensive access to the data is still excludable.

So the sole-source problem does not necessarily go away when the database is published. Those who would use the database are thus at the mercy of the one developer who controls it; they must pay (if they can) whatever price, and accept whatever terms, that developer chooses to set.¹⁹¹ And any attempt to circumvent the architectural constraints that maintain the sole-source monopoly will not only carry its own extralegal costs, but will also likely run afoul of one or more of the pro-expansionist technological measures discussed above and thus expose the circumventer to legal liability.¹⁹²

The solution to the sole-source problem therefore cannot be found in a mere refusal to enact database protection legislation or in the exclusion of sole-source databases from such protection, any more than repealing the law of trespass would make fences disappear. A developer's physical control over sole-source data creates an architectural property "right" even in the absence of a legal entitlement. Yet most of the proposed solutions to the sole-source dilemma fail to consider the architectural. The most clearly deficient solutions are those that merely establish an exception to a *sui generis* "property rule" entitlement,¹⁹³ along the lines of copyright's fair use exception.¹⁹⁴ One

would have already provided the incentive necessary to generate it. Any exclusive right at the commodification stage would accordingly impose deadweight loss and other costs on the public with no countervailing benefit. See *Eldred v. Ashcroft*, 537 U.S. 186, 248 (2003) (Breyer, J., dissenting) (noting that copyright entitlement can lead to costs in the form of "(1) royalties that may be higher than necessary to evoke creation of the relevant work, and (2) a requirement that one seeking to reproduce a copyrighted work must obtain the copyright holder's permission").

190 See *supra* Part II.B.

191 See Reichman & Samuelson, *supra* note 17, at 66 (discussing the problem of "sole-source data providers [that] charge monopolistic prices or oblige libraries and research institutions to accept terms and conditions that effectively waive both the special privileges and the fair use exceptions set out in the Copyright Act of 1976").

192 See *supra* Part II.B (discussing hacking); *supra* Part II.C.1 (discussing existing pro-expansionist technological measures).

193 The notion of protecting an entitlement with a "property rule" was first articulated by Guido Calabresi and A. Douglas Melamed in their seminal article *The Cathedral*: "An entitlement is protected by a property rule to the extent that someone who wishes to remove the entitlement from its holder must buy it from him in a voluntary transaction in which the value of the entitlement is agreed upon by the seller." Calabresi & Melamed, *supra* note 170, at 1092.

commentator, for example, suggests that to prove a prima facie case of database infringement, “the plaintiff would have to show that each item in the database allegedly extracted or used was publicly accessible through alternative means.”¹⁹⁵ This is similar to a provision in the second proposed Collections of Information Antipiracy Act, which would have provided an affirmative defense for non-profit researchers who extract government information that was not “publicly available from the government or reasonably available from any other source.”¹⁹⁶ But both of these approaches assume that an unauthorized use has occurred—that the defendant has somehow managed to overcome the architectural constraints that the database developer has put in place. The main threat that sole-source databases pose, however, is that users will simply not be able to access the database or the underlying data at all. Knowing that unauthorized use is legally defensible is of little comfort if unauthorized access is architecturally impossible.

For the same reason, a misappropriation or unfair competition approach to database regulation will not solve the sole-source problem.¹⁹⁷ Misappropriation theory has as its starting point the unautho-

194 The fair use doctrine in copyright law relieves a defendant from liability in certain circumstances, see 17 U.S.C. § 107 (2000), but it provides no affirmative rights that would help a user overcome architectural restrictions on use or access. See Kreiss, *supra* note 97, at 47 (“[T]he fair use provision is a shield against a finding of infringement; it is not a sword which can be used to gain access to the work.”); *supra* text accompanying note 80.

195 Freno, *supra* note 175, at 206.

196 H.R. 354, 106th Cong. sec. 2, § 1408(c)(1)(A) (1999).

197 The legislative proposals sometimes use misappropriation language to achieve a sui generis property right result. See *supra* note 69. Some commentators have suggested a true misappropriation approach to the problem. See, e.g., Dennis S. Karjala, *Copyright and Misappropriation*, 17 U. DAYTON L. REV. 885, 915–26 (1992) (discussing the need for balance between protecting against misappropriation and allowing access to factual information); Reichman & Samuelson, *supra* note 17, at 139–45 (arguing for a refinement of the misappropriation doctrine in *International News Service v. Associated Press*, 248 U.S. 215 (1918)). They may have gotten their wish with the most recent database protection legislation to see action in Congress: the Consumer Access to Information Act of 2004, H.R. 3872, 108th Cong. (2004), and the Database and Collections of Information Misappropriation Act, H.R. 3261, 108th Cong. (2003). These latest bills clearly take a “hot news” and misappropriation approach to the database underproduction problem. See *supra* note 70. For contrasting views on the role of misappropriation concepts in intellectual property law generally, compare Richard A. Posner, *supra* note 74, at 621 (concluding that “the term and the doctrine can be jettisoned, so far as intellectual property is concerned at any rate, without loss, and should be”), and Leo J. Raskind, *The Misappropriation Doctrine as a Competitive Norm of Intellectual Property Law*, 75 MINN. L. REV. 875, 876 (1991) (arguing that the misappropriation doctrine should be invoked sparingly in intellectual property law),

rized appropriation of some intangible good.¹⁹⁸ A misappropriation law's only function is to assign liability when such an appropriation has already occurred and has caused commercial harm to the developer's market. Where extralegal means prevent the occurrence of the appropriation, however, the question of the appropriation's propriety never arises.

Substituting a straightforward liability rule for these property rules does not help either. The idea behind a liability rule is that one may override a preexisting legal entitlement by unilaterally taking what one wants—i.e., exercising the owner's right without the owner's consent.¹⁹⁹ The law then determines compensation for the taking not through issuance of an injunction and subsequent bargaining with the owner, but through a monetary award set by an objective third party, such as a court or—as is often the case in copyright law—a centralized royalty authority.²⁰⁰ For example, federal statute grants patent and copyright owners money damages only, instead of injunctive relief,

with Dennis S. Karjala, *Misappropriation as a Third Intellectual Property Paradigm*, 94 COLUM. L. REV. 2594, 2596 (1994) (urging widespread incorporation of misappropriation principles into intellectual property law).

198 RESTATEMENT (THIRD) OF UNFAIR COMPETITION § 38 (1995).

199 “Whenever someone may destroy the initial entitlement if he is willing to pay an objectively determined value for it, an entitlement is protected by a liability rule.” Calabresi & Melamed, *supra* note 170, at 1092. Abraham Bell and Gideon Parchomovsky have refined the Calabresi and Melamed model to show that a hybrid property/liability regime they call “mandatory zero order liability rules” governs current intellectual property entitlements. Abraham Bell and Gideon Parchomovsky, *Liability Rules*, 101 MICH. L. REV. 1, 39–44 (2002). In the intellectual property sphere, Jerry Reichman has been the foremost advocate for use of liability rules. See, e.g., J.H. Reichman, *Legal Hybrids Between the Patent and Copyright Paradigms*, 94 COLUM. L. REV. 2432, 2519–55 (1994) (arguing for liability rules in lieu of continued reliance on principles of copyright and patent law); J.H. Reichman, *Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation*, 53 VAND. L. REV. 1743, 1776–97 (2000) (arguing that a modified liability rule would cure the problems created by a property right system); Reichman & Samuelson, *supra* note 17, at 145–51 (arguing for a liability rule similar to that of trade secret law rather than exclusive property rights); Pamela Samuelson, Randall Davis, Mitchell D. Kapor & J.H. Reichman, *A Manifesto Concerning the Legal Protection of Computer Programs*, 94 COLUM. L. REV. 2308, 2426–29 (1994) (arguing for a repository system in which database owners would be automatically compensated for secondary use).

200 See Copyright Act of 1976, Pub. L. No. 94-553, § 801, 90 Stat. 2541, 2594–96 (establishing royalty tribunal); Copyright Royalty and Distribution Reform Act of 2004, H.R. 1417, 108th Cong. sec. 3, §§ 801–02 (2004) (proposing replacing royalty arbitration panel with a full-time royalty judge and two full-time assistants); Copyright Royalty Tribunal Reform Act of 1993, Pub. L. No. 103-198, § 2, 107 Stat. 2304 (codified at 17 U.S.C. § 801) (replacing royalty tribunal with ad hoc royalty arbitration panel).

when the U.S. government or an agent thereof engages in unlicensed use of their entitlements.²⁰¹ Unless the liability rule includes some method of ensuring access to the database, however, it will be no more helpful to the user than the property-rule exception. The event that triggers the liability/compensation determination is the invasion of the entitlement by an outside party; the triggering event will accordingly not occur where architectural control over the subject of the entitlement prevents unauthorized access and use.

These straightforward property and liability rules are unable to solve the sole-source dilemma because they attempt to use purely legal entitlements to solve an architectural problem. The solution again must instead be technological; it must directly address both the legal entitlement question and the architectural access question. Although this point has escaped explicit recognition by commentators and policymakers, one can find some technological tools in the academic literature and legislative history of the various database proposals.

One such tool consists of borrowing the “essential facilities” doctrine from antitrust law to promote fair access to sole-source databases. The essential facilities doctrine began as a means of ensuring nondiscriminatory access to key aspects of an industry’s physical infrastructure, such as railroad terminals, when owned by a single competitor.²⁰² It has since been applied to facilities ranging from produce markets²⁰³ to sports arenas.²⁰⁴ Legislators on Capitol Hill are particularly fond of suggesting this doctrine as a solution to the sole-source database problem; it has been incorporated into several of the database protection bills that have made it to the floor of the House.²⁰⁵

201 The U.S. Court of Federal Claims determines the amount of the monetary award. 28 U.S.C. § 1498(a)–(b) (2000).

202 *United States v. Terminal R.R. Ass’n of St. Louis*, 224 U.S. 383, 394–413 (1912). Although the term “essential facility” did not appear in a published judicial opinion until the 1977 ruling in *Hecht v. Pro-Football, Inc.*, 570 F.2d 982, 992 (D.C. Cir. 1977), *Terminal Railroad* is considered the case that established the doctrine. Abbott B. Lipsky, Jr. & J. Gregory Sidak, *Essential Facilities*, 51 STAN. L. REV. 1187, 1195–98 (1999).

203 See *Gamco, Inc. v. Providence Fruit & Produce Bldg., Inc.*, 194 F.2d 484, 486–88 (1st Cir. 1952) (applying the Sherman Act to defendant’s refusal to allow plaintiff to use its building located adjacent to the main freight lines).

204 See *Fishman v. Estate of Wirtz*, 807 F.2d 520, 539–40 (7th Cir. 1986) (applying essential facilities doctrine to Chicago Stadium and the market for live professional basketball).

205

Subsection (d) [of sec. 2, § 1405 of the Collections of Information Antipiracy Act, H.R. 354, 106th Cong. (1999)], deals with the relationship of

The essential facilities doctrine has some appeal as a technological solution to the sole-source problem. To order a database developer to permit access by others is to directly regulate the architectural control that causes the problem in the first place. As an antitrust doctrine, however, it focuses on promoting competition, and thus only applies to disputes between competitors.²⁰⁶ In contrast, those with the greatest need and least ability to access sole-source databases are likely to be downstream users, not competitors, and who would therefore not have standing to invoke the doctrine.²⁰⁷ Moreover, the scholarship on the doctrine even within antitrust law has been mostly critical.²⁰⁸ This criticism has followed the doctrine in its few inroads into

this Act to antitrust law. It states that this chapter will not limit application of antitrust laws, including those laws regarding single suppliers of products and services. The subsection is intended to address the so-called 'sole source' issue, involving situations where the information within a collection is not available elsewhere for others to obtain, giving the producer of the collection a de facto monopoly over the facts contained therein. The committee believes that an appropriate response to potential abuse, to the extent it is not dealt with by existing regulatory authorities overseeing certain industries, can be found in the antitrust laws, which are specifically designed to deal with such monopoly concerns. The essential facilities doctrine in particular may be especially relevant to this issue.

H.R. REP. NO. 106-349, at 33 (1999); *accord* H.R. REP. NO. 105-525, at 19 (1998) (discussing an analogous provision in H.R. 2652, 105th Cong. sec. 2, § 1205(d) (1997)). One of the most recent bills includes general language disclaiming any effect on antitrust law but does not contain the same sole-source-specific provision as H.R. 354 and H.R. 2652. Database and Collections of Information Misappropriation Act, H.R. 3261, 108th Cong. § 6(a)(1) (2003).

206 See, e.g., *Interface Group, Inc. v. Mass. Port Auth.*, 816 F.2d 9, 12 (1st Cir. 1987) (Breyer, J.) ("[I]t is difficult to see how denying a facility to one who, like Interface, is not an actual or potential competitor could enhance or reinforce the monopolist's market power.").

207 See *Thomas v. Network Solutions, Inc.*, 176 F.3d 500, 509-10 (D.C. Cir. 1999) (dismissing an essential facilities claim on the ground that plaintiffs were users rather than competitors of defendant's Internet domain name registration service).

208 See, e.g., 3A PHILLIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW* ¶ 771c (2d ed. 2002) ("Lest there be any doubt, we state our belief that the 'essential facility' doctrine is both harmful and unnecessary and should be abandoned."); ADAM THIERFÉ & CLYDE WAYNE CREWS, JR., *WHAT'S YOURS IS MINE: OPEN ACCESS AND THE RISE OF INFRASTRUCTURE SOCIALISM* 23-35 (2003) (criticizing the essential facilities and natural monopoly doctrines as "fundamentally flawed"); Phillip Areeda, *Essential Facilities: An Epithet in Need of Limiting Principles*, 58 *ANTITRUST L.J.* 841, 841 (1990) (arguing against the expansion of the essential facilities doctrine); Donald I. Baker, *Compulsory Access to Network Joint Ventures Under the Sherman Act: Rules or Roulette?*, 1993 *UTAH L. REV.* 999, 1005-06 (noting the need for clarity and limitation in the essential facilities doctrine); Michael Boudin, *Antitrust Doctrine and the Sway of Metaphor*, 75 *GEO. L.J.* 395, 397-401 (1986) (expressing doubt as to the efficacy of the essential

the world of intellectual property in general²⁰⁹ and into the world of data protection in particular.²¹⁰ Application of the doctrine to intellectual property may also raise constitutional issues under both the First and Fifth Amendments.²¹¹ In short, the reliance on the essential facilities doctrine smacks of a vague hope that the law has somehow already dealt with the sole-source problem rather than a serious and rigorous attempt to find a solution.

Compulsory licensing—a subset of the liability rule approach—is another regulatory tool that has technological potential. In a compulsory licensing regime, the statute leaves the owner of an entitlement no choice but to permit its transfer to or exercise by certain qualifying

facilities doctrine); Keith N. Hylton, *Economic Rents and Essential Facilities*, 1991 BYU L. REV. 1243, 1251–66 (arguing that the essential facilities doctrine may be both contrary to economic theory and anticompetitive); David J. Gerber, Note, *Rethinking the Monopolist's Duty to Deal: A Legal and Economic Critique of the Doctrine of "Essential Facilities,"* 74 VA. L. REV. 1069, 1071–72 (1988) (arguing that courts should find a duty to deal only in exceptional circumstances).

209 See, e.g., Lipsky & Sidak, *supra* note 202, at 1218–19 (arguing that “essential facilities principles are inherently inconsistent with intellectual property protection”); O’Rourke, *supra* note 104, at 546–48 (approving of the use of the doctrine in evaluating whether fair use rights are alienable in software licenses). Compare Thomas A. Piraino, Jr., *An Antitrust Remedy for Monopoly Leveraging by Electronic Networks*, 93 Nw. U. L. REV. 1, 50–62 (1998) (arguing that the doctrine is the best tool available for ensuring that Microsoft does not unfairly leverage its dominance in the market for computer operating systems), with James B. Speta, *Tying, Essential Facilities, and Network Externalities: A Comment on Piraino*, 93 Nw. U. L. REV. 1277, 1280–82 (1999) (arguing for the application of other antitrust doctrines to Microsoft instead).

210 Compare Robert Pitofsky et al., *The Essential Facilities Doctrine under U.S. Antitrust Law*, 70 ANTITRUST L.J. 443, 444–45 (2002) (urging application of essential facilities doctrine to data on sales of pharmaceuticals in Germany), with Paul D. Marquardt & Mark Leddy, *The Essential Facilities Doctrine and Intellectual Property Rights: A Response to Pitofsky, Patterson, and Hooks*, 70 ANTITRUST L.J. 847, 847–48 (2003) (arguing the opposite); compare *BellSouth Adver. & Publ’g Corp. v. Donnelley Info. Publ’g, Inc.*, 719 F. Supp. 1551, 1566–67 (S.D. Fla. 1988) (allowing an antitrust claim to proceed on the theory that a sole-source developer’s refusal to share information with a competitor was a denial of an essential facility), *rev’d on other grounds*, 999 F.2d 1436 (11th Cir. 1993), with *Morris Communications Corp. v. PGA Tour, Inc.*, 364 F.3d 1288, 1295–98 (11th Cir. 2004) (holding that neither the essential facilities doctrine nor other antitrust principles require the PGA to give a competitor access to real-time golf scores), and *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 279–85 (2d Cir. 1979) (rejecting an attempt to use antitrust principles to secure a competitor’s proprietary business information).

211 The doctrine implicates the First Amendment because government regulation of the expressive aspects of intellectual property can be seen as compelled speech. Lipsky & Sidak, *supra* note 202, at 1240–47. A Fifth Amendment issue arises because federally-mandated intrusion into a theretofore private essential facility can be seen as an exercise of the government’s takings power. *Id.* at 1223–40.

parties in exchange for compensation determined by a third party. Intellectual property law usually uses compulsory licenses in contexts in which the costs of negotiating individual licenses are thought to be so high as to foil an otherwise welfare-enhancing transaction.²¹² One might also use a compulsory license to achieve a redistribution of wealth or other resources that would not occur in an unregulated market.²¹³

There is little reason *ex ante* to think that transactions involving a database entitlement will generally involve prohibitively high transaction costs. Nevertheless, some scholars have suggested using compulsory licensing in the database market, perhaps with distributive goals in mind.²¹⁴ And others have embraced it as a solution to address the more narrow sole-source issue.²¹⁵ But the main advantage of compul-

212 See Ginsburg, *supra* note 40, at 1925 (“The most popular current justification for compulsory licensing is the reduction of otherwise insuperable transaction costs.”); Paul Goldstein, *Preempted State Doctrines, Involuntary Transfers and Compulsory Licenses: Testing the Limits of Copyright*, 24 UCLA L. REV. 1107, 1138 (1977) (“Compulsory licensing will, to be sure, eliminate transaction delays.”). Compulsory licenses are therefore simply one way of using a liability rule to promote economic efficiency:

Often the cost of establishing the value of an initial entitlement by negotiation is so great that even though a transfer of the entitlement would benefit all concerned, such a transfer will not occur. If a collective determination of the value were available instead, the beneficial transfer would quickly come about.

Calabresi & Melamed, *supra* note 170, at 1106 (describing when efficiency calls for a liability rule). It is difficult to determine exactly when transaction costs are so high as to justify compulsory licenses, but one can find such licenses in both copyright law and patent law. *E.g.*, 17 U.S.C. § 111(c)–(d) (2000) (compulsory license for cable television retransmission); *id.* § 115 (compulsory license for recording of musical performances); *Foster v. Am. Mach. & Foundry Co.*, 492 F.2d 1317, 1324 (2d Cir. 1974) (affirming denial of an injunction against patent infringement and approving the use of a judicially-administered compulsory license instead).

213 *Cf.* Calabresi & Melamed, *supra* note 170, at 1110 (“[T]he choice of a liability rule is often made because it facilitates a combination of efficiency and distributive results which would be difficult to achieve under a property rule.”).

214 *E.g.*, Ginsburg, *supra* note 40, at 1927 (“Compulsory licensing is an appropriate means of reconciling the warring social goals of stimulating the production of information on the one hand, and ensuring its broadest dissemination on the other.”); Lipton, *supra* note 23, at 798 (“[D]atabase law should include compulsory licensing provisions that allow those working in science, technology, and education to access and use databases compiled by sole providers of important scientific, technical, and educational material.”).

215 See Ginsburg, *supra* note 23, at 176 (“Consider . . . a database containing information not available elsewhere. The information provider can rely on a contract or on technology to secure this information. But a special database statute could require that the information provider license the data.”); see also Reichman & Samuelson, *supra* note 17, at 145–47 (proposing a compulsory license as part of the solution to

sory licensing in the database debate is not that it could avoid the costs of individual negotiations or redistribute resources. Its main advantage is its potential as a technological tool: it could require a database developer to provide architectural access to its sole-source data, in addition to permitting legal exercise of its entitlement—compulsory access as well as compulsory license.²¹⁶

One of the primary objections to compulsory licenses (and to liability rules in general) in intellectual property law is that they hinder the development of efficient private collective rights organizations that can serve the same function with less government administration.²¹⁷ Yet compulsory licenses can play a valuable role in setting the default entitlements around which the parties then bargain. This role

the database problem in a market dominated by sole-source developers); John Tesensohn, *The Devil's in the Details: The Quest for Legal Protection of Computer Databases and the Collections of Information Act*, H.R. 2652, 38 IDEA 439, 479–80 (1998) (same). The European Union considered including a compulsory license for sole-source databases within its sui generis database directive, but its final enactment contained no such provision. Reichman & Samuelson, *supra* note 17, at 146.

216 See MARK J. DAVISON, *THE LEGAL PROTECTION OF DATABASES* 35–36 (2003) (observing that the compulsory license could create “an effective right of physical access to the [legally protected] material”).

217 See Paul Goldstein, *The Private Consumption of Public Goods: A Comment on Williams & Wilkins Co. v. United States*, 21 BULL. COPYRIGHT SOC'Y U.S.A. 204, 211 (1974).

This fact, that both buyer and seller are interested in reducing transaction costs and in cooperating toward that end, underscores the flaw in the court's second assumption, that if transaction costs are to be reduced the solution must come in the form of government intervention through, say, a central clearinghouse or compulsory licensing scheme.

Id.; Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CAL. L. REV. 1293, 1295 (1996) (“The lesson learned in a number of industries is that privately established Collective Rights Organizations (CROs) will often emerge to break the transactional bottleneck.”); Robert P. Merges, *Of Property Rules, Coase, and Intellectual Property*, 94 COLUM. L. REV. 2655, 2655 (1994).

[I]n the presence of high transaction costs, industry participants have an incentive to invest in institutions that lower the costs of IPR [intellectual property rights] exchange. Thus, at least in some cases, the costly bargaining occasioned by a strong property rule leads to an administrative structure that serves much the same function as a statutory liability rule.

Id. Note that a collective rights organization could still form under a collective licensing regime; in such a case, users would simply be in a better bargaining position than they would occupy under a property rule approach. This has been the case in one music licensing context: although the Copyright Act provides a compulsory license for cover versions of published music, 17 U.S.C. § 115 (2000), in practice few musicians take advantage of this license. The vast majority choose instead to obtain licenses through the Harry Fox Agency, a private collective rights organization. See Reichman & Samuelson, *supra* note 17, at 148 (discussing the Harry Fox Agency and

is particularly important in the database context, where architectural constraints give the content owners extensive control (and thus strong bargaining power), and where the users who would be most damaged by enactment of a new property right—like our penurious researcher—would be those in the weakest bargaining positions.²¹⁸ The need for circumvention of these constraints thus makes compulsory licensing more attractive here than in other intellectual property contexts; it allows users to avoid the costs that arise from a database developer's imposition of overly protectionist conditions on access and use.

But other disadvantages of compulsory licensing would persist. Compulsory licenses remove the price-setting function from the private market and substitute a comparatively inflexible, top-down pricing regime, which is inherently less sensitive to consumer tastes and preferences. These unitary or near-unitary pricing schemes fail to distinguish between the valuable and the useless, and thus fail to encourage optimal product improvement, differentiation, and even production.²¹⁹ Even if resource allocation is efficient under compulsory licensing, the transaction costs of setting rates, collecting fees, and distributing proceeds may exceed the benefit to the licensor and licensee groups. A cumbersome regulatory mechanism designed to set prices and distribute proceeds may be particularly inappropriate where the goal is to provide cost-free, unconditional access to non-profit downstream users. For these reasons, compulsory licensing is often viewed with suspicion in the intellectual property realm²²⁰ and may not be a panacea here. Despite the heretofore unrecognized

the likelihood of collective rights organizations developing even under a compulsory license for databases).

218 See Reichman & Samuelson, *supra* note 17, at 153 (observing that architectural/technological capabilities make a database developer “increasingly capable of serving ‘as its own collection society, subject to no consent decrees, no membership controls and no external regulation’”) (quoting J.H. Reichman, *Electronic Information Tools—The Outer Edge of World Intellectual Property Law*, 25 INT’L REV. INDUS. PROP. & COPYRIGHT L. 446, 464 (1993)).

219 Goldstein, *supra* note 212, at 1129 (noting that under compulsory license “the royalties to be paid are uniform regardless of the work’s individual market value”); *id.* at 1135 (arguing that compulsory licenses retard investment in and differentiation among copyrighted works).

220 E.g., Stanley M. Besen et al., *Copyright Liability for Cable Television: Compulsory Licensing and the Coase Theorem*, 21 J.L. & ECON. 67, 68 (1978) (“The basic thesis of this paper is that the choice of compulsory licensing for distant signals instead of full copyright liability will . . . aggravate the problems associated with distant-signal importation.”); Goldstein, *supra* note 212, at 1139 (“The compulsory license solution to computer use of copyrighted works should be accepted only with the most thorough justification.”); David Ladd et al., *Copyright, Cable, the Compulsory License: A Second Chance*, COMM. & L., Summer 1981, at 3, 50.

technological advantages of compulsory licensing, it may not be the technological tool best suited to fix the sole-source problem.

B. *The Re-Reification Solution*

The sole-source issue is really a microcosm of the database debate as a whole. Architectural control over a sole-source database differs only in degree from architectural control over a database comprising publicly available data. In both cases, architecture can help preserve the developer's incentive to produce and disseminate the database. But in both cases, architecture also imposes significant costs on anyone who wants to use the data without the developer's consent. For databases in general, architectural restrictions obviate the safeguards—such as limited duration and privileged use for value-added uses—that intellectual property law uses to strike the balance between private incentive and public benefit. For sole-source databases, architectural restrictions have the same effect, and in addition preclude welfare-enhancing competition. Any resolution of either the narrow sole-source problem or the broader database issue will therefore need to focus directly on regulating those aspects of technology that impose these costs and that threaten to undermine whatever balance of legal entitlements emerges from the database debate. The tool needs to be technological.

While the essential facilities doctrine and compulsory licensing have some attractive technological features, we have already seen why they might not be the best tools in our toolbox. We can also quickly dispense with two other technological measures that would directly regulate architecture in the database market. At one end of the spectrum we have the extreme pro-expansionists' dream: the law could give legal backing to database developers' architectural ability to constrain behavior by outlawing database hacking and associated anti-circumvention technologies.²²¹ At the other end of the spectrum, the extreme anti-expansionists' dream: legislation that mandates removal of technological constraints on database use and access, such as encryption, copy protection, and access controls, so that a database's

All told, the costs incurred by the interested parties and the public under the compulsory license certainly run into millions of dollars. There are alternatives to compulsory licensing of cable secondary transmissions that can minimize transaction costs and, at the very least, eliminate public revenues being used for government regulation.

Id.

²²¹ As discussed *supra* Part II.C.1, to some extent the DMCA and CFAA already do this and certain legislative proposals have sought to further this type of technological regulation.

contents would always be architecturally available and hacking would be unnecessary.²²² Neither of these approaches would produce an acceptable policy outcome. If the law buttresses database developers' architectural controls, developers will be able to dictate the terms of database transactions—regardless of where the legal entitlements lie—with results that will protect incentive only and thus disserve the greater good. If the law prevents developers from employing any technological self-help measures, the public will engage in widespread unlicensed use, thus robbing the developer of any incentive to produce the database in the first place (and rendering any available legal sanction toothless due to the high costs of enforcement).

These two extreme technological options are therefore unacceptable. The same is true of a third, more moderate possibility, which seems at first blush to have more potential: refrain from regulating the use of technology by either party, developer or user. This third alternative is in reality not much more likely than the other two to produce the optimal balance between private incentive and public benefit. As discussed above,²²³ if information technology is left unregulated, the winner of the battle for architectural control of databases and other information goods is not the public, but the better technologist, and we cannot count on any correlation between that technologist's interests and overall social welfare.

We therefore need some technological measure that is more sensitive to the balance between private incentive and public benefit that underlies intellectual property law. It must give meaning not only to whatever incentivizing entitlement the legal system grants to develop-

222 This idea may sound radical in the intellectual property context, *see* Burk & Cohen, *supra* note 19, at 82 (labeling as “inconceivable” the notion that Congress would forbid the copyright content industry from using technological protection measures), but there is nothing new about statutes that directly regulate technology, sometimes—perhaps most of the time—in the absence of any new legal entitlement for those affected by the regulation.

Mandatory limitations on the forms or uses of technology are equally common [as restrictions on freedom to contract]. In countless situations, we compel persons who supply certain commodities to the public to include specified features. Seatbelts, airbags, catalytic converters, child-proof caps, warning labels (on cigarettes and drugs), construction features specified by building codes or the Americans with Disabilities Act, safety features in electrical appliances—the list is endless. The persons supposedly benefited by such features sometimes would happily do without them, but we refuse to allow manufacturers to omit them, and we usually forbid purchasers to disable them.

Fisher, *supra* note 77, at 1242–43.

223 *See supra* Part II.B.

ers, but also to whatever safeguards the law imposes as limitations on that entitlement. The design of the optimal technological measure therefore depends to some extent on what precise balance the law strikes in the entitlements sphere. How broad would a database entitlement be? How long would it last? What unlicensed uses would the law excuse as privileged?

Although there exists some unanimity on these issues, in that most commentators recognize the need for both an entitlement and certain limitations thereon, there is a great deal of disagreement about the specific answers to these questions.²²⁴ This combination of unanimity and disagreement has three important implications. First, Congress is likely to enact some database protection regime. Second, the enactment will probably be a complicated composite, incorporating not only an incentivizing entitlement, but also categorical exceptions, privileged uses, durational limitations, and so forth. Third, the precise boundaries of the entitlement and its exceptions will be subject to frequent legislative and judicial adjustment after the fact, as the legal system adjusts to the theretofore unknown property right.

These implications in turn have consequences for the development of the appropriate technological tool. In order to be sensitive to any newfound legislative balance between private incentive and public

224 For a sample of the varied proposals suggesting some database entitlement but disagreeing as to its details, compare Reichman & Samuelson, *supra* note 17, at 56 (proposing unfair competition or liability principles to protect databases, rather than property rights), with Pollack, *supra* note 17, at 49–50 (supplying a redraft of the Collections of Information Antipiracy Act, H.R. 2652, 105th Cong. (1997)), with Freno, *supra* note 175, at 167 (arguing for a balance between promoting incentives and international protection for American database makers and preventing data monopolies in the United States), with Baron, *supra* note 80, at 881 (offering suggestions for protection based on early copyright principles), with Karjala, *supra* note 197, at 893 (arguing for copyright based on misappropriation), with *Protection for Databases Hearing*, *supra* note 177, at 74 (statement of Laura D. Tyson & Edward F. Sherry, Members, Info. Indus. Ass'n) (arguing that statutory protection is necessary), with Database Investment and Intellectual Property Antipiracy Act of 1996, H.R. 3531, 104th Cong. § 2 (1996) (protecting database makers who made “a substantial investment . . . in the collection, assembly, verification, organization and/or presentation of the contents of the database”), with Collections of Information Antipiracy Act, H.R. 2652, 105th Cong. § 1201 (1997) (protecting database makers against misappropriation), with Collections of Information Antipiracy Act, H.R. 354, 106th Cong. § 1402 (1999) (same), with Consumer and Investor Access to Information Act of 1999, H.R. 1858, 106th Cong. § 102 (1999) (prohibiting the sale and distribution of duplicated databases that another user created), with Database and Collections of Information Misappropriation Act, H.R. 3261, 108th Cong. § 3 (2003) (guarding against unlicensed duplication of databases), with Consumer Access to Information Act of 2004, H.R. 3872, 108th Cong. § 2 (2004) (prohibiting database misappropriation).

benefit in the database market, the tool of choice must be flexible enough to allow for a diverse and detailed range of protean policy choices. This means that high-tech, code-intensive technological regulation is unlikely to succeed. For example, if a database developer were to use copy protection software in its products, the law could require the software to incorporate the legal limitations on the developer's entitlement. Under this form of regulation, then, a developer could only use copy protection code if that code inhibited free-riding copyists but allowed copying by statutorily privileged users—and the code's restrictions would have to expire altogether when the term of legal protection ended.²²⁵

Even if one assumes that such code would not become obsolete over the life of the entitlement, this approach would require reprogramming whenever legislation or court decisions altered the public-private balance. Perhaps more important, certain aspects of the legal regime would resist reduction to code. Suppose that (as seems likely) a database enactment were to include some analog of copyright's fair use doctrine—the prototypical example of privileged use in intellectual property law. Whether conduct qualifies as fair use is “irreducibly a situation-specific determination” that does not lend itself to *ex ante* resolution in any context, and particularly not within the limitations of computer programming.²²⁶ A technological tool that requires producers of information goods to code for all the legal niceties of a legal regime holds little promise.²²⁷

The best solution, therefore, would not use digital architecture to fight digital architecture. Rather, it would remove architectural restrictions from the picture altogether. Architecture's excessive influence on behavior here is a direct result of information's de-reification—i.e., its separation from the fixed, physical res in which it resided in the print era. Data reified on a printed page are architecturally free for the taking, constrained only by legal modalities. Data de-reified in digital form, on the other hand, are subject to myriad architectural restrictions on use and copying. The key to successful

225 For an example of this kind of high-tech technological tool in the copyright context, see Deirdre Mulligan & Aaron Burstein, *Implementing Copyright Limitations in Rights Expression Languages*, in *DIGITAL RIGHTS MANAGEMENT* 137 (Joan Feigenbaum ed., 2003) (detailing a species of technological protection that would allow the exercise of both producers' and users' legal entitlements).

226 Burk & Cohen, *supra* note 19, at 55.

227 A technological tool that relied heavily on code would also be vulnerable to hacking, which would once again present the danger that legal entitlements would take a back seat to architecturally determined “rights.” See *supra* notes 92–99 and accompanying text.

technological regulation, therefore, is to *re-reify* the database: return it to a format that is not susceptible to the developer's architectural control at all. This purposely retrograde approach will allow law to resume its former place as the primary behavioral constraint on the information marketplace.

To be more specific, the re-reification paradigm would require a database developer to reduce its database to a freestanding medium and to deposit a copy of the database in that form with a central depository.²²⁸ The re-reified medium could be (and perhaps would have to be) digital, but it would share with print media one critical characteristic: it would lack any internal architectural protections—no access controls, no encryption, no copy protection. The depository would in effect hold this technologically unfettered copy as a hostage against the developer's attempts to override the law through architectural means.

This technological tool would thus immediately curb the potential for database developers to exercise absolute *architectural* control over sole-source data. Yet the extent to which it would limit developers' *legal* control would be almost entirely within the control of policymakers, who would dictate the terms of public access to the re-reified depository copy. If the policy contemplated a strong proprietary entitlement in databases, then the freestanding version of the database could simply be locked away in the depository until the entitlement expired, at which point it would be made available to the public. If the policy instead contemplated a right against wholesale, competitive appropriation only, while privileging value-added and non-profit uses, the legislation could immediately make the depository copy public but limit copying therefrom. Between these two extremes exist a practically unlimited number of possibilities for implementing policy—two-tiered periods of exclusivity, short but renewable terms of protection, privileged access to the database for favored uses, adjustments to the entitlement along the way, etc.—none of which would be meaningful without the threshold requirement that the developer re-reify the data.

228 The U.S. Copyright Office, which is part of the Library of Congress, currently accepts the deposit of copyrighted works, both to enhance the Library's collection and as part of the copyright registration process. 17 U.S.C. §§ 407, 408(d) (2000); *see also* Burk & Cohen, *supra* note 19, at 66–67 (suggesting the Library of Congress as a depository and clearinghouse for “escrow keys,” a technological tool for effectuating fair use in copyright law). Congress thus has a model for a new database depository. Given the different purposes and uses of the database depository, however, the government might farm out this responsibility to a private agency.

In particular, re-reification could give meaning to the two limitations on an entitlement that typically play the most important role in intellectual property law, namely duration and privileged uses. The European directive, the database industry's most successful congressional bills, and the academic proposals for database reform all contemplate an entitlement that expires after a set period of time.²²⁹ Yet the expiration of the legal right will be meaningless if the database continues thereafter to be architecturally insulated from the public. Only if the legal entitlement requires re-reification of the database in architecturally unfettered form will the data really enter the public domain in a meaningful way. A database depository that makes expired databases available to all would promote this goal.²³⁰ A public depository would also help solve one of the thornier problems involving the duration of a database entitlement: determining when the term of protection begins and ends for dynamic databases that un-

229 See *E.U. Database Directive*, *supra* note 65, at 77/26; Collections of Information Antipiracy Act, H.R. 354, 106th Cong. sec. 2, § 1408(c) (1999).

No criminal or civil action shall be maintained under this chapter for the extraction or use of all or a substantial part of a collection of information that occurs more than 15 years after the portion of the collection that is extracted or used was first offered for sale or otherwise in commerce.

Id.; Lipton, *supra* note 23, at 838–40 (discussing what the appropriate duration for database property rights should be); Pollack, *supra* note 17, at 142 (calling for a fifteen-year term similar to that of H.R. 354); Reichman & Samuelson, *supra* note 17, at 143 (discussing the American push for a twenty-five-year term of protection versus the ten-year term of the European directive). The same cannot be said of the two latest proposed bills; they contain no expiration provisions. See Consumer Access to Information Act of 2004, H.R. 3872, 108th Cong. (2004) (lacking a provision for the expiration of protection); Database and Collections of Information Misappropriation Act, H.R. 3261, 108th Cong. (2003) (lacking a provision for the expiration of protection). These bills, however, apply only to “highly time-sensitive” data, H.R. 3872 § 2(b)(2), or to misappropriation that occurs “in a time sensitive manner,” H.R. 3261 § 3(a)(2), and therefore may have built-in devices for limiting their temporal reach. *But see* Band Memorandum, *supra* note 75, at 11 (arguing that H.R. 3261 “could protect information so long as it retains any commercial value” and that “[t]his time period can stretch indefinitely into the future by updating and otherwise maintaining the database”) (on file with author).

230 Parties on both sides of the debate have observed that a deposit system could lend meaning to the expiration of a new database right. *H.R. 354 1999 Hearing*, *supra* note 64, at 18–19 (statement of Marybeth Peters, Register of Copyrights); *id.* at 151–52 (statement of Michael K. Kirk on behalf of Am. Intellectual Prop. Law Ass’n); *id.* at 163 (statement of Charles Phelps on behalf of Ass’n of Am. Univ.); *Protection for Databases Hearings*, *supra* note 177, at 90 (statement of Laura D. Tyson & Edward F. Sherry, Members, Info. Indus. Ass’n).

dergo frequent updating.²³¹ The re-reification scheme could require periodic deposits of such databases, with a new term of protection beginning with each deposit and covering only newly added data.²³²

Re-reification also gives policymakers a great deal of flexibility in addressing any fair use analog and other valued-added downstream issues—the archetypal privileged uses. A database regime that strongly emphasizes the importance of downstream access and low input costs could establish a legal entitlement that applies only to direct competitors who appropriate the database wholesale, leaving the rest of the public free to use the re-reified, architecturally unfettered copy. Giving ingenious downstream users access to the entire database would allow them to manipulate it in ways that the developer (and thus the developer’s architectural capabilities and restrictions) may not have foreseen. At the other end of the spectrum, a regime that promotes strong proprietary rights could implement a depository system that allows only non-competing scientists, researchers, and journalists to access the re-reified database free of architectural controls. A myriad of options exists in between: a short “lead time” period of total exclusivity followed by complete re-reification for all downstream users, a depository system that admits all comers but requires affirmation of their non-infringing intent, access to only portions of the data at any one time, and so forth. Regardless of the balance struck, then, the fact that the database exists in re-reified form is key to ensuring that privileged uses will be not an illusory legal promise but an architectural reality.

231 “Even data that nominally entered the public domain at expiry of the fifteen-year term could remain unavailable in practice if would-be users lacked means to identify and isolate those data within the larger mix of protected and unprotected data comprising a dynamic collection.” Reichman & Uhlir, *supra* note 17, at 810; see also *H.R. 354 1999 Hearing*, *supra* note 64, at 57 (statement of James G. Neal on behalf of Am. Ass’n of Law Libraries) (“Where dynamic electronic databases are concerned, the older versions, as a practical matter, may be unavailable—making the right of access after 15 years recognized in the language, a hollow one.”); *Protection for Databases Hearing*, *supra* note 177, at 89–90 (arguing for protection of updated databases only if developer provides older versions); Peter A. Jaszi, *Some Public Interest Considerations Relating to H.R. 3531 Database Investment and Intellectual Property Antipiracy Act of 1996*, FED. RELATIONS E-NEWS, Aug. 1996, at <http://www.arl.org/info/frn/copy/peter.html> (“The effective term of protection for databases would be potentially perpetual, at least for dynamic compilations in electronic form.”).

232 In contrast, the Clinton Administration suggestion that the unavailability of an old, expired version of a database should be a *defense* to an infringement claim involving the new, updated version, see *H.R. 354 1999 Hearing*, *supra* note 64, at 32–33 (statement of Andrew J. Pincus, Gen’l Counsel, U.S. Dep’t of Commerce), is another example of a legal non-solution to an architectural problem: it mistakenly presumes that the defendant will have the *technological ability* to infringe in the first place.

The effect of re-reification on entitlement duration and privileged uses is clear and far-reaching. Its effect on the other aspects of the database debate is more subtle and more limited. For example, the question of whether a database entitlement is even needed to incentivize database development is properly left to market and legal modalities; the role of technological regulation would simply be to ensure that architectural forces do not obviate whatever legal entitlements are enacted to provide the desired market incentives. Even here, however, a depository could serve as a registry, a way of making the entitlement available only to developers who opt in by formally registering their products.²³³ Those who need no incentive to develop a database and who are accordingly willing to do without the entitlement—such as an academic researcher motivated by prestige and salary²³⁴—would simply not opt in. Combined with a prominent notice requirement for those works that do opt in, then, the registry approach would avoid giving protection to databases whose developers have no interest in commodification and would thus eliminate significant and unnecessary search costs for database users.²³⁵

The only downside of an opt-in regime is that it would have to offer database developers a deal sweet enough to entice them into surrendering their unilateral architectural controls. In other words, the benefit of the new entitlement for developers would have to exceed their cost of implementing effective self-help technological measures. If this balance is too hard to strike, an alternative to the opt-in approach would be to simply apply the re-reifying regime to those segments of the database market that pose the greatest architectural threat—e.g., digital databases developed for commercial exploitation—leaving less worrisome segments free to use whatever technological controls they see fit.²³⁶ In any event, a world in which an opt-in

233 A number of commentators have suggested using a registry in the database context, although not because of its technological advantages. See *supra* note 230; see also Lipton, *supra* note 23, at 789 (promoting registry model because database protection should “promote *commerce* rather than the expression of ideas”).

234 See Landes & Posner, *supra* note 10, at 331 (citing Howard P. Tuckman & Jack Leahey, *What Is an Article Worth?*, 83 J. POL. ECON. 951 (1975), to note that a professor who publishes will likely receive a higher salary than one who does not).

235 See *Eldred v. Ashcroft*, 537 U.S. 186, 248 (2003) (Breyer, J., dissenting) (noting that copyright entitlement imposes “search costs that themselves may prevent reproduction even where the author has no objection”). Note that the opt-in depository/registry aspect of re-reification would not resolve the incentive problem on its own, because a developer who needed no incentive could still opt into the entitlement absent a legal restriction that prevented him from doing so.

236 See Lipton, *supra* note 23, at 799 (proposing that new entitlements cover databases “developed at least partly for commercial exploitation in identified mar-

sweetener does not convince enough database developers to forgo architectural controls and use the new legal entitlement is still better than a world that simply grants them that entitlement without regulating their technological options, as the current proposals tend to do.

The flexibility in setting the legal entitlements under the re-reification model demonstrates that for the most part re-reification is an anti-expansionist measure only in a technological sense: it limits the ability of producers of information goods to achieve architecturally what they have not earned legally. It can be used in conjunction with a regime of strong or weak intellectual property entitlements; whatever the entitlements, re-reification will simply prevent developers from unilaterally expanding them through technological means. The one issue on which re-reification would not be particularly flexible or policy-neutral, however, is the role of contract in the database market. A developer's ability to extract contractual concessions from users depends on the cost to those users of going elsewhere for the same product. Requiring re-reification and deposit would therefore limit the ability of database developers to obviate the public ordering of legislative entitlements through private bargaining. The extent of this effect would vary with the right of users to access the deposited database before expiration of the entitlement, so in that sense it would be flexible. And given contract law's potential to upset the balance set by a purely public ordering of entitlements,²³⁷ this may not

kets" but not "(a) paper-based databases, (b) educational or teaching materials, (c) scientific and technical materials not developed with the intention of commercial exploitation, and (d) compilations developed for private or personal use with no commercial intent").

237 See Benkler, *supra* note 17, at 430 ("Because copyright represented a federal legislative balance between producers and users of information, state enforcement of contracts that upset that balance was inconsistent with federal policy."); Dennis S. Karjala, *Federal Preemption of Shrinkwrap and On-Line Licenses*, 22 U. DAYTON L. REV. 511, 518-21 (1997) (arguing that allowing contract to privately reorder the rules would ignore the public interest that copyright balances strive to protect); O'Rourke, *supra* note 104, at 538 ("As the number of software patents has increased, the collision between private contract and public intellectual property law in the form of patent has become increasingly apparent."); Reichman & Franklin, *supra* note 104, at 884 (noting that "[t]he forces driving the information-based sectors of the economy thus tend to destabilize the relationship between state and federal laws that had previously buttressed the national system of innovation" and predicting that whether "the traditional reliance of that system on public good uses of information can withstand the privatizing assault on the public domain that has accompanied these phenomena increasingly depends on the extent to which state contract laws governing access to information will validate standardized 'click on' and 'shrinkwrap' licensing agreements"); see generally Symposium, *Intellectual Property and Contract Law for the Information Age: The Impact of Article 2B of the Uniform Commercial Code on the Future of Information*

be a serious drawback of the re-reification approach. It is, however, an effect that the anti-expansionists will welcome more than will their opponents.

The particular methods by which privileged users might access the re-reified copy remain to be seen. It may be that, as the contours of a new database entitlement become settled through legislation and case law, the process will be partially automated—i.e., that some aspects of the private/public balance will become predictable and permanent enough to be regulable in computer code. If so, a parallel model is found in Dan Burk's and Julie Cohen's proposal to regulate the reach of anti-circumvention code in copyrighted works, so as to give meaning to certain customary, limited, and therefore predictable aspects of copyright's fair use doctrine.²³⁸ Burk and Cohen acknowledge, however, that other aspects of fair use would remain resistant to expression in code, and would require instead some human gatekeeper to make the legal determination.²³⁹ The need for a human intermediary is likely to be even greater in the realm of database regulation, where the new entitlement's scope will be more uncertain, and where effective technological regulation will likely require implementation not only of a fair use analog, but also of durational limitations on the entitlement.

Lastly, re-reification should be constitutionally permissible. An analogous provision in the copyright statute requires deposit of copyrighted works with the Library of Congress²⁴⁰ and has withstood attack under the First and Fifth Amendments.²⁴¹ Moreover, the more recent technological regulation in the DMCA and CFAA has yet to experience a constitutional setback, despite the pleas of some scholars.²⁴² If

and Commerce, 87 CAL. L. REV. 1 (1999); Symposium, *Intellectual Property and Contract Law in the Information Age: The Impact of Article 2B of the Uniform Commercial Code on the Future of Transactions in Information and Electronic Commerce*, 13 BERKELEY TECH. L.J. 809 (1998).

238 Burk & Cohen, *supra* note 19, at 65 (suggesting that the law encourage "the design of rights management technologies that incorporate automatic fair use defaults based on customary norms of personal noncommercial use").

239 *Id.* at 65–66. Burk and Cohen propose a mechanism to implement the gatekeeper's decisions: a "key escrow" system under which the gatekeeper would provide the fair user with the technological "key" needed to free the copyrighted work from its anti-circumvention code. *Id.* at 59–65.

240 17 U.S.C. § 407 (2000).

241 *Ladd v. Law & Tech. Press*, 762 F.2d 809, 812–15 (9th Cir. 1985).

242 *See, e.g., Universal City Studios, Inc. v. Corley*, 273 F.3d 429, 453–58 (2d Cir. 2001) (upholding the DMCA's anti-trafficking provisions against a First Amendment challenge); *United States v. Sablan*, 92 F.3d 865, 867–69 (9th Cir. 1996) (holding that the lack of a mens rea requirement for the CFAA's damage element did not offend

these pro-expansionist technological measures have not been held unconstitutional, it is hard to see why technological requirements that counterbalance them by giving meaning to fair use and entry into the public domain should suffer a different fate.²⁴³

If re-reification proves useful in the database context, it could help resolve some of the conflict between architecture and law in other fields of intellectual property as well, most notably copyright.²⁴⁴ The drawback here is that formalities like deposit, notice, and registration run afoul of the Berne Convention, which withholds national treatment from any copyright regime that includes such formalities.²⁴⁵ They have therefore not been a significant part of U.S. law since 1988, when the United States implemented the Convention.²⁴⁶ A direct challenge to the Berne standard would probably not succeed at this point; the international winds are blowing toward pro-expansionist technological measures, not away from them.²⁴⁷ On the other hand, a

due process); 321 Studios v. Metro Goldwyn Mayer Studios, Inc., 307 F. Supp. 2d 1085, 1100–01 (N.D. Cal. 2004) (same); United States v. Elcom Ltd., 203 F. Supp. 2d 1111, 1127–42 (N.D. Cal. 2002) (upholding the DMCA's anti-circumvention provisions against challenge under the First Amendment and the Intellectual Property Clause); DVD Copy Control Ass'n v. Bunner, 75 P.3d 1, 10–17 (Cal. 2003) (upholding against First Amendment challenge an order enjoining as a trade secret the disclosure of DVD decryption code). Scholars have repeatedly questioned the constitutionality of the DMCA, e.g., Benkler, *supra* note 17, at 414–29, but no court has yet been persuaded.

243 Note that re-reification would not require the repeal of the DMCA and CFAA. It would, however, render them less effective, insofar as re-reified, architecturally unfettered databases would not have any access protections or authorization requirements to circumvent in the first place.

244 Patent law already has effective technological measures in the form of its registration and public availability requirements. See, e.g., 35 U.S.C. § 7 (2000) (requiring the Director of the U.S. Patent and Trademark Office to maintain a library of patents); *id.* § 9 (allowing the Director to furnish copies of patent drawings to the public); *id.* § 10 (allowing the Director to publish patents); *id.* § 11 (allowing the Director to exchange patent drawings with foreign countries); *id.* § 12 (allowing the Director to furnish copies of patent drawings to public libraries).

245 Berne Convention for the Protection of Literary and Artistic Works, Mar. 1, 1989, art. 5(2), 1161 U.N.T.S. 3, 35 (“The enjoyment and the exercise of these rights shall not be subject to any formality . . .”). *But see* Burk & Cohen, *supra* note 19, at 70–78 (arguing that their technological proposal for copyright fair use would comport with the international treaty obligations).

246 Berne Convention Implementation Act of 1988, Pub. L. No. 100-568, 102 Stat. 2853.

247 For example, the DMCA originated in two World Intellectual Property Organization treaties, although Congress went further than it had to in the treaties' implementation. See WIPO Copyright Treaty, Apr. 12, 1997, arts. 11–12, S. TREATY DOC. NO. 105-17, at 10–11, 36 I.L.M. 65, 71–72; WIPO Performances and Phonograms Treaty, Apr. 12, 1997, arts. 18–19, S. TREATY DOC. NO. 105-17, at 35–36, 36 I.L.M. 76,

return to anti-expansionist, pre-Berne formalities is in vogue these days on the domestic front,²⁴⁸ and in time their utility might garner international appeal as well.

CONCLUSION

Lawyers naturally think in terms of legal modalities. We talk of rights and remedies, legislation and litigation, property and liability. In a world governed by law alone, in which the assignment of legal entitlements settles the matter of who can do what,²⁴⁹ this narrow focus is adequate. In the real world, however, other modalities govern behavior as well, and each influences the others.²⁵⁰ A legal entitlement is useless if architectural constraints prevent the entitlement holder from exercising it. In the battle between those advocating expanded protection for information goods and those opposing such expansion, the anti-expansionists have largely failed to see that they must directly regulate technology if the legal rights they value so highly—fair use, alienability, limited exclusivity—are to have meaning. Merely opposing the enlargement of intellectual property entitlements and resisting statutes like the DMCA will not return us to a world of architecturally unfettered information goods. Only affirmative technological measures can do that.

86–87; Digital Millennium Copyright Act, Pub. L. No. 105-304, tit. I, 112 Stat. 2860, 2861 (1998) (listing as its title “WIPO Treaties Implementation”); *see also* Burk, *supra* note 128, at 1103 (arguing that in enacting the DMCA Congress went beyond what the WIPO treaties required). Fortunately, international law contains no restraint on formalities in the database context. The only significant provision is the European Union directive, which makes no mention of formalities. (Indeed, the one provision in the directive that mentions non-member states—the ballyhooed reciprocity requirement—is no more than a recital in a preamble and a vague provision about concluding treaties.) *See E.U. Database Directive, supra* note 65, at 77/24, 77/27.

248 *See, e.g.*, Public Domain Enhancement Act, H.R. 2601, 108th Cong. §306(a) (2003) (requiring copyright owners to pay a one dollar fee to maintain their copyrights after fifty years have passed since publication); LAWRENCE LESSIG, *THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD* 251–52 (2001) (proposing a renewal requirement); Landes & Posner, *supra* note 87, at 471–75 (same). These proposals mirror the renewal formalities that copyright law imposed previous to 1976. *See* 17 U.S.C. § 24 (1970) (repealed 1976).

249 *See* Calabresi & Melamed, *supra* note 170, at 1090–91 (discussing assignment of entitlements). Of course, in a world of alienable legal entitlements and no transaction costs, the initial assignment of the entitlement is significant only as a matter of wealth distribution; the entitlement itself gravitates to he or she who values it most highly. *See* Coase, *supra* note 24, at 2–8 (discussing the hypothetical transfer of property rights from a farmer to a cattle-raiser as the size of the herd increases).

250 The plagiarism example is a case in point: it is a social norm, but an academic who plagiarizes will see the market for his or her services diminish appreciably.

In particular, what has been missing from the database debate is a recognition that a database enactment provides us with an opportunity not only to strike the right balance of legal entitlements, but also to regulate the architectural controls that might otherwise render those entitlements irrelevant. Digital technology has created the market problem of which database developers complain, but it has also offered its own unfortunate architectural solution—one that would upset the balance between private production and public benefit that we value in intellectual property law. The most promising way to prevent this unwelcome result from coming to pass is to offer the database industry an entitlement, but to condition that entitlement on the abandonment of the most troublesome technological measures. Once we remove the database from the de-reified format that makes architectural control possible, striking the right balance of entitlements—whatever it might be—becomes feasible. We must re-reify the data.

The intellectual property community's failure to address this issue is symptomatic of a larger oversight in the modern scholarship. The latter-day conception of property rights has been too narrow, disdaining premodern, "might makes right" concepts like physical possession of a res in favor of a focus on legal prerogatives.²⁵¹ Yet physical possession and the physical characteristics, capabilities, and limitations of a good carry their own extralegal prerogatives that can constrain behavior more than any legal entitlement. Those who resist the expansion of intellectual property rights have accordingly recognized in the last several years that architecture establishes its own prerogatives. They should now realize that a realm ruled by unregulated digital information technology may more closely resemble a "might makes (property) right" regime than a balanced, publicly ordered set of entitlements and freedoms.

251 See, e.g., Besen et al., *supra* note 220, at 78–79 ("It is reasonable to think of property rights as involving not physical possession, but rather the prerogatives and obligations pertaining to the use of a particular resource.") (citing Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347 (1967)).