The Open Source Movement, Copyright, and Copyleft

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Copyright Regime Provides Foundation for Open Source Movement

This paper explains how the Open Source community relies on copyright to further its goal of providing free access to source code, even as copyright and patent infringement suits simultaneously threaten the future of the Open Source movement. Unlike developers of proprietary, or 'closed-source' software, open-source programmers enable widespread use and modification of their software by limiting intellectual property (IP) restrictions on their own works; computer programs. The Open Source movement depends upon the Copyright regime for its existence. Open-source developers essentially give away their copyrighted works through counterintuitive use of software. This approach can be characterized as copyright without 'all rights reserved.' Open-source software is usually free in that it is not sold when distributed or licensed, and therefore is sometimes characterized as free software. Despite the fact that open-source software is often free, it is copyrighted and usually not donated to the public domain.[1]

The most critical software IP asset is the program code, whether it is open-source or proprietary. Computer programs are "literary works" within meaning of 17 U.S.C. § 101 and are protected from unauthorized copying, whether from their binary or human-readable source code version.[2] Source code is human readable and computer programs are treated as literary works under the current copyright regime.[3] Once compiled into machine-readable binary object or executable forms, code provides instructions to computers to perform

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[1] *Metro-Goldwyn-Mayer Studios, Inc. v. Grokster Ltd.*, 380 F.3d 1154, 1159 C.A.9 (Cal. 2004). The *'Grokster I'* court characterized open-source software, such as the Gnutella Peer-to-Peer (P2P) protocol, as software whose source code is either in the public domain or is copyrighted and distributed under an open-source license that allows modification of the software, subject to some restrictions. Most open-source software is not in the public domain, is attributed to authors, and due to its relatively recent creation, will not enter into the public domain for many years; see http://www.fsf.org/licensing/essays/categories.html (last visited May 10, 2005) Free Software Foundation (FSF) Succinctly defines and explains differences between open-source, free, proprietary, commercial, shareware, public domain, and copylefted software
[2] *Apple Computer Inc. v. Franklin Computer Corp.*, 714 F.2d 1240 (1983) held that 17 U.S.C. §§ 101, 102(a) does not require human readability of software code in order for it to be copyrightable
[3] *Id.*

certain functions. Source code development for complex software programs requires a large amount of time to design, write, test, debug, implement, and install. It is common for these tasks to be divvyed up amongst separate teams in both proprietary and open-source development settings.

Since public domain software rarely leads to disputes or litigation, this paper will concentrate on copyrighted and licensed open-source software. Unlike proprietary software vendors who actively lobby for technology-specific copyright amendments to further restrict copying, distribution, and fair use of software, open-source adherents seek instead to creatively use the existing copyright regime to further their goals of opening up access to their works.[4]

The Open Source movement is revolutionizing how software is made and distributed and challenging conventional software development and distribution models in the process.[5] Despite its revolutionary approach to software production and distribution, the Open Source movement depends on existing copyright law and does not seek to exclude software from copyright protection.[6] Open source adherents often rail against software patents, but have come to accept that source code is a copyrightable literary work under 17 U.S.C. § 101.[7]   Although it is not typically sold, the reach of open-source software rivals the market share of commercial software distributed by behemoths such as Microsoft. Many popular software titles are open-source: ranging from operating systems

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[4] *Software firms want copyright law rewrite* at http://news.zdnet.com/2100-9588_22-5516568.html (last visited April 10, 2005) (Business Software Alliance/BSA criticizes DMCA as not going far enough)
[5] DiBona, Ockman & Stone, eds., *Open Sources: Voices from the Open Source Revolution* (1999) (Leaders of open-source movement discuss their vision of software industry they have created. Essays offer insight into how movement works, why it succeeds, and its future).
[6] Lemley, Menell, Merges & Samuelson, *Software Internet Law* (2000); *See* Haynes, *Black Holes of Innovation In the Software Arts*, 14 Berkeley Tech. L.J. 567 (1999).
[7] Interview with Jon 'Maddog' Hall, esq., President and Executive Director of Linux International, (April 14, 2005).

such as Linux[8]; to web browsers such as Firefox and Netscape[9]; to web server software such as Apache; to widely used P2P clients such as Gnutella, Morpheus, and FastTrack; to the e-mail server Sendmail; and to programming languages such as Perl.[10] Disputes arise when popular open-source programs become commercially valuable or are incorporated into proprietary 'closed-source' commercial software.[11] To date, these disputes have not been resolved through litigation or legislative amendments, and the suits that have been brought involve a combination of copyright and patent infringement claims.[12] Despite this paper's focus on the implications of open-source software on copyright, patent infringement suits are also being considered by proprietary software firms in their attempt to restrict the growth of open-source market share.[13]

Open Source: What it is and What it is not

Open-source software refers to computer programs developed and licensed in the Open Source context, whereas the Open Source movement a loose-knit community of like-minded developers, end-users, businesses, and academics linked via the Internet. One of

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[8] See the Linux Documentation Project at http:// www.linuxdoc.org (last visited April 10, 2005) and The Linux journal at www.linuxjournal.com (last visited April. 10, 2005). See also Benkler, *Coase's Penguin, or, Linux and The Nature of the Firm*, 112 Yale L.J. 369 (2002); McGowan, *Property Challenges in the Next Century: Legal Implications Of Open-Source Software*, 2001 U. Ill. L. Rev. 241 (2001).

[9] See http://mozilla.org (Netscape's open-source browser). See also firefox.org (last visited April. 10, 2005) Firefox is an increasingly popular Mozilla-based open-source browser available under the Mozilla open-source license.

[10] Amy Harmon, *A Surge in Popularity of Software that Unlocks the Code*, N.Y. Times, January 4, 1999 at C18.

[11] *Red Hat Inc, v. SCO*, 2004 U.S. Dist. LEXIS 7077 Countersuit from Linux distributor against proprietary software vendor who claimed Linux code infringed on Unix software copyrights; *Computer Associates International v. Quest Software, Inc.*, 333 F. Supp. 2d 688, 2004 U.S. Dist. LEXIS 11832. Copyright infringement suit involving Open-source software; the term 'closed-source' term sometimes incorrectly used interchangeably with proprietary software, but aptly describes most proprietary software whose source code is not publicly available

[12] *Id.*, In both *Red Hat* and *Computer Associates*, claims of software patent infringement were asserted (by SCO and Computer Associates, respectively) along with copyright infringement.

[13] Robert McMillan, *Study: Microsoft patents could threaten Linux Software lawyer says patent lawsuit is 'inevitable*, INFOWORD, August 2, 2004 [hereinafter *Microsoft patents could threaten Linux*], available at http://www.infoworld.com/article/04/08/02/HNmspatentsthreat_1.html (last visited March 14, 2005) (on file with author). IP attorney predicts patent infringement suits involving open-source software based on analysis of 283 existing US software patents, including 27 held by Microsoft.

the goals of the Open Source community is to improve how software is developed and distributed. The idea behind Open Source is that when programmers can read, redistribute, and modify source code, software evolves as people improve it, adapt it, and fix bugs. In the Open Source context, all of this happens at a speed that outpaces conventional proprietary software development. Although some open-source licenses such as the Creative Commons license have been applied to non-software works such as audiovisual works and music, the most common application of open-source licenses is for software.

A combination of copyright, licensing, and trademark enables distribution and control of open-source code. The aim of open-source licenses is ensure that the software remains open, that is, that the source code remains available to all. Open-source software is copyright protected, but available for free pursuant of the various open-source licenses. Open-source licenses will be discussed in greater detail later in this paper. Examples of open-source software licenses are the General Public License (GPL)[14] and Lawrence Lessig's Creative Commons license.[15]

A split in the Open Source movement developed in 1998, and as a result there are two main camps within the movement. Both camps are proponents of giving away access to source code. The non-profit Free Software Foundation (FSF) leads the free software camp and calls software developed and licensed under their guidelines 'free software.' The free software definition is given below.

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[14] Boyle, *The Public Domain: The Opposite of Property*', 66 Law & Contemp. Prob. 1, 31 (2003). GPL does not allow those who modify the software to subsequently conceal their source code or restrict its reproduction.
[15] See Creative Commons Legal Code license at http://creativecommons.org/licenses/by-nc/2.0/legalcode (last visited May 13, 2005) (on file with author)

Free software is licensed so that users have the freedom to run, copy, distribute, study, change, and improve the software.[16] Free software licenses grant four freedoms to users: the freedom to run the program for any purpose, the freedom to study how the program works and adapt it to your needs (access to the source code is a precondition for this), the freedom to redistribute copies to others, and the freedom to improve the program and release your improvements to the public.[17] The FSF feels that users should be free to redistribute copies, either with or without modifications, either gratis or by charging a fee for distribution, to anyone anywhere without having to ask or having to pay for permission.[18] The free software definition excludes almost all proprietary and commercial software because most proprietary software is licensed under restrictions that prevent at least one, if not all four of the FSF freedoms.

The FSF encourages developers to use restrictive licenses so that free software remains free. The FSF also wants derivative works based on free software to be free. The free software movement has social and philosophical goals of improving society through freely available quality software. The other camp in the Open Source movement is a bit more pragmatic and allows less restrictive licensing of open-source software, including terms that allow commercial sales and give less freedom to users than FSF licenses do.[19] The scope of this paper is limited to the more pragmatic and less restrictive camp within the Open Source movement because it is open-source software, not free software, which

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[16] http://www.gnu.org/philosophy/free-sw.html (last visited May 12, 2005) (on file with author). FSF definition of free software and explanation of what the four enumerated freedoms imply.
[17] *Id.*
[18] *Id.*
[19] http://www.gnu.org/philosophy/free-software-for-freedom.html (last visited May 11, 2005) Why ``Free Software'' is better than ``Open Source'' – FSF contrasts Open Source and closely-related free software movements.

has created the most tension with proprietary software companies, including several copyright infringement suits discussed in detail later in this paper.

The other camp in the Open Source movement is led by the Open Source Initiative (OSI), a non-profit corporation dedicated to managing and promoting the Open Source methodology, specifically through the OSI Certified Open Source Software certification mark (an OSI trademark program).[20] The OSI certification implies that software bearing the registered trademark is distributed under a license that conforms to the OSI definition of Open Source. The OSI Open Source definition is given below.

Open source is a collaborative development methodology. The Open Source and free software camps work together at times because they share common goals, including improving software development in ways that proprietary software licenses do not allow. Open-source and free software have more in common with each other than with proprietary, 'closed-source' software. Proprietary software is seldom distributed with source code, and typically users are only given access to the executable binary files needed to install and run the software. Open source goes beyond merely providing access to software source code. For software to be considered open-source, the distribution and licensing terms of the software must comply with the criteria discussed in the following paragraphs.

True open-source software cannot be licensed in any way that restricts parties from selling or giving away the software as a component of an aggregate software distribution containing programs from several different contributors.[21] The license shall not require royalties or fees for such sale, but distributions of open-source programs **can** be sold. The

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[20] http://www.opensource.org/docs/certification_mark.php (last visited May 11, 2005) (Description of OSI Certification program); http://www.opensource.org/index.php (last visited May 11, 2005) (Describes OSI)
[21] http://www.opensource.org/docs/definition.php (last visited May 11, 2005) (on file with author)

source code for open-source programs must be freely available and the software license must allow distribution of the code. If source code is not distributed, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost–preferably, downloading via the Internet without charge.[22] Easy and free access to source code enables improvements and fixes to programs through modification of the code. One of the goals of the Open Source movement is to promote progress of software development by making program evolution and modification easy.

Open-source licenses must allow modifications and derivative works. Any derivative works must be able to be distributed under the same terms as the original software. The license may require derivative works to carry a different name or version number from the original software, but cannot prohibit creation of derivative works. An open-source license must guarantee that source be readily available and cannot restrict anyone from making use of the program in a specific field of endeavor such as a for-profit business or genetic research.[23] Thus, open-source licenses must not prevent the software from being used commercially.

Open source licenses 'follow' source code in that the rights attached to the program apply to all to whom the program is redistributed without the need for execution of additional licenses by the parties. This prevents open-source licensees from converting open-source code into proprietary, 'closed-source' code through trade secrecy means such as non-disclosure agreements.

A modification or addition to an open-source program does not necessarily have to be open-source and the resulting program can be licensed and sold provided the original

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[22] *Id.*
[23] *Id.*

open-source sections of the program are not claimed as proprietary. A business can download and modify open-source code and own the copyright for a sub-routine added to the open-source program. Members of the Open Source community take issue with entities, usually software firms, which attempt to convert an entire open-source program into a closed-source program by claiming that the pre-existing open-source code was somehow copied from proprietary source code.[24] Remedies to breaches of open-source license agreements are provided by traditional contract law, with licensors suing licensees.

Open source is a collaborative software development and distribution model. Source code to an open-source program is made available by licensors under a license that gives licensees the right to modify and redistribute it.[25] Open-source programs are developed through a process of iterations of modification and redistribution whereby users download sections of code from a web site, modify the program's source code, upload it to the same web site, and merge the modified sections into the original code.[26]

Open Source: Myths vs. Reality

The Open Source movement is not against private ownership of software or using proprietary software programs on open-source platforms. The Open source community is not opposed to IP rights or the concept of selling, licensing, and owning software.[27] Open-source software is copyrightable subject matter, but programmers who write and contribute to open-source software programs choose not to assert all of their exclusive copyrights. Open-source licensors grant licenses to licensees to copy, re-distribute, and create

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[24] Interview with Jon 'Maddog' Hall, esq., President and Executive Director of Linux International, (April 14, 2005).

[25] *Universal City Studios v. Reimerdes*, 111 F. Supp. 2d 294, 305 (D.N.Y., 2000) (n6 describes open source).

[26] *Id.*

[27] See http://www.opensource.org/advocacy/faq.php (last visited April 12, 2005) (on file with author). Answers frequently asked questions (FAQs) about open source, points out that open-source software is sold (e.g., by Red Hat), and that there is no 'crusade' against IP rights by the open-source community. Also has links to definitions of open source.

derivative works using their code.[28] Open-source software is not in the public domain or

otherwise uncopyrightable, nor is there a prohibition against selling open-source programs

such as is done with commercial 'distributions' of the open-source Linux operating

system.[29] Although often used interchangeably, open-source software is not necessarily

'Free Software.' Open Source adherents often point out that 'Free Software' does not

mean the software is gratis. It is expected that users of open-source programs will adhere

to their license agreements and honor contracts associated with use and re-distribution of

open-source programs.[30] Copyrights protect open-source software even though the authors

do not wish to retain all exclusive rights afforded them by 17 U.S.C. § 106.

Open source adherents are not wild-eyed radicals, software pirates, or copyright

infringers who seek to circumvent protection on proprietary software or distribute pirated

copies of commercial programs. It is legal to share and distribute open-source software,

notwithstanding open-source programs used for copyright infringement[31] or circumvention

that violates the DMCA.[32] This is similar to proprietary software programs used for

infringement and circumvention (e.g., Napster's MusicShare and closed-source 'warez'

cracking programs used to circumvent copy protection measures for digital media). The

only commonality between non-infringing open-source and infringed, pirated copies of

proprietary software is that both are widely available via Internet downloads. Many

consumers obtain, install, and use pirated copies of proprietary software such as games,

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[28] Miller, *Allchin's Folly: Exploding Some Myths About Open Source Software*, 20 Cardozo Arts & Ent. L.J. 491 (2002)

[29] Commercial, for-profit sales of Linux have been common for years – examples include Red Hat Incorporated and SUSE distributions.

[30] Interview with Jon 'Maddog' Hall, esq., President and Executive Director of Linux International, (April 14, 2005).

[31] *Metro-Goldwyn-Mayer Studios, Inc. v. Grokster Ltd.*, 380 F.3d 1154, 1159 C.A.9 (Cal. 2004) (open-source Gnutella software used for P2P copyright infringement).

[32] Litman, *Digital Copyright*, 153, 163-164 (2001). 'The Copyright Wars' chapter and notes 3-5 discuss DeCSS reverse engineering and how the open-source DeCSS code violated DMCA § 1201.

operating systems, business applications, and productivity tools because they are readily available on the Internet for free, just as open-source software is.[33] For many consumers, proprietary software is only worth paying for in order to get technical support, upgrades, fixes, patches, or documentation and manuals. Commercial, for-profit distributors of open-source software such as Red Hat justify charging for open-source software the same way, with the only difference between them and proprietary software publishers such as Microsoft being that Red Hat does not fool themselves into thinking that software source code or executable binaries alone necessarily have value to their customers.[34]

Open-source software is not in the public domain or otherwise available for use without restrictions. The Open Source movement acknowledges that the simplest, most straightforward way to make a program free is to put it in the public domain uncopyrighted, but specifically chooses not to do so. Placing code in the public domain allows people to share the program and their improvements, but it has the drawback of allowing uncooperative people to convert the program into proprietary software. In the view of open-source proponents, the problem with public domain software is that programmers can make slight or inconsequential changes to the code and re-distribute the resulting software as a proprietary product.[35] From the Open Source view, people who receive a program that the author had placed in the public domain and has been subsequently modified by a proprietary software company do not have the freedom the original author gave them.

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[33] See Raymond, *The Cathedral & the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*, ch. 5 (O'Reilly, 2001) ('The Manufacturing Delusion' section explains how proprietary software is often only bought to get access to technical support, updates, fixes, and upgrades, which are free for most open-source programs)

[34] *Id.*

[35] See http://www.gnu.org/copyleft/copyleft.html (last visited April 10, 2005) (on file with author) (public domain software allows "uncooperative people" to convert the program into proprietary software by making only a few changes, and subsequently distribute the result as a proprietary product – 'uncooperative people' refers to proprietary software developers who seek to recast public domain software as proprietary code via superficial changes to the code)

Donating code to the public domain allows middlemen to strip away freedoms and convert the program into a proprietary work.[36] Instead of distributing software subject to reserved all 17 U.S.C. §106 rights and restrictions, open-source developers distribute software without restrictions on use, modification, adaptation, or redistribution to a third party.[37] The Open Source movement seeks to make copyrighted code publicly available without donating it to the public domain. The movement stops short of placing open-source software in the public domain through the use of licenses that ensure public access to the code while simultaneously retaining **some** exclusive rights afforded by 17 U.S.C. § 106.

Copyleft Uses Existing Copyright Law And Licenses to Keep Code 'Open'

One approach to bridge the distance between 'all rights reserved' software licenses that explicitly retain all exclusive rights and the goals of the Open Source movement is the 'copyleft' approach. Instead of the 'all rights reserved' language often found in 'shrink wrap' or 'click through' licenses for proprietary software, authors of 'copylefted' software do not seek to retain all of the exclusive rights afforded them by 17 U.S.C. § 106. Despite the moniker, copylefted software is copyrighted and licensed. Under the copyleft scheme, the copyright holder explicitly does not reserve exclusive rights against copying or distribution of his/her source code.[38] Copyleft is a method of making a program free and requiring all modified and extended versions of that program to be free as well.[39] Copyleft furthers goals of the Open Source movement by giving users freedom in how they use

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[36] *Id.*

[37] Dratler and Conway-Jones, eds., *Intellectual Property Law: Commercial Creative and Industrial Property*, (Law Journal Press 2004). Chapter 6: The Nature of Copyright Protection, § 6.02 Ownership of Copyright, section 4 provides a synopsis of open-source software and how it fits into the copyright regime.

[38] See http://www.gnu.org/copyleft/copyleft.html (last visited April 8, 2005) (on file with author) (Under Copyleft licenses, programmers give free licenses to their software by making it free subject to the condition that all derivative works based on the software will be also be free. Free implies free access to source code, not gratis price)

[39] *Id.,* See also Dusollier, *Open Source and Copyleft: Authorship Reconsidered?*, 26 Columbia J.L. & Arts 281 (2003).

software and restricts how others can convert open-source software into proprietary software.[40] Instead of using licenses for their usual purpose as a means of privatizing and restricting use of software, copyleft uses copyright law to keep software 'free' and open. This may seem counter-intuitive, but it is consistent with 17 U.S.C. § 106. Copyleft gives licensees permission to run a copylefted program, copy and modify it, and to distribute modified versions, but explicitly forbids the licensees from adding restrictions of their own. For effective copyleft, access to the source code of modified versions of copylefted programs must be granted. Derivative works based on copylefted works must remain available to the Open Source community. When programmers improve copylefted open-source software, copyleft prevents their employers from prohibiting sharing of those changes or making the improved versions of the program proprietary.[41]

Open Source Depends on Current Copyright Regime, Not Amendments

The Open Source movement is not seeking legislative amendments to the copyright act, but many open-source proponents have criticized what they view as copyright and patent abuse by proprietary software vendors.[42] Open Source proponents hold copyrights for their software and license it expressly so that they can control how it is used and prevent it from becoming closed-source and taken away from the public in the future. Open-source licenses are a response to commercial software licenses that the Open Source

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[40] See DiBona, Ockman & Stone, eds., *Open Sources: Voices from the Open Source Revolution*, ch. 3 (1999). (sub-chapter 'Copyleft and the GNU GPL' by Richard Stallman, original co-author of Unix source code, discusses Copyleft origins and applicability to GNU open-source software)

[41] *Id.*

[42] Tom Hull, *Only the Free World Can Stand Up to Microsoft*, available at http://www.gnu.org/philosophy/free-world.html (last visited May 10, 2005). Notes 7, 9, and 12 criticize and suggest solutions to perceived abuses of software copyright by Microsoft and other proprietary software publishers.

community says unduly restrict fair use of software and the right to make derivative works.[43]

Differences Between Open-Source and Proprietary Software

Many proprietary software companies, their trade associations, and lobbyists sometimes speak as if there is an unquestionable 'natural' right to own software and exert power over users. Open source proponents reject this view of a natural right of software ownership and characterize copyright and 'all rights reserved' software licenses as an artificial government-imposed monopoly that limits the users' natural right to copy.[44]

Open-source, free, or open-code[45] software differs in two important ways from proprietary software. First, the holder of an open-source program is free to make as many copies as he/she pleases, to modify and improve the code, and to further distribute copies of the modified program. Second, to enable the aforementioned modifications, open-source software is distributed with the source code, not just the binary object or executable code.[46]

When software is proprietary and closed, then only the proprietor or copyright holder can change the source code. While this protects the source code from copying, misappropriation, and distribution, it drastically limits the universe of potential debuggers and improvers. Improvements and debugging of proprietary code is restricted to a finite

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[43] Eben Moglen, Address at the Harvard Journal of Law & Technology, (February 23, 2004) (transcript available at http://www.gnu.org/philosophy/moglen-harvard-speech-2004.html) (last visited May 10, 2005) Eben Moglen, is a law professor at Columbia who serves as General Counsel for the Free Software Foundation, discussing SCO open-source copyright infringement lawsuits "I have confronted wraithlike examples of what were said to be derivative work but weren't derivative work under copyright law, or asserted copyright claims that turned out to be based on code that nobody owned"

[44] DiBona, Ockman & Stone, eds., *Open Sources: Voices from the Open Source Revolution*, ch. 3 (1999) ('The GNU Operating System and the Free Software Movement' by Richard Stallman discusses the Free Software Movement's view of copyright as an unnatural restriction on rights to use software)

[45] *See* www.opencode.org (last visited April 10, 2005) (The term 'Open Code' has slightly different connotations than open-source or free software. Open code is a consortium devoted to supporting the open code development model and is associated with the Berkman Center for Internet and Society at Harvard Law School. The Berkman Center has adopted the open-source approach in the litigation context with its Open Law project for pro bono litigation, which seeks to 'develop arguments, draft pleadings, and edit briefs in public, online.'); *See* http:// www.berkmancenter.org/ (last visited April 10, 2005).

[46] *Id.*

group of 'in-house' developers who are authorized to access the source code, which puts proprietary code at a distinct disadvantage as compared to the broad and diverse group of developers who assist with debugging and improving open-source programs. The life cycle of new releases is slower for proprietary software than for open-source software. Open-source development lifecycles are accelerated because more developers are able to collaborate online which enables releasing new versions of programs quicker than comparable proprietary programs. This pattern holds even for proprietary software developed by software companies with nearly limitless resources such as Microsoft whose releases of Windows2000/XP and Office 2000/XP/2003 are delayed much more often than new versions of Linux and other complex open-source programs. When software is open-source, other developers besides the original authors are able to find bugs and problems or suggest improvements, which in turn leads to better software.[47]

There are two distinct motivations for making and using open-source code. A political and ethical motivation behind open source is exemplified by the Free Software Foundation that views software as a form of expression, and feels that imposing restrictions on this form of expression is as wrong as restricting the flow of scientific information or artistic advancement.[48] Others see open source as a better way to develop, debug, test, and distribute software.[49] Despite differing motivations, both groups consider Open Source to

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[47] See http://www.opensource.org/for-hackers.html (last visited April 10, 2005). Discussion of techie/hacker debugging and improvements that can be readily made to open-source programs.

[48] See www.fsf.org (last visited April 11, 2005) (home of the Free Software Foundation) and http://www.gnu.org/philosophy/free-sw.html (last visited May 5, 2005) (Information on the Gnu's Not UNIX/GNU project and source of some of the most widely used open-source utility programs) both sites contain discussions of philosophy behind and motivations for free, open-source software.

[49] See http://www.opensource.org/ (last visited April 10, 2005). Makes cases for open-source code from the perspective of a 'techie/hacker', a business, and a customer/end-user of software.

be a better business model for software development and use than the traditional

proprietary model.[50]

Open-Source Licensing: Many Licenses with Similar Goals

The way open-source software is given away without the author's complete loss of

control is through licensing. Proprietary, free, open-source, and open-code software can be

licensed. Software license terms range from very restrictive proprietary licenses that only

grant licensees permission to run a program on one machine to copyleft licenses, which

grant considerably more freedom to licensees.   All open-source licenses need the copyright

regime in order to function.

There are more than 57 different open-source licenses in use today.[51] Some open-

source licenses originated in university settings and government funded labs and others

from corporate research and development labs.[52] Open-source licenses are geared towards

furthering collaboration on software development and removing barriers to sharing source

code with colleagues – whether they are in the same lab, corporation, or dispersed around

the world and collaborating online. Some open-source licenses provide that licensees can

do almost anything they wish with the software – including incorporating the code into

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[50] See http://www.opensource.org/for-suits.html (last visited April 10, 2005) (Discusses improved business model vis a vis traditional proprietary software)

[51] See http:// www.opensource.org/licenses/ (last visited April 23, 2005) (Lists 58 known open-source licenses in use as of April 2005)

[52] *Id.* Lists open-source licenses including the GNU General Public License (GPL), the GNU Library or Lesser' Public License (LGPL), the BSD license (University of California, Berkeley UNIX license); the MIT license; the Artistic license; and the Mozilla Public License (MPL); the IBM Public License; the MITRE Collaborative Virtual Workspace License (CVW License); the Ricoh Source Code Public License; and the IJG JPEG library license); *See* www.gnu.org (last visited April 10, 2005) (discussion of different ways to share software such as open-source, shareware, and public domain approaches)

proprietary software.[53] Other open-source licenses require that code in derivative works be kept open-source and subject to the original license terms.

The GPL, Lesser General Public License (LGPL), BSD, and MIT licenses were the most commonly used for open-source software throughout the 1980s and most of the 1990s, with the GPL and LGPL coming from the Free Software Foundation (FSF) and the BSD and MIT licenses originating in academic settings (The University of California, Berkeley and The Massachusetts Institute of Technology, respectively). These older open-source licenses have morphed into a new generation of licenses in response to changing needs of licensees in light of global distribution of code that the Internet has enabled.

The GPL is one of the most prominent open source licenses because of its use for licensing the original Linux source code. The GPL itself has spawned an official variant-the GNU Lesser General Public License (LGPL), also offered by FSF, to address concerns raised by the restrictions of the GPL that prevent programs licensed under the GPL (GPL'd code) from being linked to proprietary, non-GPL'd code. Unlike the GPL, the LGPL allows open-source software to be linked to separate proprietary programs and form binary executable programs.[54] The LGPL allows the licensee to maintain the proprietary nature of applications that are linked to open-source code. The LGPL overcomes what is sometimes referred to as a 'viral' provision of the GPL that forces all software linked to GPL'd code to be open-source. The LGPL is less restrictive than the GPL because of the recognition that open-source and proprietary code is often linked together to form a single new mixed-type program.

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[53] See Hecker, *'Setting Up Shop: The Business of Open-Source Software*,' http://www.hecker.org/writings/setting-up-shop.html (last visited April 10, 2005). A comparison of the legal effects of using various open source licenses.

[54] See http://www.gnu.org/copyleft/lesser.html (last visited April 23, 2005). Explains LGPL and compares/contrasts with the Free Software Foundation's more restrictive GPL (The originator of Linux, Linus Torvalds, licenses Linux under the GPL).

An example of a more recent open-source license is the Mozilla public license (MPL). The MPL is used by Netscape to make the code to its Netscape Internet browser available. In terms of sheer numbers of licensees and licensed works, the MPL is the most popular open-source license. Since the Netscape/Mozilla web browser source code was released under the MPL in 1998, the MPL has become the most widely open-source license.[55] The MPL's popularity can be traced to the Netscape and Firefox browser source code being released and licensed under the MPL.[56] Despite the large number of open-source licenses in use, they all share the underlying goal of the Open Source movement, namely to retain just enough control over open-source code to ensure that it remains available to the community in the future.

Open or Closed – Decision Depends on Type of Software and Customer

Software developers and publishers make a conscious choice when deciding whether to incorporate open-source software into their projects. This decision is often based on if they feel they can comply with open-source license terms. Software firms face a related, but separate decision as to whether to open up their **own** software and give up some of their exclusive 17 U.S.C. § 106 rights in their source code. Very few software development environments or projects are completely proprietary or one hundred percent open-source.[57] The decision as to whether to open up source code, or to rely on a combination of copyright, trade secrecy, patents, and trademarks to protect software IP varies based on the type of developers and type of software being created. For-profit developers of commercial software such as games and business productivity applications are unlikely to

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[55] See http://www.opensource.org/licenses/ (last visited April 23, 2005). Gives brief history of open-source licenses and mentions ascendancy/growing popularity of the MPL.
[56] *Id.*
[57] Mark Woodward, Address at the Serena Federal/Mid-Atlantic User's Conference, (May 12, 2005) (President and CEO of Serena, the largest supplier of configuration management (CM) software stated that "all companies and organizations are using open-source code, whether they know it or not")

make their source code freely available. The open-source decision also varies with the

software development setting – university labs tend to participate in open-source

development more often than commercial software publishers. The target audience and

customer base for the software also impacts the decision. The agendas and goals of

developers influence the open-source decision as well. Software developers who place

high importance upon attribution or moral rights in their works are more likely to write

open-source software and unlikely to write software subject to non-disclosure agreements

and other tools used to enforce trade secrecy. Custom programs developed by commercial

software companies for specific customers are more likely to be proprietary or held as trade

secrets and unlikely to be open source. Software developed for national security, defense,

or financial applications is unlikely to be open source. Software made for specialized

environments such as avionics or real-time systems used in defense and power utilities is

usually held in secrecy (the code and algorithms themselves are sometimes classified as

secret by governments). Patented software is rarely open source because prior publication

and disclosure of source code can bar patentability.[58] There are U.S. and international

trademarks for software titles that include both open-source and proprietary operating

systems, graphical interfaces, logos, icons, business applications, and games.[59] Despite

limits on required disclosures needed to obtain copyright and patent protection, many

proprietary software firms want to avoid publicly disclosing their source code and

algorithms (program logic) as is required in patent applications and copyright registrations

and prefer to employ trade secrecy.

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[58] 35 U.S.C. § 102 (a-b) (prior disclosure, publication, description, or use of open-source software is a statutory bar to patentability if occurring more than one year before patent application is filed)
[59] Examples of software-related trademark registrations include names, logos, and icons associated with the Apple Macintosh, Microsoft Windows, and Red Hat Linux operating systems in addition to product names such AppleWorks, iPhoto, iTunes, Microsoft Office, Netscape, and game titles, characters, and graphics.

Copyright and Licensing is Best Option for Open-Source Software

Unlike proprietary software whose source code is usually either a trade secret or protected by patents, author's rights in open-source software cannot be protected as a trade secret or patented.[60] Open-source software is rarely patented because of time-pressures to release it quickly and because source code has been copyrightable as a literary work before the emergence of the Open Source movement.[61] The principle of open-source code allows others to inspect the structure of the program and disavows most copyright or proprietary interest in the source code. The objective of open-source licensing is to encourage others to further develop the programs.

Selling Free Software: The Linux Example

Linux is an Operating System (OS), which acts as a communication service between the hardware, the physical equipment of a computer, and the software, applications which use the hardware, of a computer system. The Linux OS is a prime example of open-source software that is licensed and sold.

Linus B. Torvalds owns the copyright to the core Linux OS code (the 'kernel', as in the core of a popcorn kernel) under the terms of the General Public License (GPL).[62] The GPL states that the source code must be freely distributed and that anyone is allowed to make copies for their own use, or to sell or give it to others - with a few restrictions. While most Linux software is licensed under the GPL, not all software developed for Linux has to be. Many other open-source licenses exist, with some commercial software packages

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[60] Publicly disclosed and distributed open-source code cannot be secret; prior disclosure, publication, description, or use of open-source software is a statutory bar to patentability if occurring more than one year before patent application is filed per 35 U.S.C. § 102 (a-b)

[61] *Apple Computer Inc. v. Franklin Computer Corp*., 714 F.2d 1240 (1983) The court considered the idea/expression dichotomy and held that the idea for Apple's software was capable of various modes of expression and determined that since other programs could have been written to perform the same function as Apple's operating system, the program was an expression of an idea and thus copyrightable as a literary work.

[62] See http://www.li.org/whatislinux.php (last visited May 5, 2005) (on file with author).

having more restrictive licenses, such as the common copying restrictions faced by Windows users.

Linux is distributed by a number of commercial and non-commercial organizations that add to, or enhance the basic functions of the operating system. Novell's SUSE Linux, for example, is a version of Linux with features of the core Linux OS along with enhancements that are specific to the SUSE 'distribution.' Linux distributions come completely pre-configured to specifications set by companies and customers, including configuration utilities and installers for specific hardware. Red Hat Linux is another example of a commercial distribution of Linux that is sold by a for-profit corporation.

Tensions Between Open Source and Proprietary Software Firms

Problems inevitably arise when open-source applications such as Linux, Netscape, and Firefox Internet browsers become commercially valuable and when formerly proprietary code is 'donated' to open-source projects. Although there has been relatively little legislative activity or litigation involving open-source software to date, proprietary software companies have filed copyright and patent infringement suits claiming that 'their' source code has found its way into widely used open-source software such as the Linux operating system.[63] The following section discusses how copyright disputes have arisen at the intersection of proprietary and open-source software.

SCO and the War Against Open-Source – Linux Copyright Infringement Suits

Copyright infringement suits are threatening the 'star' of the Open Source movement, the popular Linux operating system. In March 2003, Caldera Systems, a

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[63] *Red Hat, Inc. v. SCO Group, Inc*., 2004 U.S. Dist. LEXIS 7077 (D. Del., 2004). SCO, maker of proprietary UNIX operating system with working title 'Project Monterey', filed suit against IBM and Red Hat, Inc. accusing IBM of misappropriating the confidential and proprietary information from SCO in Project Monterey." SCO claimed in its suit that "IBM ... misused its access to the UNIX source code" by "working closely with the open-source community [and] contributing technologies and resources" to the LINUX system, thus benefiting Red Hat, among others.

former Open Source company now doing business as the SCO Group, sued IBM for more than $1 billion, claiming that IBM improperly granted access to SCO's proprietary Unix source code to the Open Source community. [64] SCO sued IBM for donating their formerly proprietary Unix AIX source code to the open source community to enhance Linux. SCO also alleged that IBM wrongfully provided SCO code and trade secrets to open-source programmers working on Linux development. IBM responded by asserting that SCO's proprietary Unix licenses violated open-source license terms since some of SCO's code was originally licensed under the GPL. IBM also claims that SCO distributes its UnixWare proprietary software under the GPL and has done so in the past, therefore SCO cannot place restrictions on certain uses of software that the open-source GPL license was aimed to protect.

Open source licenses and allegations of copyright infringement in the source code of Linux is the crux of the ongoing *SCO v. IBM, Red Hat v. SCO* (countersuit), and *SCO v. Novell* litigation. [65] Red Hat, Inc., a Linux vendor, filed a complaint on August 4, 2003[66] against SCO in an attempt to get a declaratory judgment of non-infringement of SCO's copyright. The stakes are enormous because if the court determines that Red Hat's Linux distribution infringes SCO's software copyrights, the Open Source movement will be dealt a crushing blow. A second goal of Red Hat's suit is to hold SCO accountable for alleged unfair and deceptive trade practices that Red Hat alleges are designed to chill use of Linux by steering open-source users towards proprietary software like the Unix version sold by

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[64] See http://www.sco.com/scoip/lawsuits/ibm/index.html (last visited April 23, 2005) Links to SCO's motions and court orders, case has not gone to trial as of this writing. SCO filed a copyright infringement and breach of contract suit against former joint venture partner IBM on March 6, 2003.
[65] *SCO Group, Inc. v. Novell, Inc.*, 2004 U.S. Dist. LEXIS 12267, 2-3 (D. Utah, 2004); *See* http://www.novell.com/licensing/indemnity/legal.html (last visited May 4, 2005) (legal documents and faxes/letters between SCO and Novell regarding alleged copyright infringement in Novell's Linux source code)
[66] See http://www.sco.com/scoip/lawsuits/redhat/index.html (last visited April 23, 2005) Motions and court orders related to Red Hat countersuit.

SCO.[67] Red Hat has alleged that SCO's licensing letters to current and former proprietary

Unix customers are designed halt the growing adoption of Linux through deceptive

copyright claims and vague threats of potential infringement liability.[68]

In January 2004, SCO filed a separate action against Novell, Inc., who like Red

Hat, sells a distribution of Linux under an open-source license. Unlike *Red Hat v. SCO*,

where Red Hat and SCO had no prior business relationship, Novell sold the very copyrights

and related IP rights to SCO for their proprietary Unix operating system that Novell now

stands accused of infringing upon.[69] Novell sold the copyrights for Unix code to SCO in

1995 and has not sold Unix since.[70] In 2004, Novell acquired SUSE LINUX AG, a

German company that had been selling Linux for several years. Novell has been selling an

Open Source commercial Linux distribution under the SUSE name since 2004.[71] *SCO v.*

Novell has been accompanied by several acrimonious and accusatory press releases, letters

to customers, and corresponding press coverage with Novell asserting that SCO is

attempting to use scare tactics to turn corporate customers away from Linux because of

ominous threats of copyright infringement suits against end-users who buy Linux.[72] These

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[67] *Id.*

[68] *Red Hat, Inc. v. SCO Group, Inc.*, 2004 U.S. Dist. LEXIS 7077 (D. Del., 2004). Red Hat, Inc. ("Red Hat") alleges that SCO engaged in a campaign to create fear, uncertainty, and doubt about the Linux operating system and that SCO letters to corporations and press releases are part of SCO's campaign to harm the Linux industry.

[69] *SCO Group, Inc. v. Novell, Inc.*, 2004 U.S. Dist. LEXIS 12267, 2-3 (D. Utah, 2004); Steve Lohr, *SCO Changes Tactics In Dispute Over Linux*, N.Y. Times, July 22, 2003 at C2 (Discusses SCO's contention that Linux is an unauthorized derivative work based on their proprietary version of Unix and points out that Novell sold Unix to SCO in 1995, contrasts that with *SCO v. IBM*); *See* http://www.sco.com/scoip/lawsuits/novell/index.html (last visited April 22, 2005). (SCO and Novell motions, filings, and court orders related to the *SCO v. Novell* litigation)

[70] *Id.*

[71] See http://www.novell.com/company/ir/04annual/10k.pdf (last visited April 27, 2005). Novell's 2004 annual shareholder's and Security and Exchange Commission 10-K (2003 SEC 10-K) report indicates the SUSE LINUX AG Acquisition was completed on January 12, 2004. SUSE is now listed as a 'Novell Business' and had been privately held prior to the 2004 purchase by Novell.

[72] See http://www.novell.com/licensing/indemnity/legal.html (last visited April 22, 2005). Links to legal documents and faxes/letters between SCO and Novell regarding alleged copyright infringement in Novell's Linux source code. Also see http://www.publicknowledge.org/issues/sco,

threats are the basis of Red Hat's claims in *Red Hat, Inc. v. SCO*, with the key differences being that SCO paid $100,000,000 for Novell's Unix and UnixWare IP assets (including source code) in 1995, and Novell did not have a stake in Open Source until they started selling the allegedly infringing Linux software after acquiring SUSE in 2004.[73]

As the SCO suits show, determining how contributions are cleared is a large problem for open-source development projects. There is strict liability for copyright infringement, but determining liability in the open-source context is difficult because the contributions come from many sources and there is little control or auditing of these contributions. Selling Linux distributions and other commercial involvement by Red Hat, Novell/SUSE, and others, necessitates greater scrutiny of open-source contributions. When feasible, IP audits of contributions should be conducted to clear contributions before they are incorporated into open-source software.

IBM once made and sold a proprietary version of Unix, AIX, but has since donated the AIX source code to the Open Source community.[74] IBM is a Linux 'ally' and has not shown any inclination to assert their Linux-related copyrights or patent rights against the Open Source community.[75] Quite to the contrary, IBM has donated 500 patents to the Open Source community.[76] In response to SCO's lawsuit against IBM, Novell declared that it had rights to the Unix code that SCO was claiming copyright ownership to, raising

http://en.wikipedia.org/wiki/SCO_v._IBM_Linux_lawsuit, and http://en.wikipedia.org/wiki/SCO-Linux_controversies (last visited April 27,2005) for a synopsis of the ongoing SCO Open Source copyright infringement suits.

[73] *SCO Group, Inc. v. Novell, Inc.*, 2004 U.S. Dist. LEXIS 12267, 2-3 (D. Utah, 2004).

[74] *SCO and the Battle Over UNIX*. Gives brief history of transformation of AIX from proprietary to open-source UNIX operating system (OS).

[75] *Microsoft patents could threaten Linux*. IBM described as a Linux ally with 60 Linux-related patents that they have not enforced against Linux users or distributors.

[76] Press release, *IBM Pledges 500 U.S. Patents To Open Source In Support Of Innovation And Open Standards* (January 11, 2005) available at http://www.ibm.com/news/us/en/2005/01/patents.html (last visited May 5, 2005). Announces IBM's donation of 500 software-related patents to the Open Source Initiative (OSI).

doubts about SCO's ownership of the source code.[77] SCO responded by suing Novell for publicly disparaging SCO's title to Unix.

SCO is also employing an RIAA/MPAA tactic by threatening and suing end users of Linux. In December 2003, SCO sent letters to some of the largest companies in the world claiming that Linux is an "unauthorized derivative" of SCO's version of Unix.[78] SCO sent letters to Unix licensees, including AutoZone and DaimlerChrysler, demanding that the licensees certify certain things regarding their usage of Linux. AutoZone and DaimlerChrysler, former SCO Unix customers who now use Linux, did not respond to SCO's letters. SCO sued AutoZone and DaimlerChrysler, alleging that their downloading and use of Linux infringes upon SCO copyrights.[79] The SCO suits against AutoZone and DaimlerChrysler also allege violations of their respective Unix license agreements. These suits against Linux end-users are seen by the Open Source community as an attempt by the proprietary software industry in general, and SCO in particular, to kill the most successful open-source product, Linux, by scaring away would-be customers.

Adoption of Open Source Chilled by Infringement Allegations and Suits

Realizing that SCO's infringement claims threatened its business and chilled adoption of open-source software by potential customers, Red Hat sued SCO for a declaratory judgment of non-infringement, and asserted that SCO's ownership claim misleads Linux consumers. Even though the *SCO v. IBM* case will not go to trial until November 2005, SCO's allegations have already had a chilling affect on corporate use of open-source software. To assuage customer fears, several open-source distributors and allies, including Novell, Red Hat, IBM, and Hewlett-Packard, have promised to indemnify their

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[77] SCO and the Battle Over Unix. Gives succinct explanation of *SCO v. IBM, SCO. V. Novell, Red Hat v. SCO, SCO v. AutoZone*, and *SCO v. DaimlerChrysler*.
[78] SCO and the Battle Over Unix, 'End Users Targeted, and Red Hat and Other Vendors Respond' section
[79] *Id.*

customers against any copyright claims.[80] An industry-wide Open Source legal defense

fund established by the Open Source Development Labs (OSDL) consortium raised $10

million from companies such as Intel, IBM, and MontaVista Software to defend against

SCO's infringement suits.[81]

Microsoft has assisted SCO obtain funding for their lawsuits, even though they are

ostensibly competitors.[82] The Open Source community feels that Microsoft is providing

investment resources and legal advice to help SCO crush Linux, out of fears that Linux

and other open-source programs are taking market share away from their proprietary

products. In the words of an Open Source proponent and Hewlett-Packard executive,

"Microsoft is going to use the legal system to shut down open-source software."[83]

Open-Source Software Involved in non-Linux Copyright Litigation

Open-source software appears in a variety of commercial and non-commercial, yet

widely used and popular applications that lie at the heart of copyright disputes. The open-

source Gnutella P2P file sharing software lies at the heart of the ongoing *Grokster*

litigation.[84] Gnutella is an open-source program that enables file sharing through its own

de-centralized communications protocol, thus differentiating it from Napster's earlier

centralized and proprietary P2P MusicShare software.[85] As the 9th circuit noted in *Grokster*

I, the Gnutella-based FastTrack and Morpheus P2P file-sharing protocol communications

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[80] SCO and the Battle Over UNIX. 'End Users Targeted, and Red Hat and Other Vendors Respond' section.
[81] *Id.*
[82] *Id.* "Microsoft … helped SCO raise $50 million by introducing SCO to a funding source called BayStar Capital"; Microsoft and SCO sell competing proprietary, closed-source server operating system (OS) software, Windows2000/2003 server OSs compete with SCO's Unix server software and they can be used on the same server hardware.
[83] *Microsoft patents could threaten Linux* 2002 memo from Gary Campbell, Hewlett Packard's (HP's) vice president of strategic architecture at the time, urging HP executives to develop a strategy to protect HP from Microsoft patent lawsuits against open-source technologies.
[84] *Metro-Goldwyn-Mayer Studios, Inc. v. Grokster Ltd.*, 380 F.3d 1154, 1159 C.A.9 (Cal. 2004).
[85] *A & M Records, Inc. v. Napster, Inc.*, 239 F.3d 1004, 1011 (9th Cir. 2001). Although Napster allowed free downloads of their MusicShare P2P client program, it was not open-source nor was the server-side component of MusicShare (i.e., Napster did not make the source code available to the public).

programs are comprised of open-source code that "is copyrighted and distributed under an open-source license that allows modification of the software, subject to some restrictions."[86]

DeCSS DVD decryption cases provide another example of how open-source software and the Open Source movement have been involved in copyright disputes.[87] In *Universal City Studios, Inc. v. Corley*, the authors of the Linux and Windows versions of DeCSS DVD decryption software explicitly wanted to publish their source code on Internet sites as open-source software so other open-source programmers and developers could improve the DeCSS program and port it to other operating system (OS) platforms.[88] In *Pavlovich v. Superior Court*, the defendant was an open-source developer who was interested in leveraging the collective programming skills of the Open Source community to develop video and DVD-related applications for the Linux operating system. Ostensibly, Pavlovich's goal was to improve video and DVD support for Linux and develop an open source DVD player for Linux so that they could play DVDs on their computers.[89]

Open Source Benefits and Infringement Liability Risks

Companies using open-source software often enter into risk benefit analyses to determine if the benefits of using open-source software outweigh the risk of exposure to

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[86] *Id.,* Defendants Grokster and StreamCast Networks use different versions of the Gnutella -based P2P protocol. Grokster uses "Fasktrack" software from KaZaa. Due to licensing dispute between StreamCast and KaZaa, StreamCast uses its own "Morpheus" software to implement their P2P protocol.
[87] *Universal City Studios, Inc. v. Corley*, 273 F.3d 429, 2001 U.S. App. LEXIS 25330; *Universal City Studios, Inc. v. Reimerdes*, 111 F. Supp. 2d 346, 2000 U.S. Dist. LEXIS 11949 (S.D.N.Y. 2000); *Pavlovich v. Superior Court*, 29 Cal. 4th 262, 282 (Cal., 2002) CSS is a licensed trade secret which licensees are forbidden to disclose and its purpose is to prevent the pirating of movies from DVD's. Pavlovich declined to seek a license because he thought "more than likely a license would not allow us to release the source code and things like that that didn't follow the same development path as open source followed."
[88] *Id.*
[89] *Id.*

lawsuits. [90] The benefits of open-source software include software that is more robust, less prone to security problems, cheaper, and has less defects/bugs. A large risk for open-source software is infringement liability. Liability can be mitigated if contributions to open-source programs have been cleared. Uncertainty surrounding how contributions are cleared and doubts as to whether contributions were cleared at all prevent many companies from using open-source products. Clearing source code contributions to open-source programs is analogous to clearing music samples used in a song; both processes involve steps to ensure that the rights to use the contributions (music or code) have been granted before they are incorporated into larger or derivative works. Clearing contributions to open-source programs before they are used will shield users and customers from liability from copyright or patent infringement suits. The clearance problem cannot be wholly mitigated by indemnity initiatives such as those offered by IBM and Novell that promise to protect Linux customers from copyright infringement suits.[91]

The fact that open-source code is fully disclosed to the public makes it relatively easy for proprietary software patent holders and copyright owners to look for code where infringement can be alleged. This 'trolling' for infringement suits against companies using open-source software has had a chilling effect on the use and re-distribution of open source code due to the fear of being sued for infringement.

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[90] *Red Hat, Inc. v. SCO Group, Inc.*, 2004 U.S. Dist. LEXIS 7077 (D. Del., 2004) (Red Hat alleged that SCO engaged in a campaign to create fear, uncertainty, and doubt about the LINUX operating system, and points to SCO press releases that are part of SCO's campaign against the LINUX industry)

[91] See http://www.novell.com/licensing/indemnity/ (last visited April 22, 2005) Novell indemnifies its Linux customers against copyright infringement claims made by third parties (e.g., SCO). Novell's Indemnification Program allows customers to use SUSE Linux "with the peace of mind that Novell will protect you against any future copyright challenges"

Many businesses, governments, and organizations want to migrate from proprietary software to open-source software to take advantage of the financial and technological benefits open-source software offers. The benefits of open-source include lower total cost of ownership, quicker availability of patches and bug fixes, and more responsive customer support.[92] Most corporations and universities are using open-source software already, whether they have made a conscious decision to do so or not. In the words of an executive of a proprietary publisher, "Open-source software is in every organization and business whether they know it or not. Open Source is a good thing, but it important for businesses to identify open-source code they use, manage it, and be aware of it."[93] Potential open-source converts are wary about migrating from proprietary to open-source software because of current restrictive licenses with proprietary software vendors. Some proprietary software licensors such as SCO have resorted to sending preemptive letters warning licensees that switching to open-source products like Linux will constitute a breach of their license terms.

Wider corporate adoption of open-source software will occur if the specter of patent and copyright infringement suits subsides. In addition to the aforementioned copyright infringement suits from SCO, future patent infringement suits loom as a threat to Open Source. The next section discusses the scope of potential patent infringement liability and how that risk can be mitigated

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[92] Todd Benson, *Brazil: Free Software's Biggest and Best Friend*, N.Y. Times, March 29, 2005 at C1. President of Brazil has instructed Brazilian government ministries, state-run companies, and government-funded research labs to switch from Microsoft Windows and proprietary software to Linux and other open-source software.

[93] Mark Woodward, Address at the Serena Federal/Mid-Atlantic User's Conference, (May 12, 2005) (President and CEO of Serena, the largest supplier of configuration management (CM) software stated that Serena participates in several open-source projects, including the Eclipse Web/Java development tool, which Mr. Woodward referred to as "the most successful open-source project ever.")

Copyright and Patent Subject Matter Overlap Problematic for Open Source

Another source of tension between the Open Source community and proprietary software vendors is the fact that Linux and other open-source software can be protected by both copyright and patents. Software is patentable subject matter, despite the traditional patent doctrine that mere algorithms can't be patented.[94] Patent infringement suits from Microsoft are but one prong of a two-pronged attack on Linux, with SCO's aforementioned copyright infringement suits comprising the second front in proprietary software vendor's war on open-source.

A 2004 study by Open-Source Risk Management (OSRM) conducted by the senior counsel to the Free Software Foundation found that hundreds of patents, including many assigned to Microsoft could expose open-source customers to patent infringement suits.[95] Besides the indemnity programs offered by Linux vendors, OSRM sells insurance against lawsuits related to the use of open-source products.[96] Ninety-eight of the patents cited in the OSRM study are held by companies like IBM, HP, and Novell and others that either sell or have a vested interest in Linux and have stated an intention **not** to sue for any infringement of their patents related to open-source software.[97]

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[94] *Diamond v. Diehr*, 450 U.S. 176, 209 USPQ 1 (1981).

[95] *Microsoft patents could threaten Linux.* Lists proprietary software companies with patents that may be infringed by Linux, but many of the patents mentioned have been donated to the Open Source community.

[96] *Id.* Mentions that OSRM sells indemnity insurance to protect Linux users against infringement suits; See http://www.novell.com/licensing/indemnity/ (last visited April 22, 2005). Novell indemnifies its Linux customers against copyright infringement claims made by third parties. Novell's Linux Indemnification Program claims to allow customers to deploy Novell Linux "with the peace of mind that Novell will protect you against any future copyright challenges against the technology in those solutions."

[97] See http://www.novell.com/linux/truth/better_choice.html (last visited April 22, 2005). (See Copyright section, Novell and others have donated their Linux-related IP rights to the Open Source community, including many of the patents cited in the OSRM study. "Novell has no intention of asserting its patent portfolio against the Linux kernel or other open source programs …")

No open-source program has ever been found to infringe on any patents[98], and despite their copyright infringement suits, SCO has no patents that cover Linux or other open-source software. Microsoft has no copyright claims on Linux source code, but may rely on 27 of their software patents to bring future infringement suits against Linux vendors.[99] The patentability of software and patent rights asserted against open-source software has been sharply criticized by the inventor of Linux.[100] Since it is unlikely that patent system reforms will revert back to the pre-*State Street[101]* days before software was patentable, some forward-thinking patentees are donating their patent rights to the open-source community. This relatively recent development has been spurred by proprietary software vendors like IBM[102] and Sun Microsystems[103], who have a stake in selling server and computer hardware to customers who use open-source software like Linux.

No Sweeping Legislative Solutions Needed to Address Open-Source Software

Unlike past attempts to address technological changes through legislative 'fixes' (e.g., the Audio Home Recording Act pushed by the RIAA to address Digital Audio Tape

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[98] *Open Source Risk Management, Inc. (OSRM) Statement Regarding Recent Statements Made by Microsoft* CEO (November 19, 2004), available at http://www.novell.com/linux/truth/osrm_ms_statement.pdf (last visited May 13, 2005). (OSRM refutes claims made by Microsoft CEO, Steve Ballmer, that Linux infringes Microsoft or other patents).

[99] *Microsoft patents could threaten Linux.* Study found no patents held by SCO that could pose a threat to the Linux kernel, but found 27 patents held by Microsoft could overlap with Linux code.

[100] Robert McMillan, *Torvalds joins in anti-patent attack*, IDG News Service (February 2, 2005), available at http://www.techworld.com/applications/news/index.cfm?NewsID=3059 (last visited May 13, 2005). Linus Torvalds, creator/author of core Linux open-source operating system 'kernel', criticizes patentability of software in general, citing how harmful the statutory subject matter overlap between patents and copyright has been to open-source software.

[101] *State Street Bank & Trust Co. v. Signature Fin. Group, Inc*., 149 F.3d 1368, 47 U.S.P.Q.2d 1596 (Fed.Cir.1998) (discussing the patentable subject matter requirement of 35 U.S.C. § 101, software patentable)

[102] *IBM opens 500 patents to open source* (January 11, 2005) Available at http://www.techworld.com/opsys/news/index.cfm?NewsID=2909 (last visited May 5, 2005); press release, *IBM Pledges 500 U.S. Patents To Open Source In Support Of Innovation And Open Standards* (January 11, 2005) available at http://www.ibm.com/news/us/en/2005/01/patents.html (last visited May 5, 2005). Mentions IBM's donation of 500 software-related patents to the Open Source Initiative (OSI).

[103] Paul Krill, *Sun launches OpenSolaris and frees 1,670 patents* Infoworld, (January 25, 2005), available at http://www.infoworld.com/article/05/01/25/HNsunsolarispatents_1.html (last visited May 5, 2005). Sun CEO announces that formerly proprietary Solaris OS is available for free as OpenSolaris. Sun also announced release of 1,670 patents to the open source community along with 10 million lines of source code.

audio recording), no copyright amendments are necessary to address open-source development and distribution.

Open-source licensees who do not honor the terms of their licenses can be dealt with in the same manner that any breaching licensee is dealt with. If a licensee breaches terms of an open-source license, whether a Copyleft, GPL, Creative Commons, BSD, or other open-source license is used, the licensor has the same spectrum of remedies that are available to proprietary software licensors. When licensors of open-source software want to terminate licenses because of a breach by licensees, currently available copyright and contract remedies suffice.

Open-source software is copyrighted, so the copyright owner can sue for infringement. Open-source copyright holders can sue choose between actual damages, which includes the amount it has lost due to infringement as well as any profits attributable to the infringement, and statutory damages, which can be as much as $150,000 for each open-source program that was infringed upon. Just as with proprietary software infringement, the government can criminally prosecute for infringement of copyrighted open-source code. Although a criminal prosecution for open-source infringement is a remote possibility, if convicted, infringers can be fined up to $250,000, or sentenced to jail for up to five years, or both, just as infringers of proprietary software can be.

Due to the global online network of open-source developers and customers, detecting and reporting piracy or license breaches for open-source software should be easier than the Business Software Alliance's (BSA) attempts to get employees and students to turn in their employers and schools for using unlicensed or proprietary software. This is because many corporate and educational end-users of proprietary software have no personal stake in determining if commercial software they use is licensed or not.

Developers and users of open-source software have a vested interest in ferreting out parties who breach licenses because they helped create the software. Despite high-profile BSA advertising campaigns designed to get employees to 'turn in' their employers for use of unlicensed software, the proprietary programs sold by BSA members (e.g., Adobe, Apple, Macromedia, Microsoft, and others) are still widely pirated and unlicensed in business offices.[104]

Establishing a 'creative commons' of open-source software can be done without copyright amendments and will allow the Internet-fueled explosion of innovation to continue.[105] The Internet's design includes a hardware-neutral platform upon which the widest range of open-source programmers can experiment and collaborate. The copyright regime and open-source licenses must be allowed to continue to protect this free space so that information and software innovation can flow freely and inspire open-source developers. The flexibility built into the copyright regime has allowed the Open Source movement to rise and the copyright act should not be changed in ways that keep the movement from flourishing.

The open-source software development environment benefits society by allowing a naturally collaborative industry to share code and innovate in an 'R&D' type of environment. This environment can only continue to function if the fear of copyright or patent infringement lawsuits is predictable and mitigated.

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[104] See http://www.bsa.org (last visited April 11, 2005). The 'Tip Us Off' link leads to a 'report piracy' form that can be used to turn in all varieties of software piracy. The 'BSA research' link contains a 2004 BSA survey which estimates that 36% of all software worldwide is pirated and 21% of software in use in businesses is either pirated or unlicensed.

[105] Ariana Eunjung Cha, *Creative Commons Is Rewriting Rules of Copyright*, Washington Post, March 15, 2005, at E5; see http://cyberlaw.stanford.edu/future (last visited May 13, 2005) (synopsis of Stanford Law Professor and Creative Commons Chairman Lawrence Lessig's *Future of Ideas*).

The goals and licensing of the Open Source movement are consistent with the Constitutional basis of the copyright and patent regimes, i.e., to promote the progress of science and the useful arts.[106] Open source authors and 'inventors' are voluntarily giving up some, but not all exclusive rights to their source code, which is consistent with the U.S. Constitution and the Copyright Act.[107]

Future of Open Source: Coexistence with Proprietary Software & Copyright Regime

The SCO-related cases have the potential to be landmark decisions for Open Source akin to the importance *Sony* had on the then-emerging Video Tape Recorder (VTR-Betamax) technology and *Grokster* may have on P2P technology. If SCO prevails, distribution and licensing of open-source software like Linux could be dealt a deathblow. SCO's copyright claims implicate the vast majority of users and developers of opens-source software. The common thread between the copyright infringement suits against open-source code is a claim by SCO that some of their proprietary Unix code has been incorporated into open-source Linux. SCO asserts that open-source programs infringe upon their copyrights because of alleged theft of source code, but a clearinghouse system for open-source code contributions could have averted the SCO suits.

Whether SCO prevails or not, their claims and suits point out some of the pitfalls to be avoided when using or developing open-source software. Users of open-source software may be exposed to copyright infringement liability if a contribution to the open-source program was infringing. This liability is not mitigated if the contribution was made anonymously or from a contributor not connected to the user. Before releasing software to the open source community, an organization or company needs to ensure that it has the

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[106] U.S. Const., Section 8 of Article One "[Congress shall have power] to 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."
[107] 17 U.S.C. § 106.

legal rights to do so. This can be accomplished via an IP audit of the code that is being contributed or by clearing the contribution with a third party certification organization (i.e., a clearinghouse for code contributions). Companies procuring titles to proprietary software also need to make sure that the chain of title is clean and not subject to prior open-source licenses. Posting source code to a web site, as is commonly done during the open-source life cycle, will significantly reduce or eliminate any ability to claim trade secret protection for that code. There is a need for an unbiased clearinghouse that can efficiently clear contributions to open-source projects so that open-source users and developers have more assurance that future SCO-style infringement claims will not open them up to liability.

Given the volume and pace of contributions to open-source projects, and government budgetary constraints, it is unrealistic to expect the Copyright Office to be able to serve as a source code clearinghouse. This function also cannot fall on software companies because competitors will not turn over their code to each other for inspection that is necessary in order to clear open-source contributions. The clearinghouse function will likely have to be a non-profit consortium funded by contributions from proprietary and open-source software companies along with their corporate customers. The incentive for these parties to fund a clearinghouse is to ensure that they and their customers are not caught up in lengthy and expensive infringement suits and counter-suits like SCO, IBM, Novell, Red Hat, AutoZone, and DaimlerChrylser have been for the past two years.

The Open Source development methodology taps the economies of scale of a global network of programmers linked via the Internet. The pitfall is that reliance on the loose-knit revolving volunteer membership of the Open Source community for software debugging and testing can lead to unpredictability. Relying on anonymous contributions of source code can also open up parties to copyright infringement liability when those

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contributions originated in proprietary software and have not been cleared. Commercial and proprietary software that is partially comprised of open-source code can peacefully coexist with the Open Source movement, provided it does not violate the license terms of the embedded open-source software.

Created from open-source software and open standards such as SendMail, IRC, ICQ, and the TCP/IP, FTP, and HTTP protocols, the Internet has enabled collaboration between geographically separated open-source developers. As the Open Source community of developers, deployers, and contributors continue to connect via the Internet, changes in the development and use of software will be ushered in. These changes are not dependent on legislative amendments to the copyright act or on litigation victories. The freedoms provided by open-source software and its business model can coexist with the current copyright act and the 'paracopyright' of the DMCA.

Just as proprietary software businesses need international uniform treatment of software as copyrightable expressions, the Open Source community will benefit from international harmonization of international IP and copyright laws. Since open-source development is a global operation, copyright laws of software in the United States, European Union (EU), and developing countries via the World Intellectual Property Organization (WIPO), the World Trade Organization's Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement, and other treaty mechanisms must protect source code as the copyrightable expression of a computer program. The Open Source movement is international, as evidenced by Finnish programmer Linus Torvalds writing Linux code that is now distributed by North Carolina-based Red Hat. To the extent software source code is not copyrightable as the expression of a program in the EU and under TRIPS, it needs to be in order for the open-source licensing scheme to function.

Due to the non-profit and academic status of most open-source organizations, the movement is unlikely to exert much influence on copyright amendments in Congress. Copyright amendments drafted to specifically address any 'threat' posed by open-source code are not necessary, but the future of Open Source movement is threatened current and potential copyright and patent infringement suits from proprietary software publishers.[108] Even if open-source software use is chilled by lawsuits, the Open Source collaborative methodology and distribution model has spread beyond software and is the basis of licensing for other works distributed online – including photography, film, and literature.[109] The Open Source methodology has also been adopted in the legal context, including drafting pleadings, legal briefs, and collaborative pro-bono client representation.[110] Open-source software is not a new technology that necessitates copyright act amendments; rather it can thrive within current copyright law through creative licensing. Although it is unlikely that the current copyright act can undermine open-source software development and distribution, the Digital Millennium Copyright Act's (DMCA) anti-circumvention provisions do pose a threat to certain open-source programs (e.g., the DeCSS DVD decryption/playback programs).[111] Just as ongoing peer-to-peer (P2P) litigation against

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[108] Michael Faulkner and Eric Goldman, *SCO and the Battle Over UNIX: A Clear Explanation,* InformIT (June 18, 2004) [hereinafter SCO and the Battle over UNIX] available at from http://www.informit.com/articles/article.asp?p=175171 (last visited May 13, 2005) (on file with author). Summarizes ongoing infringement suits and countersuits involving open-source Unix and Linux code.

[109] See http://creative commons.org (last visited May 13, 2005) (on file with author). Nonprofit Creative Commons (Chairman, Lawrence Lessig) applies the Creative Common license to a broad range of creative works including audio, images, video, and text.

[110] See http:// www.berkmancenter.org/ (last visited April 10, 2005). The Berkman Center for Internet and Society at Harvard Law School has adopted the open-source online collaboration methodology in the litigation context with its Open Law project for pro bono litigation, which seeks to "develop arguments, draft pleadings, and edit briefs in public, online."

[111] 17 U.S.C. § 1201, the DMCA's anti-circumvention provisions, often referred to as 'paracopyright' were used to shutdown distribution of Linux and Windows versions of DeCSS open-source code (including posting links to source code) in the US (*Universal City Studios, Inc. v. Corley*, 273 F.3d 429, 2001 U.S. App. LEXIS 25330; *Universal City Studios, Inc. v. Reimerdes*, 111 F. Supp. 2d 346, 2000 U.S. Dist. LEXIS 11949 (S.D.N.Y. 2000); *Pavlovich v. Superior Court*, 29 Cal. 4th 262, 282 (Cal., 2002)) and Theirer and Crews eds.,

Grokster et al has not fundamentally changed Internet file sharing; infringement suits against specific open-source programs will have little affect on the overall Open Source methodology. The open-source collaborative methodology is already expanding beyond software to include other creative works such as music, photography, drawings, screenplays, and literature.[112] This revolutionary development and distribution model will outpace the stagnating growth of conventional, proprietary distribution of works if it is allowed to continue unhindered by shortsighted legislative copyright 'fixes' sought by the proprietary software industry.

The success of open-source software is not limited to non-profits, university labs, and hobbyists. As Red Hat has shown, open-source can work as a profitable business model. Despite the uncertainty caused by SCO's suits and looming patent infringement suits, venture capital continues to flow to software startups that make open-source software.[113] Software development can be both profitable and benefit society if some source code is open-source. The Open Source development methodology is leading to **more** innovation.

Copy Fights: *The Future of Intellectual Property in the Information Age*, 193 (2002) (Discusses 2002 Norwegian DeCSS case, citation: LOV-1902-05-22-10-§145 – original Johansen DeCSS case from 1999).
[112] See http://creative commons.org (last visited April 10, 2005) (on file with author). Nonprofit Creative Commons (Chairman, Lawrence Lessig) applies the Creative Common license to a broad range of creative works including audio, images, video, and text.
[113] Gary Rivlin, *Open Wallets for Open-Source Software*, N.Y. Times, April 27, 2005 at C1.