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Intellectual Property, Computer Software and the Open Source Movement

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John R. Thomas
Visiting Scholar in Entrepreneurship and Economic Growth
Resources, Science, and Industry Division



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Intellectual Property, Computer Software and the Open Source Movement

Summary

The term "open source" refers to a computer program that is distributed along with a license, or contract, that requires users of the program to comply with specified conditions. Among these stipulations are that the source code be distributed along with the software, and that others be allowed to modify the source code as they desire. In contrast, the source code of "closed source" software is proprietary, not publicly distributed and subject to alteration only by the software manufacturer.

Some concerns have arisen concerning the relationship between open source software and intellectual property rights, including copyrights, patents and trade secrets. Although a particular computer program may be designated as open source, it remains possible that an owner of intellectual property may enforce its rights against open source software developers and users. Some commentators have also expressed concern that open source licenses may overreach, converting proprietary programs into open source software even if only a portion of that program was derived from an open source original. Others have suggested that open source licenses may not be legally enforceable, which would allow users to obtain and assert intellectual property rights pertaining to software that was initially distributed as open source.

Striking a balance between promoting innovation, on one hand, and accommodating the demands of software developers and users, on the other, forms an important component of contemporary software policy. The possibility of intellectual property rights, and their attendant license fees and royalties, may provide a significant incentive for firms to innovate and to distribute software. However, some proponents of open source software believe that these incentives are unnecessary, and further hope to maintain a non-proprietary environment of software distribution and development.

Should Congress have an interest in this area, several options present themselves. No action need be taken if the current relationship between open source software and intellectual property is deemed satisfactory, particularly as software publishers become increasingly aware of intellectual property and as judicial precedents may make the legal situation clearer. Congress might also assist individuals in identifying intellectual property that pertains to software that has been identified as open source; speak to the enforceability of open source licenses; and, as a possible more far-reaching legal reform, allow proprietary software publishers a grace period for removing portions of program code that derived from an open source original.

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Intellectual Property, Computer Software and the Open Source Movement

Perhaps the most dramatic development in the contemporary computer industry is the "open source" software movement. The term "open source" refers to a computer program whose "source code" is made available to the public for modification or improvement as individual users desire.[1] In contrast, the source code of "closed source" software is proprietary, not publicly distributed and subject to alteration only by the software manufacturer.

The rise of open source software has generated considerable discussion in recent years. Proponents of open source software contend that the open source system preserves the freedom of computer users and provides a superior development methodology as compared to the usual proprietary model.[2] Other commentators have expressed concerns regarding the security of open source software and whether it will operate in a compatible fashion with other programs.[3]

Intellectual property rights, including copyrights, patents and trade secrets, present another possible set of concerns with respect to open source software. Although a particular computer program may be designated as open source, it remains possible that an owner of intellectual property may enforce its rights against open source software developers and users.[4] In addition, open source software is ordinarily accompanied by a license that requires users to maintain the program as open source.[5] Some commentators have expressed concern that these licenses may

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[1] "Source code" is a set of programming instructions that is typically written in a "high-level" language, such as C or Pascal, that resembles the English language. After a programmer drafts the source code, it is compiled into a machine language that consists entirely of numbers and can be recognized by a computer. Proprietary software is distributed only with the machine code, that allows the computer to function, but cannot be altered by the user. For more on this technology, *see infra* notes 9-12; CRS Report RL31627, *Computer Software and Open Source Issues: A Primer*, by Jeffrey W. Seifert.

[2] Shawn W. Potter, "Opening Up to Open Source," 6 *Richmond Journal of Law and Technology* (2000), 24.

[3] David S. Evans & Bernard J. Reddy, "Government Preferences for Promoting Open-Source Software: A Solution in Search of a Problem," 9 *Michigan Telecommunications & Technology Law Review* (2003), 313.

[4] James A. Harvey & Todd S. McClelland, *"SCO v. IBM:* The Open Source Benefits and Risks Are Real," 20 *Computer & Internet Lawyer* (Sept. 2003), no. 9 at 1.

[5] Natasha T. Horne, "Open Source Software Licensing: Using Copyright Law to Encourage

(continued...)

overreach, converting proprietary programs into open source software even if only a portion of that program was derived from an open source original.[6] Others have suggested that open source licenses may not be legally enforceable, which would allow users to obtain and assert intellectual property rights pertaining to software that was initially distributed as open source.[7]

This report considers the impact of intellectual property rights upon open source software. This report commences with an introduction to the open source movement in the software industry. Next, it briefly reviews the intellectual property laws, including copyrights, patents and trade secrets. After identifying issues of interface between open source software and the intellectual property laws, this report concludes with a discussion of possible legislative issues and approaches.

Introduction to the Open Source Movement

Fundamental Concepts

An understanding of the fundamentals of modern computer software technology will assist in an understanding of the open source movement. Software programmers typically write software programs using a high level computer language such as Basic, C++, or Java. By using the words, symbols and numbers that make up these high-level computer languages, the programmer tells the computer what to do. For instance, the command "ADD (X, Y)" instructs the computer to add the value of the variable X to the variable Y. A computer program written in this high level language is said to be in "source code" form.[8]

Computers are incapable of reading the high-level instructions of source code, however. Rather, the computer responds to binary inputs — either a "0" or a "1" — that correspond to an open or closed electrical switch. The number "01001101" might tell a computer to add two numbers and save the result, for example. Thus, after writing the program in source code, the programmer ordinarily uses a compiler program to translate or "compile" the source code into the corresponding 1s and 0s that the computer can read. Source code that has been compiled into this series of 1s and 0s is called "object code."[9]

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[5] (...continued)
Free Use," 17 *Georgia State University Law Review* (2001), 863.

[6] Christian H. Nadan, "Open Source Licensing: Virus or Virtue?," 10 *Texas Intellectual Property Law Journal* (2002), 349.

[7] Dennis M. Kennedy, "A Primer on Open Source Licensing Legal Issues: Copyright, Copyleft and the Future," 20 *St. Louis University Public Law Review* (2001), 345.

[8] Daniel Lin et al., "Source Code Versus Object Code: Patent Implications for the Open Source Community," 18 *Santa Clara Computer and High Technology Law Journal* (2002), 235.

[9] *Ibid.*

Today, most computer programs are distributed in object code form. This distribution system is often referred to as the "proprietary software" model. When a consumer purchases a copy of, for example, WordPerfect software, that program comes on a CD-ROM into which the object code 1s and 0s have been encoded. One of the reasons that software developers distribute only the object code, and not the source code, is convenience. Software in object code format is ready for the computer to use.[10]

This technique also protects the source code from disclosure. Because skilled programmers can easily read source code, a competitor could review this text in order to find out how a program works. As a result, if software were distributed in source code form, rival firms could readily take and reuse parts of the program in competing products. As this report discusses below,[11] this appropriation of the original programmer's work may violate intellectual property laws. However, such violations may be difficult both to discover and stop. Distributing software in object code form is a more cost-efficient and effective means of preventing this infringement.[12]

Some computer users have expressed dissatisfaction with the proprietary software model. End users of proprietary software must ordinarily rely upon the software publisher to fix mistakes in the code and develop additional features. As free software advocate Richard Stallman has explained, the proprietary software model "keeps users helpless and divided: the inner workings are secret."[13] Stallman further opines that computer users "should be free to modify programs to fit their needs, and free to share software, because helping other people is the basis of society."[14]

A loosely organized open source software community has resulted from this reaction to proprietary software development.[15] In contrast to proprietary software, the source code of "open source" software is available to the public.[16] Computer users are therefore able to examine the human-readable instructions that the programmer wrote to create the software. A number of well-known programs are "open source," including a widely used Internet server program, Apache; a popular Internet programming language, Perl; the program that routes more than 80 percent of all Internet email messages worldwide, Sendmail; the program that is the basis for the domain name system, Bind; and the fastest growing operating system in the

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[10] Nadan, *supra* note 6.

[11] *See infra* notes 31-62 and accompanying text.

[12] *See* Patrick K. Bobko, "Linux and General Public Licenses: Can Copyright Keep 'Open Source' Software Free?," 28 *American Intellectual Property Law Association Quarterly Journal* (2000), 81.

[13] Richard Stallman, The GNU Project, at http://www.fsf.org/gnu/thegnuproject.html.

[14] *Ibid.*

[15] R. Polk Wagner, "Information Wants to Be Free: Intellectual Property and the Mythologies of Control," 103 *Columbia Law Review* (2003), 995.

[16] Klaus M. Schmidt & Monika Schnitzer, "Public Subsidies for Open Source? Some Economic Policy Issues," 16 *Harvard Journal of Law and Technology* (2003), 473.

world, Linux.[17] Due to the open source status of these programs, members of the public may consult their source code as desired.

Open Source Software Licenses

It is important to note that the term "open source" implies more than merely distribution of source code along with the object code. In such circumstances, the publisher could continue to assert its intellectual property rights in the software, thereby limiting the ability of others to modify the program or redistribute it. Even though disclosed to the public, the source code would remain under the control of the publisher.[18]

As a result, publishers of open source software ordinarily do more than simply provide copies of both the source code and the object code when they distribute computer programs to the public. In addition, they establish the terms of use of the software by means of a license. A license is a contract through which the publisher allows recipients to use and modify the software, subject to certain conditions specified in the license. For example, the license might require that anyone who redistributes the software also make the source code of that software publicly available. Contracts that provide users with a sufficient set of privileges to access and modify the software's source code are deemed to be "open source licenses."

The practice of preserving the rights of software users through a set of license provisions is sometimes called "copylefting." This term is a play on words on the term "copyright."[19] Under this system, the copyright holder licenses the recipient of a copy of the software. The license permits the redistribution of further copies of the software — including software containing modifications — under the condition that those copies are subject to the same license. This legal framework ensures that derivatives of the licensed work remain open. If the licensee fails to distribute derivative works under the same license, then he may face legal consequences. In particular, the licensor could terminate the license, leaving the licensee without permission to copy, distribute, or modify the software. [20]

Although no official definition specifies which software licenses qualify as open source licenses, an organization called the "Open Source Initiative," or OSI, has promulgated a widely followed set of standards.[21] OSI describes itself as a "non-profit corporation dedicated to managing and promoting the Open Source

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[17] Jason B. Wacha, "Open Source, Free Software, and the General Public License," 20 *Computer and Internet Lawyer* no.3 (March 2003), 20.

[18] Joseph Scott Miller, "Allchin's Folly: Exploding Some Myths About Open Source Software," 20 *Cardozo Arts and Entertainment Law Journal* (2002), 491.

[19] *See* Free Software Foundation, "What is Copyleft?," available at http://www.gnu.org/licenses/licenses.html#WhatIsCopyleft

[20] Kennedy, *supra* note 7.

[21] *See* Open Source Initiative, Introductory Statement (2004), available at http://www.opensource.org.

Definition"[22] through a certification program that it administers.[23] To satisfy the Open Source Definition, the license must satisfy certain conditions, including:

> 1. The publisher must provide both object and source code.
>
> 2. The publisher must allow modification and redistribution of the code (with or without modifications by the licensee).
>
> 3. The publisher must not limit distribution to certain fields of endeavor or products, or limit its use with other free software. [24]

A number of different groups have promulgated a variety of open source licenses that OSI has certified as compliant with the Open Source Definition. Among these is the General Public License, or GPL.[25] As compared to the Open Source Definition, the GPL imposes additional restrictions upon software publishers. As a result, a license may fulfill the conditions of the Open Source Definition but not qualify as a GPL. According to its sponsor, the Free Software Foundation, the GPL guarantees computer users the following "four freedoms":

> The freedom to run the program, for any purpose.
>
> The freedom to study how the program works, and adapt it to your needs.
>
> The freedom to redistribute copies so you can help your neighbor.
>
> The freedom to improve the program, and release your improvements to the public, so that the whole community benefits.[26]

It is important to note that, in this context, the term "freedom" does not mean that the software has to be sold at no charge. Rather, it refers to permissible user activities, and in particular the principle that software should be openly available in all of its current and future forms to all those desiring to learn or benefit from it.[27]

The chief distinction between the Open Source Definition and the GPL is that the Open Source Definition effectively allows users to appropriate privately any

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[22] *See* Open Source Initiative, The Open Source Definition, Version 1.9 (2004), available at http://www.opensource.org/docs/definition.php.

[23] *See* Open Source Initiative, OSI Certification Mark and Program (2004), available at http://www.opensource.org/docs/certification_mark.php.

[24] The Open Source Definition, *supra* note 22.

[25] *See* Terry J. Ilardi, "Mass Licensing," 747 *Practising Law Institute Patents & High Technology Licensing* (2003), 187.

[26] The Free Software Foundation, "The Free Software Definition" (2004), available at http://www.gnu.org/philosophy/free-sw.html.

[27] *Ibid.*

modifications that they make.[28] For example, under the Open Source Definition, a user could refuse to disclose publicly the source code of any programs that include the user's modifications. The licensee could also claim intellectual property rights in any modifications they introduced into the software.[29] Of course, in such cases, the licensee's software would not qualify as open source. In contrast, the GPL requires that the source code be kept open to the public, even if the recipient of the software made changes. Also, under the GPL, the licensee cannot restrict the ability of others to build upon any modifications that the licensee made.[30]

For example, a computer programmer may use software under a license that minimally complies with the Open Source Definition. Suppose further that the programmer modifies the software, and then licenses the object code of the modified version with the additional restriction that no licensee could copy the modified version's object code. This practice is acceptable under the Open Source Definition. This practice would not comply with the Free Software Foundation's GPL, however.

Introduction to Intellectual Property

As we have seen, both proprietary and open source software publishers rely upon the intellectual property laws to sustain their chosen development model. More specifically, the term "intellectual property laws" identifies a number of doctrines, including copyrights, patents and trade secrets, that provide innovators with proprietary interests in their intangible creations.[31] Copyright provides authors with exclusive rights in their writings, visual works and other works of authorship; patents relate to products, processes and other useful inventions; while trade secret law concerns secret information that is of commercial value.[32] After briefly identifying the principal policy justifications for the copyright, patent and trade secret law, this report summarizes the basic workings of these legal disciplines.

Intellectual Property Policy

By providing individuals with exclusive rights to their inventive products and processes, the intellectual property laws allows authors and inventors to secure the economic benefits of their discoveries. Absent the a system of intellectual property, competitors might readily be able to appropriate the benefits of an innovator's research and development efforts. Aware of these potential "free riders," firms might

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[28] Daniel B. Ravicher, "Facilitating Collaborative Software Development: The Enforceability of Mass-Market Public Software Licenses," 5 *Virginia Journal of Law and Technology* (2000), 11.

[29] Kennedy, *supra* note 7.

[30] David McGowan, "Legal Implications of Open-Source Software," 2001 *University of Illinois Law Review* (2001), 241.

[31] Roger E. Schechter & John R. Thomas, *Intellectual Property: The Law of Copyrights, Patents and Trademarks* (2003), 1-2.

[32] Gordon U. Sanford, III, "An Intellectual Property Roadmap: The Business Lawyer's Role in the Realm of Intellectual Property," 19 *Mississippi College Law Review* (1998), 177.

devote few, if any resources towards innovation. Copyrights, patents and trade secrets solve this market failure problem by providing economic incentives for individuals and institutions to engage in research and development.[33]

Intellectual property rights may also facilitate market mechanisms by creating discrete, well-defined property interests that are readily subject to commercial exchanges.[34] Absent patent rights, for example, an inventor may have no tangible asset to sell or license. In addition, an inventor might otherwise be unable to police the conduct of a contracting party. Any technology or know-how that has been disclosed to a prospective buyer might be appropriated without compensation to the inventor. The availability of patent protection decreases the ability of contracting parties to engage in opportunistic behavior. By lowering such transaction costs, the patent system may make technology-based transactions more feasible.[35]

Some commentators have identified natural rights as an additional rationale for the intellectual property laws, and in particular the copyright law. Under this view, individuals enjoy a natural right of property in the works they have created through their own labors.[36] Intellectual property law may also encourage marketplace behavior that is both ethical and efficient. As a matter of fairness and justice, this view holds, one individual should not be allowed to profit from another's labor and goodwill.[37] In economic terms, intellectual property laws may also stimulate socially desirable activities that create wealth, including innovation, and discourage costly acts that merely redistribute existing wealth, such as industrial espionage.[38]

The intellectual property system has long been subject to criticism, however. Some observers believe that intellectual property rights encourage industry concentration and create barriers to market entry.[39] Others have suggested that intellectual property rights can actually slow the pace of innovation in some circumstances, as competitors are discouraged from pursuing certain research pathways due to existing proprietary interests.[40] And in an era where digital

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[33] Simone Rose, "Patent 'Monopolyphobia': A Means of Extinguishing the Fountainhead?," 49 *Case Western Reserve Law Review* 509 (1999).

[34] Jonathan Eaton & Samuel J. Kortum, "Trade in Ideas: Patenting and Productivity in the OECD," 40 *Journal of International Economics* (1996), 251.

[35] Robert P. Merges, "Intellectual Property and the Costs of Commercial Exchange: A Review Essay," 93 *Michigan Law Review* (1995), 1570.

[36] Wendy J. Gordon, "A Property Right in Self Expression: Equality and Individuality in the Natural Law of Intellectual Property," 102 *Yale Law Journal* (1993), 1533.

[37] *See* Justin Hughes, "The Philosophy of Intellectual Property," 77 *Georgetown Law Journal* (1988), 287.

[38] David D. Friedman, et all, "Some Economics of Trade Secret Law," 5 *Journal of Economic Perspectives* (1991), 61.

[39] John R. Thomas, "Collusion and Collective Action in the Patent System: A Proposal for Patent Bounties," *University of Illinois Law Review* (2001), 305.

[40] Mark A. Haynes, "Commentary: Black Holes of Innovation in the Software Arts," 14

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information can be immediately disseminated across the globe, the notion that an innovation can be an object of possession has been challenged.[41]

When analyzing these contending views, it is important to note the lack of rigorous analytical methods available for determining the effect of the intellectual property rights upon the U.S. economy as a whole. The relationship between innovation and intellectual property rights remains poorly understood. Concerned observers simply do not know what market impacts would result from changing the patent term from its current 20-year period, for example.[42] Consequently, current economic and policy tools do not allow us to calibrate the intellectual property system precisely in order to produce an optimal level of investment in innovation.

Copyrights

Under the federal Copyright Act of 1976, copyright may extend to any original work of authorship, including computer software programs.[43] Copyright protection arises automatically, without the need of the proprietor to take any formal steps. However, authors who register their works with the U.S. Copyright Office,[44] and then place a notice of copyright on copies of their works,[45] are afforded certain advantages when enforcing their copyrights.

Copyright confers a number of exclusive rights to the author or, in some circumstances, to the employer of the author.[46] Most notable is that the copyright proprietor has the exclusive right to make copies of the protected work and to distribute it to the public.[47] Each copyright ordinarily enjoys a term of the life of the author plus 70 years.[48]

As with the other intellectual property rights, copyrights do not enforce themselves. Copyright proprietors bear responsibility for monitoring its competitors to determine whether they are using the protected work or not. Copyright owners who wish to compel others to observe their intellectual property rights must usually commence litigation in the courts.

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[40] (...continued)
Berkeley Technology Law Journal (1999), 567.

[41] John Perry Barlow, "The Economy of Ideas," *Wired* 2.03 (March 1994).

[42] *See* F. Scott Kieff, "Property Rights and Property Rules for Commercializing Inventions," 85 *Minnesota Law Review* (2001), 697.

[43] The 1976 Copyright Act, as amended, is codified at 17 U.S.C. § 101 (2000) *et seq.*

[44] 17 U.S.C. §§ 408 - 412 (2000).

[45] 17 U.S.C. § § 401 - 406 (2000).

[46] 17 U.S.C. § 201 (2000).

[47] 17 U.S.C. § 106 (2000).

[48] 17 U.S.C. § 302(a) (2000).

As with patents and trade secrets, copyrights may be sold or licensed to others.[49] An intellectual property license is a grant of permission to use the owner's proprietary interest. It does not convey ownership rights in the intellectual property, which remain with the licensor. A license is necessary if, without one, the licensee would be liable for infringement if it made use of the subject matter that is protected by an intellectual property right.

Patents

In contrast to copyright, patent rights do not arise automatically. Under the Patent Act of 1952, inventors must prepare and submit applications to the U.S. Patent and Trademark Office ("USPTO") if they wish to obtain patent protection.[50] USPTO officials known as examiners then assess whether the application merits the award of a patent.[51]

In deciding whether to approve a patent application, a USPTO examiner will consider whether the submitted application fully discloses and distinctly claims the invention.[52] In addition, the application must disclose the "best mode," or preferred way, that the applicant knows to practice the invention.[53] The examiner will also determine whether the invention itself fulfills certain substantive standards set by the patent statute. To be patentable, an invention must be useful, novel and nonobvious. The requirement of usefulness, or utility, is satisfied if the invention is operable and provides a tangible benefit.[54] To be judged novel, the invention must not be fully anticipated by a prior patent, publication or other knowledge within the public domain.[55] A nonobvious invention must not have been readily within the ordinary skills of a competent artisan at the time the invention was made.[56]

If the USPTO allows the patent to be issued, the patent proprietor obtains the right to exclude others from making, using, selling, offering to sell or importing into the United States the patented invention.[57] The maximum term of patent protection is ordinarily set at 20 years from the date the application is filed.[58] The patent

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[49] 17 U.S.C. § 201(d) (2000).

[50] The 1952 Patent Act, as amended, is codified in 35 U.S.C. § 1 (2000) *et seq.*

[51] 35 U.S.C. § 131 (2000).

[52] 35 U.S.C. § 112 (2000).

[53] *Ibid.*

[54] 35 U.S.C. § 101. (2000).

[55] 35 U.S.C. § 102 (2000).

[56] 35 U.S.C. § 103 (2000).

[57] 35 U.S.C. § 271(a) (2000).

[58] 35 U.S.C. § 154(a)(2) (2000). Although patent term is based upon the filing date, the patentee gains no enforceable legal rights until the USPTO allows the application to issue as a granted patent. A number of Patent Act provisions may modify the basic 20-year term, considering examination delays at the USPTO and delays in obtaining marketing approval

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applicant gains no enforceable rights until such time as the application is approved for issuance as a granted patent, however. Once the patent expires, others may employ the patented invention without compensation to the patentee.

Trade Secrets

The common law of trade secrets protects valuable, commercially useful information that is the subject of reasonable measures to preserve its secrecy.[59] Maintaining trade secret status ordinarily requires the trade secret proprietor to restrict access to the confidential information, require employees to promise not to disclose the information, or take other precautions that are prudent under the circumstances. Computer software may be the subject of trade secret protection so long as these requirements are met.

Unlike a copyright or patent, a trade secret is not limited in duration to a fixed number of years. Instead, a trade secret endures so long as the protected information remains commercially valuable and is maintained as a secret.[60] If the trade secret holder ceases to take measures to maintain the confidentiality of the protected information, or if the information becomes widely available to the public, then the trade secret is extinguished.

A trade secret is misappropriated when it has been obtained through the abuse of a confidential relationship or improper means of acquisition.[61] Typical cases of trade secret misappropriation involve trespass, bribery and theft, as well as breaches of a duty of confidence committed by former employees or commercial partners. Unlike the Patent Act, trade secret law does not provide a cause of action against an individual who independently developed or reverse engineered the subject matter of the trade secret.[62]

Potential Conflicts Between Open Source Software and Intellectual Property

Conflicts potentially arise between open source standards and intellectual property rights.[63] Some observers have expressed concerns that if open source software is incorporated into an otherwise proprietary program, then the terms of the open source license will apply to the entire program and defeat intellectual property

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[58] (...continued)
for the patented invention from other federal agencies.

[59] American Law Institute, Restatement of Unfair Competition Third § 39 (1995).

[60] *See* United States v. Dubilier Condenser Corp., 289 U.S. 178, 186, 53 S.Ct. 554, 77 L.Ed. 1114 (1933).

[61] Restatement of Unfair Competition, *supra* note 59, at § 43.

[62] *Ibid* § 39 cmt. c.

[63] Stephen M. McJohn, "The Paradoxes of Free Software," 9 *George Mason Law Review* (2000), 25.

rights that would otherwise exist. It is also possible that a party not bound by the terms of an open source license may raise claims of intellectual property infringement based upon the use of software that others believe to be open source. Finally, questions have arisen regarding the validity and enforceability of open source licenses. This report next reviews these issues.

The Alleged "Viral" Nature of Open Source Software

Certain open source licenses have sometimes been described as "viral" in character.[64] Some individual open source licenses require that the terms of that license apply automatically to each copy of the software, as well as to any modified versions.[65] Some observers have expressed concerns regarding situations where a programmer, perhaps unknowingly, incorporates some open source program code into a larger software package. In these circumstances, the open source portion of the software could "contaminate" the entire program. As a result, even though the publisher intended that the program be proprietary, it may be instead be distributed as the open source license stipulates.[66] In this way, the open source software component would trump any intellectual property rights that the publisher hoped to claim.

Whether a particular open source software is potentially "viral" or not depends upon the individual terms of the accompanying open source license. Some commentators have stated that the Free Software Foundation's GPL is one example of a potentially "viral" license.[67] Under the GPL, anyone who uses or modifies the software must, upon further distributing that software or a modification of that software, make the source code fully available to the public, free of any proprietary interest.[68] This limitation prevents the software written and distributed under the GPL from being subject to intellectual property rights. As a result, the GPL maintains the "open" nature of the open source code by allowing users to modify and redistribute the software, but requiring that such modifications be made available to anyone under the terms of the GPL.

Notably, under certain conditions the GPL allows users to incorporate open source-derived computer programs into proprietary software packages without subjecting the entire package to the GPL.[69] According to the Free Software Foundation, in order to avoid the imposition of the GPL upon the entire program,

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[64] Nadan, *supra* note 6.

[65] Robert W. Gomulkiewicz, "How Copyleft Uses License Rights to Succeed in the Open Source Software Revolution and the Implications for Article 2B," 36 *Houston Law Review* (1999), 179.

[66] Nadan, *supra* note 6.

[67] Thomas M. Pitegoff, "Open Source, Open World: New Possibilities for Software in Business," 11 *Business Law Today* (Sept.-Oct. 2001), 52.

[68] *See supra* notes 25-27 and accompanying text.

[69] *See* Free Software Foundation, *Frequently Asked Questions about the GNU GPL*, available at http://www.gnu.org/licenses/gpl-faq.html#GPLInProprietarySystem.

software publishers "must make sure that the free and non-free programs communicate at arms length, that they are not combined in a way that would make them effectively a single program."[70]

The Free Software Foundation offers as an example the combination of an editor program and a shell program.[71] To expand upon this illustration, suppose that an editor program executes textual commands typed by the user. A shell, or user interface program, might provide a graphical, menu-driven interface so that the user doesn't have to memorize the text commands. The editor could be a proprietary program. The shell might have been developed for individuals who did not wish to learn the text commands, and distributed under the GPL. As the editor can work independently of the shell in this example, the proprietary nature of the editor would be maintained even though the shell was subject to the GPL.[72]

The functional separation of proprietary and open source software provides one avenue for avoiding the broad application of an open source license to an entire software product. Some observers believe, however, that conformity with this exception imposes substantial compliance burdens. For example, attorneys James A. Harvey and Todd S. McClelland state:

> It is therefore a good practice to advise clients with respect to procedures designed to segregate software that can be licensed as proprietary from that which must be distributed under an open source license. Developing and maintaining procedures to implement these administrative tasks can be very difficult in complex development environments.[73]

Views differ on the supposed "viral" nature of some open source licenses. Representatives of proprietary software firms have expressed concerns that "open source is an intellectual-property destroyer,"[74] and have reportedly referred to open source software as a "cancer" and "un-American."[75] Others believe that, in order for open source software to remain open to the public, all programs derived from an open source original should be treated as open source as well.[76] And, as noted above, some open source licenses take an intermediate position.[77] Although these licenses require that the original software that is distributed with the license remain open source, they allow modifications and upgrades to that code to be "taken private" and be treated as proprietary software.

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[70] *Ibid.*

[71] *Ibid.*

[72] Seifert, *supra* note 1.

[73] Harvey & McClelland, *supra* note 4.

[74] Miller, *supra* note 18.

[75] Jonathon Krim, "Open-Source Fight Flares at the Pentagon; Microsoft Lobbies Hard Against Free Software," *Washington Post* (May 23, 2002), E1.

[76] Ravicher, *supra* note 28.

[77] *See supra* notes 28-30 and accompanying text.

Third Party Infringement Claims

Some open source licenses, such as the General Public License (GPL), effectively prevent individuals from asserting intellectual property rights in open source software.[78] This restriction only applies to individuals who have consented to these licenses, however.[79] Parties not subject to that license are therefore not necessarily prevented from enforcing their intellectual property rights against individuals who use the software. As a result, even though one individual has distributed software that it has designated as open source, another entity may possibly assert that the software infringes an intellectual property right. Such assertions lead to potential conflicts between the intellectual property rights owner and individuals who believe that the software is open to the public.

For example, suppose that a computer scientist, Alpha, invents a new method of sorting data useful for computer programs. Alpha then files a patent application at the USPTO claiming the method. Later, a programmer named Beta independently writes a software program that uses the same data sorting method that Alpha had claimed in his pending application. Unaware of Alpha's patent application, Beta distributes his own software to the public under the GPL. If the USPTO approves of Alpha's application, Alpha could assert claims of patent infringement against anyone using Beta's software. These users would be subject to legal liability, even though the software was believed to be open source, and even though no one had knowledge of the patent infringement.[80]

This scenario is possible not only for open source software, but also for proprietary software. A software publishing firm may also discover that their products infringe a patent or other intellectual property. However, commercial enterprises may stand in a better position to consider the intellectual property ramifications of their published software than the more diffuse open source community. Such enterprises often perform audits or establish procedures to avoid the use of other's software in their own products.[81] Members of the more loosely organized open source community may have less capability to engage in these sorts of efforts.

At least one member of the open source community has addressed possible patent issues with respect to open source software. Red Hat, Inc., a well-known distributor of the open source operating system program called Linux, has presented a "patent promise." Red Hat's promise states in part:

> Subject to any qualifications or limitations stated herein, to the extent any party exercises a Patent Right with respect to Open Source/Free Software which reads

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[78] Ira V. Heffan, "Copyleft: Licensing Collaborative Works in the Digital Age," 49 *Stanford Law Review* (1997), 1487.

[79] Harvey & McClelland, *supra* note 4.

[80] *Ibid.*

[81] *Ibid.*

> on any claim of any patent held by Red Hat, Red Hat agrees to refrain from enforcing the infringed patent against such party for such exercise . . . .[82]

This statement appears to immunize users of open source software from claims of patent infringement by Red Hat, subject to certain qualifications. Red Hat's promise expressly does not cover patents owned by anyone else, however. As a result, users of open source software theoretically face the possibility of infringement claims by anyone holding a pertinent patent.

The ongoing litigation between the SCO Group and IBM Corporation offers a notable example of third party infringement claims. SCO is the current owner of the source code, as well as certain intellectual property rights, associated with a computer program known as UNIX.[83] UNIX, a widely used operating system program, coordinates use of the computer's resources (such as its disk drive or a printer) during the computer's operation.[84] Publishers of certain versions of UNIX have declared their programs to be open source software.[85]

On March 6, 2003, SCO filed a lawsuit against IBM, in part asserting that IBM had misappropriated SCO's trade secrets.[86] More specifically, SCO contends that IBM accessed its proprietary information when it licensed the UNIX software code from SCO and its predecessors.[87] SCO further asserts that IBM then introduced this proprietary UNIX code into its own operating system, AIX, and later into its Linux-based products.[88] IBM has denied these charges and, in turn, has asserted that SCO products infringe IBM copyrights and patents.[89] As of early 2004, two other open source software vendors, Novell and Red Hat, had also become party to that litigation or to related lawsuits.[90]

In addition to commencing infringement litigation against IBM, SCO has reportedly sent 1,500 letters to other firms. These letters are said to explain that the recipient's use of Linux could expose them to liability, and also to extend an offer of

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[82] Red Hat, Inc., Statement of Position and Our Promise on Software Patents, http://www.redhat.com/legal/patent_policy.html (2004).

[83] The term "UNIX" is a trademark registered to the Open Group. *See* http://www.opengroup.org.

[84] *See* Lucent Laboratories, The Creation of the UNIX Operating System (available at http://www.bell-labs.com/history/unix/).

[85] *See* Joel West, "How open is open enough? Melding proprietary and open source platform strategies," 32 *Research Policy* no. 7 (July 2003), 1259.

[86] Harvey & McClelland, *supra* note 4.

[87] *Ibid.*

[88] Reuters News, SCO Advances Suit Against IBM (June 29, 2003).

[89] Robert McMillan, "SCO infringed copyright, IBM alleges in new claim," *Computer world* (Sept. 26, 2003).

[90] ComputerWire News, "SCO Hits Novell with IP Slander Action: (Jan. 21, 2004).

a license.[91] The requested fee is reportedly about $700 for each computer using the Linux code.[92] This demand has in turn animated some observers, such as the Electronic Frontier Foundation, to organize protests against SCO.[93] As well, a consortium of technology companies, including IBM and Intel, have contributed substantial amounts of money towards the "Linux Legal Defense Fund."[94] Contributors intend that these sums be used to defray the legal expenses of open source software users who face charges of intellectual property infringement.[95]

As of the publication date of this report, the lawsuit between SCO and IBM continues in the U.S. District Court for the District of Utah in Salt Lake City. The outcome of this litigation may significantly impact users of Linux and other open source software. It also illustrates the potential tension between intellectual property rights and the open source community. Regardless of the outcome of this particular case, the SCO-IBM dispute demonstrates the possibility of future intellectual property infringement claims against open source software, commenced by individuals who claim not to be subject to the license under which the software was distributed.

Validity of Open Source Licenses

No court has yet ruled on the enforceability of open source software licenses.[96] Some observers have suggested that these agreements may be invalid, however.[97] These commentators point to the doctrine of federal preemption, which invalidates state laws that are inconsistent with federal laws.[98] Under this view, open source software licenses — which are enforced through the mechanisms of state contract laws — conflict with the federal copyright statute, and are therefore invalid.[99]

The rule of federal preemption derives from the Supremacy Clause of the U.S. Constitution. That provision states that the "Constitution and the laws of the United States...shall be the supreme law of the land . . .anything in the constitutions or laws

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[91] David Bank, "Lawsuit Over Copyrights Is Part of Effort to Collect License Fees for Software," *The Wall Street Journal* (Nov. 19, 2003).

[92] *Ibid.*

[93] *See* Electronic Frontier Foundation, "Linux Users Unite: Stop SCO!," (2004), available at http://action.eff.org/action/index.asp?step=2&item=2775.

[94] Dean Takahashi, "Aid group to defend Linux suits: Software Backers' Aim is $10 Million," *San Jose Mercury News* (Jan. 13, 2004), 1.

[95] Keith Regan, "IBM, Intel Back Linux Legal Defense Fund," *E-Commerce Times* (Jan. 22, 2004) (available at http://www.ecommercetimes.com/perl/story/32570.html).

[96] *See* Ravicher, *supra* note 28.

[97] *See* McGowan, *supra* note 30.

[98] Paul Heald, "Federal Intellectual Property Law and the Economics of Preemption," 76 *Iowa Law Review* (1991), 959.

[99] William M. Bulkeley, "Linux Lawsuit Could Undercut Other 'Freeware'," *The Wall Street Journal* (Aug. 14, 2003), B1.

of any State to the contrary notwithstanding."[100] In resolving cases under the Supremacy Clause, courts typically determine whether enforcement of a state law would either directly conflict with federal law or frustrate federal purposes.[101] In addition, section 301 of the Copyright Act expressly exempts state laws "that are equivalent to any of the exclusive rights within the general scope of copyright" and that apply to "the types of works protected by the Copyright Act."[102]

The ongoing litigation between SCO and IBM may offer a court the opportunity to decide whether the open source license known as the General Public License, or GPL, is preempted by the federal copyright law.[103] In that litigation, IBM has in part argued that SCO cannot enforce whatever intellectual property rights SCO owns in Linux due to the terms of the GPL. According to IBM, SCO distributed Linux software under the GPL for many years. IBM observes that the GPL stipulates that software distributed under the GPL must be made available for copying by others. As a result, IBM has asserted that SCO cannot now demand payment for use of any intellectual property SCO might own in Linux.[104]

In turn, SCO has in part asserted that the GPL is invalid. As part of its argument, SCO has reportedly pointed to section 117 of the Copyright Act.[105] That statute provides that "it is not [a copyright] infringement for the owner of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program provided . . . that such new copy or adaptation is for archival purposes only . . . ."[106] Stated differently, the Copyright Act permits users to make a backup copy of their software without fear of infringement liability.

The GPL places limitations upon the ability of users to make copies of GPL-licensed software, however. In particular, the GPL requires that individuals receiving copies of the software also receive copies of the GPL, and that persons making copies of the software be able to access the program's source code.[107] The GPL then states that "[a]ny attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License."[108] SCO has

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[100] U.S. Constitution, Article VI.

[101] Heald, *supra* note 98.

[102] 17 U.S.C. § 301 (2000).

[103] For an introduction to the litigation between SCO and IBM, see *supra* notes 83-95. The GPL is discussed *supra* at notes 25-27.

[104] Bulkeley, *supra* note 99.

[105] 17 U.S.C. § 117 (2000); *see supra* notes 43-49 and accompanying text.

[106] 17 U.S.C. § 117 (2000).

[107] GNU General Public License, Version 2 (June 1991), available at http://www.gnu.org/licenses/gpl.txt.

[108] *Ibid.*

taken the position that because the GPL conflicts with the Copyright Act, the GPL is preempted and therefore unenforceable.[109]

Notably, SCO and IBM have presented a number of other arguments to the court. The court may not need to address this issue to resolve their dispute.[110] This aspect of the SCO-IBM litigation has nonetheless raised concerns in the open source software community. As explained by journalist William M. Bulkeley:

> If SCO's argument ultimately wins, free-software advocates worry it would create considerable uncertainty about the legal status of many industry products. Although most believe the industry could adapt, companies that use GPL-licensed software might be confronted by surprise copyright claims from software developers. In addition, creation of new programs might be slowed by the confusion.[111]

Other observers believe that the possibility of a court striking down the GPL is small. For example, lawyer James Boyle, a member of the faculty of the Duke University Law School, has reportedly described the federal preemption argument as "simply ludicrous."[112] Eben Moglen, a law professor at Columbia University, believes that the federal preemption argument is overly broad. In Moglen's view, this position would effectively invalidate all software licenses, even those for which people pay, and even for proprietary software.[113] Moglen believes it unlikely that a court would wish to dispute this longstanding industry practice.[114]

Possible Legislative Issues and Approaches

Given the wide recognition that intellectual property and the open source movement are of growing importance in the U.S. computer industry,[115] the relationship between these fields is the subject of increasing attention. The policymakers of the 108th Congress have addressed the open source movement with respect to cybersecurity and other contexts. Should Congress choose to address this area directly, a variety of approaches are available. If the current interface between intellectual property rights and the open source movement is considered satisfactory, then no action need be taken. Indeed, growing awareness that intellectual property and open source software licenses can sometimes conflict may lead to more

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[109] Bulkeley, *supra* note 99.

[110] *Ibid.*

[111] *Ibid.*

[112] Evan P. Schultz, "A Brewing Legal Battle Imperils Linux and Other Public-License Software," 26 *Legal Times IP Magazine* no. 41 (Oct. 13, 2003), 14.

[113] *Ibid.*

[114] *Ibid.*

[115] Mathias Strasser, "A New Paradigm in Intellectual Property Law? The Case Against Open Sources," *Stanford Technology Law Review* (2001), 4.

sophisticated treatment of intellectual property by members of the open source community, as well as continued refinement of the governing law in the courts.

Another approach is to provide governmental assistance to the open source movement in identifying intellectual properties that might bear upon a particular open source software product. For example, the U.S. Patent and Trademark Office could, upon request by a recognized open source software publisher or organization, conduct a search of pending patent applications and issued patents in order to determine whether these patents might bear upon a particular open source software program. This capability would allow members of the open source community to become more fully informed of intellectual property rights. It should be noted, however, that a number of patent research firms already exist that could conduct such a search for a fee, at least with respect to issued patents and published patent applications.[116]

More far-reaching legal reforms are also possible. For example, one recognized source of legal uncertainty for the software industry concerns the enforceability of open source licenses.[117] A legislative statement concerning the status of these licenses in terms of the federal preemption doctrine might allow software firms to make decisions concerning research, investment, and other commercial activities with more confidence.

The allegedly viral nature of open source software presents another source of concern. One possible legislative response is to allow a proprietary software publisher that discovers its product contains an open source component a fixed period of time to eliminate the open source component. If the publisher removes the open source component within the stipulated grace period, then the software would remain proprietary.

Any possible legal reform would be well-advised to recognize that the U.S. software industry is increasingly characterized both by rapid innovation and by a distinct community of knowledgeable users who wish to "opt out" of the intellectual property system. The possibility of intellectual property rights, and their attendant license fees and royalties, may provide a significant incentive for firms to innovate and to distribute software. On the other hand, some computer users believe that these incentives are unnecessary, and further hope to maintain a non-proprietary environment of software distribution and development.[118] These two trends have sometimes led to conflicts between exclusive intellectual property rights and open source software. Striking a balance between promoting innovation, on one hand, and accommodating the demands of software developers and users, on the other, forms an important component of contemporary software policy.

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[116] Steve D. Beyer, "Searching — The Art Behind An Opinion," 667 *Practising Law Institute Patents, Copyrights, Trademarks and Literary Property Course Handbook Series* (Nov. 1, 2001), 45.

[117] *See supra* notes 96-114 and accompanying text.

[118] *See* Andrea Bonaccorsi & Cristina Rossi, "Why Open Source software can succeed," 32 *Research Policy* no. 7 (July 2003), 1243.