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An Estoppel Doctrine for Patented Standards

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INTRODUCTION

Technical standards, such as interface protocols or file formats, are extremely important in software and other “network industries.” Under certain circumstances, the assertion of patent rights against established industry standards can seriously disrupt these network industries. Two particularly disruptive tactics illustrate this effect: (1) bait-and-switch, where a patentee encourages adoption of standard-related patents by offering them royalty-free, and then, after the standard has gone into widespread use, enforces its patents against adopters of the standard; and (2) snake-in-the-grass, whereby a patentee intentionally keeps a patent “quiet” while a standard is being designed or adopted, and then later, after the standard is entrenched, asserts the patent widely in an attempt to capitalize on its popularity.

Adobe’s Portable Document Format (PDF) is the industry standard for reading, writing, and transmitting documents in a graphical format. PDF is an ostensibly “open” format, meaning that anyone can author software that reads and writes PDF documents. Adobe also freely distributes its Acrobat Reader,

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the program that reads PDF documents. Adobe profits by selling Acrobat Professional, a more extensive program that, among other things, allows users to write and edit PDF files. Though anyone can make PDF-related software, most users rightfully look to Adobe as the expert in PDF.

Adobe owns several patents related to different aspects of PDF functionality.¹ Adobe uses these patents to maintain control and development of the PDF standard, rather than enforcing them against competitors who create PDF-related software.² Adobe's strategy illustrates that the existence of patents that relate to an industry standard does not imply that the standard is closed (i.e., that its use is restricted in some way). Indeed, Adobe has used its intellectual property to craft an open standard and has profited in the process.

Suppose that Adobe suffered financial difficulty or bankruptcy and opted to modify its patent strategy. Seeking to cash in quickly on its market position, Adobe could drastically increase the price of its PDF-related software and pursue an aggressive patent enforcement strategy against others in the computer software industry. Large companies with millions of documents in PDF format that rely upon the full range of PDF features could have little choice but to pay whatever price Adobe charged, at least in the short term. We call this strategic use of patents a bait-and-switch tactic. Far from a theoretical construct, it has seriously affected the computer software industry in the past.³ Moreover, the mere threat of such a strategy seriously could hinder the formation and adoption of software standards.

Bait-and-switch is not the only way that standards-related patents are asserted strategically. Consider, for example, the facts in the recent Federal Trade Commission ("FTC") decision, *Negotiated Data Solutions LLC*.⁴ Negotiated Data Solutions ("N-Data") earns money primarily by licensing patents that it acquires through purchase; the patents at issue in the case come from National Semiconductor Corporation (National). These patents cover National's NWay technology, which allows compatibility between devices made by different manufacturers and between different generations of Ethernet networking technology.⁵ In 1994, National made a commitment to the Institute of Electrical and Electronics Engineers, Inc. (IEEE), a non-profit, international technical professional organization.⁶ In exchange for IEEE's agreement to adopt a standard based on National's patented technology, National agreed to

1. Adobe, Legal Notices for Developers, http://partners.adobe.com/public/developer/support/topic_legal_notices.html (last visited Oct. 20, 2008).

2. *See id.*

3. *See, e.g.*, Unisys and GIF, discussed *infra* Part II.

4. FTC File No. 051-0094 (Jan. 23, 2008), available at <http://www.ftc.gov/os/caselist/0510094/index.shtm>.

5. Analysis of Proposed Consent Order to Aid Public Comment, *In re Negotiated Data Solutions LLC*, FTC File No. 051-0094, available at <http://www.ftc.gov/os/caselist/0510094/080122analysis.pdf>.

6. *Id.*

license the Ethernet patents for a one-time royalty of \$1,000 to any company that made or sold products using the standard.⁷ Dozens of manufacturers incorporated the Ethernet standard into hundreds of millions of computer devices, including computers, switches, routers and modems.⁸ But after it acquired National's patents, N-Data refused to honor the \$1,000 royalty commitment, and instead requested substantially higher payments under threat of suit.⁹ We call this strategic behavior a snake-in-the-grass tactic.

In a 3-2 decision the Commissioners of the FTC condemned N-Data for anticompetitive patent assertion.¹⁰ The Commissioners failed, however, to establish a rigorous standard for when to find unfair competition in standard setting.¹¹ Still, the Commission did consider certain factors in reaching its decision. First, N-Data knew of National's commitment prior to purchasing the patents.¹² Second, N-Data exploited industry lock-in by waiting until switching costs were high to demand higher royalties than the industry would have otherwise paid.¹³ Third, N-Data's conduct could lead to higher consumer prices.¹⁴ Firms that are unable to rely on the commitments of others in the standard-setting process are less likely to participate in setting common standards, leading to less interoperability between rival software platforms. In some cases this leads to higher prices, either because users must invest in multiple, non-compatible platforms or because they pay higher prices for products that work with the platform they do adopt.¹⁵ The FTC's difficulty in reaching a unanimous opinion, despite such clearly anticompetitive behavior, indicates that antitrust may be an inappropriate means by which to regulate strategic assertions of patent rights against standards.

We propose to counteract these tactics with a simple solution: over time,

7. *Id.*

8. *Id.*

9. *Id.*

10. Decision and Order, *In re Negotiated Data Solutions LLC*, FTC File No. 051-0094, available at <http://www.ftc.gov/os/caselist/0510094/080122do.pdf>.

11. See *In re Negotiated Data Solutions*, FTC File No. 051-0094 (Jan. 23, 2008) (Majoras, J., dissenting), available at <http://www.ftc.gov/os/caselist/0510094/080122majoras.pdf>.

12. See Analysis of Proposed Consent Order to Aid Public Comment, *supra* note 5.

13. See *In re Negotiated Data Solutions*, FTC File No. 051-0094 (Majoras, J., dissenting), available at <http://www.ftc.gov/os/caselist/0510094/080122majoras.pdf>.

14. *Id.*

15. A unified standard may lead to lower prices for complementary products since, for example, it costs money to adapt a product (e.g., a particular video game) to work with a number of different platforms (e.g., different video game consoles). In addition, where complementary goods are network goods (e.g., "plug-ins" compatible with multiple operating systems, word processing programs, etc.), it "costs" consumers more when there are competing platforms because they cannot share content developed for non-compatible plug-ins. See generally Carl Shapiro & Hal R. Varian, *Information Rules: A Strategic Guide to the Network Economy* (1999). On the other hand, competing platforms could keep platform owners from raising the prices of proprietary platforms, which is one reason why open standards (i.e., free platforms) are so valuable. See Robert P. Merges, *Intellectual Property Rights and Technological Platforms* (June 1, 2008) (unpublished manuscript, on file with author).

adopters of a standard build up a “reliance interest” in the standard that can be judicially enforced. Under our approach—which we call “standards estoppel”—intentional non-assertion of a patent in the presence of its widespread adoption should create immunity from patent infringement. The purpose of this estoppel would be the prevention of “strategic” assertions of patents that exploit the logic of network lock-in. Though this is a simple doctrine based on traditional common law principles, it is a necessary addition to the contemporary legal arsenal. In particular, standards estoppel plugs some dangerous conceptual holes in current rules relating to laches, waiver, estoppel, implied licensing, and patent misuse or antitrust. Standards estoppel addresses a major shortcoming in the structure of these rules, which require continuity and privity between the patent owner and the user. Unlike traditional doctrines, standards estoppel applies even though the patent changes hands, and even though the patent owner has no direct communication or relationship with the user. With our modest addition to the doctrinal fabric, patent law can more effectively guard against the risk of illegitimate leverage, thus more effectively fostering innovation in network industries.¹⁶

Part I illustrates the importance of standards to the software industry as well as the problems caused by lock-ins in the presence of network effects. Part II describes a small subset of patent enforcement actions that present a significant danger to standard setting in the software industry. Part III proposes a solution to prevent this strategic rent-seeking behavior—an expanded estoppel doctrine—rooted in the concept of a “user reliance interest” based on principles of Lockean labor theory. Part IV shows that no current doctrine protects against strategic behavior in the standards context, and addresses criticisms to an expanded estoppel doctrine.

I

STANDARDS IN THE SOFTWARE INDUSTRY

A. Network Effects and Standards Adoption

Software is a “network product,” which means that its value increases as more users adopt it.¹⁷ Standardization spurs network effects because a program that interoperates with a variety of programs and files is more valuable than one that works only in isolation. Standardization also results from network effects because adopting a technology already widely used often makes more sense than opting for a relatively untried technology without an “installed base” of

16. This Article focuses on the software industry since the risks of strategic enforcement are clearest, but network effects based on standards adoption can arise in many contexts. Thus, standards estoppel may be applicable in other industries where standards play a key role and may be the subject of patents.

17. David Alban, *Rambus v. Infineon: Patent Disclosures in Standard-Setting Organizations*, 19 Berkeley Tech. L.J. 309 (2004).

adopters.¹⁸

Like other “network goods,” technological standards are different from “normal goods.”¹⁹ For most of the things that people buy, it makes little difference how many other people buy the same thing. For example, I do not care much whether many or few buy the same laundry detergent I buy, as long as it does the job for me. But with network goods, I do care. Software is an example: if I use a PC computer, and create a presentation using Microsoft PowerPoint, I will be able to share it more easily if many others also use a PC and run PowerPoint. Also, if I am at a conference and my computer battery runs out, I can borrow someone else’s power cord to power my battery through my presentation. Thus, in contrast to the case of laundry detergent, I do care about what others choose when I am deciding which network good to buy because more people joining a network makes that network more valuable for network participants.²⁰ In this sense, an individual’s decision to join benefits others. In the language of economics, individuals who join create positive “externalities,” spillover effects that impact the economic situation of others.²¹

18. Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 Calif. L. Rev. 1889, 1896 (2002).

19. The networks in which we are interested are known as “two way virtual networks.” Networks may be classified as either one-way or two-way. Two-way networks include many transportation and telecommunication networks, where nodes are distinctly connected in both directions. In contrast, one-way networks, such as broadcasting and paging, have connections in only one direction. Nicholas Economides, *The Economics of Networks*, 14 Int’l J. Indus. Org. 673, 674-75 (1996). Another important distinction is between actual networks, such as telephones and fax machines, and virtual networks, such as computer software. See Shapiro & Varian, *supra* note 15; Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 Calif. L. Rev. 479, 488 (1998). Actual network goods, such as telephones, derive all of their value from their connection through the network. A telephone by itself, unconnected to a working phone line, is worthless. Virtual networks, such as software media players, have independent value as well as value that increases with network growth. A software media player is independently useful since it enables playing certain types of files, but its value increases as more people adopt it and develop extensions, plug-ins, themes, technical support documents, and other ways of adding value to it. See Economides, *supra*, at 675; see also Michael L. Katz & Carl Shapiro, *Systems Competitions and Network Effects*, 8 J. Econ. Persp. 93, 94-95 (1994).

20. This added-value property implies that networks based upon open standards often have greater potential for growth than those based upon closed standards both because the cost of joining the network is low and because the potential for others to join the network is high. Likewise, networks based upon non-proprietary standards often have greater potential for growth than networks based upon proprietary standards because a community of supporters is often more reliable than a network with a single point of failure. However, the complexity of the underlying technology may be a countervailing effect. A relatively narrow technology, such as Ethernet, may be easier to develop in an open, non-proprietary way than an expansive and highly complex technology, such as an operating system. Thus, the open Ethernet standard is ubiquitous, but the proprietary Windows operating system maintains a clear market lead over open source rival Linux. See Urs von Burg, *The Triumph of Ethernet 199-212* (2001).

21. Economides, *supra* note 19, at 678. The positive feedback networks enjoy leads to a new sort of economic effect, one that may be termed “demand-side economies of scale.” See Shapiro & Varian, *supra* note 15, at 179; see also Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 Am. Econ. Rev. 424 (1985) (describing the sources of and an economic model for network externalities).

While standards do provide the compatibility that is key to network benefits, there is a dark side of standards setting: the possibility of “lock-in.” Lock-in refers to the often high cost of switching from one network to another. If the cost is high enough, users will be stuck in an old network even though a new, superior network has entered the scene.²² One type of lock-in occurs with information and databases, and takes the form of “[c]onverting data to [a] new format.”²³ For example, one might convert a collection of images stored in a particular graphics format to a different graphics format to achieve greater compression or simply to move to newer technology in favor of technology that will soon be unsupported. This type of cost generally rises as the collection of data stored in the format increases.²⁴

Standardization presents another type of lock-in cost—collective switching costs.²⁵ If everyone else uses a particular standard, unilaterally switching becomes cost prohibitive—far greater than it would have cost to adopt different technology at the outset. This effectively locks in the entire network. For example, persuading all users of one software product to switch instantaneously to a superior replacement is very difficult.²⁶ Knowing the cost of switching, people stay loyal to a no-longer-optimal system for far longer than they otherwise would.²⁷ At a minimum, the prospect of lock-in suggests that market participants should bargain hard prior to adopting a new technology and then take steps to minimize lock-in over the course of the technology’s life cycle.²⁸

In network markets, much of the value comes from the existence of a large installed user base.²⁹ Sellers of network goods know this, which is why they compete so hard to achieve network dominance. The standards estoppel doctrine would in effect provide a regulatory tool to prevent unfair exploitation of network efforts.

Of course, buyers are not stupid. They, too, know something about sellers’ strategies in network industries. One counter-strategy, already mentioned, is to take the lock-in effect into account when initially bargaining with a seller, seeking a lower price or a longer-term agreement. But this counter-strategy has its limits, particularly for buyers who worry that they will not be able to foresee all the creative techniques sellers may use later when the network is firmly in

22. Shapiro & Varian, *supra* note 15, at 116.

23. *Id.* at 117.

24. *See id.*

25. Shapiro & Varian, *supra* note 15, at 184.

26. Witness the difficulty, for example, in effecting the switch from IPv4 to IPv6. Carolyn Duffy Marsan, *IPv6 Guru Predicts Last-Minute Switch to Protocol*, Network World, Dec. 17, 2007, <http://www.networkworld.com/news/2007/121707-how-feds-are-dropping-the-ball-side-1.html>.

27. *See, e.g., id.*

28. Shapiro & Varian, *supra* note 15, at 136.

29. *See id.* at 108.

place. In the face of such uncertainty, another approach can be appealing: participating in the building of an “open access” network—a network that is not controlled by a competitive rival. This is the basic idea behind open standards.

The backers of open standards understand the risks of granting any single entity absolute control over network access. The open standards solution is to replace single-entity control with some form of collective control. Specific cases vary considerably. Patent pool-based standards require licenses from the holders of all patents essential to the standard; the pool entity then licenses the standard as a whole to any user willing to pay the required fee. Pure “open source” standards are usually available for free; they are often created through the collaboration of far-flung contributors rather than a tightly organized group of patentees. Even open source software requires a committee structure of some kind to decide on “official” versions of the software and to evaluate potential additions and changes, but open source licenses generally prevent such committees from restricting access to the software.

B. *The Value of Software Standardization*

Standardization is important to the software industry because it allows different software components to work together—to “interoperate.”³⁰ Many aspects of programming are somewhat arbitrary, and agreeing on a specification for implementation allows for greater compatibility between programs. Further, compatibility allows programmers to build upon the previous work of others without reinventing the wheel. In this vein, standards may be broadly defined as any technical specification that may be implemented in software for interoperability (e.g., file formats, file systems, programming languages, protocols).³¹

Standards may be controlled by a single firm, a group of firms, a non-profit organization, or by the industry at large.³² As with software code, standards exist on a continuum from “non-proprietary” (i.e., entirely unencumbered by intellectual property rights) to “fully owned” (i.e., a license is required for use). In addition, depending on which policy a standard owner adopts, standards may be “open” or “closed.” An open standard is widely shared whereas a closed standard is not. In the extreme case, a closed standard may be private to one firm or organization. These two issues must not be confused. Some fully proprietary standards are widely shared; some are not.

30. See Alban, *supra* note 17, at 309; Lemley, *supra* note 18, at 1889.

31. See, e.g., Lemley, *supra* note 18, at 1896.

32. See Stanley M. Besen & Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization*, 8 J. Econ. Persp. 117, 119-120 (1994) (explaining how firms may reasonably choose to compete for the “prize” of owning a proprietary standard or choose to agree on a standard and compete within, rather than between, technologies); see also Joseph Farrell & Garth Saloner, *Coordination Through Committees and Markets*, 19 RAND J. Econ. 235 (1988) (describing a combination of committee-based and unilateral action as the most efficient means of standard setting).

Some non-proprietary standards can effectively be kept closed; many are widely shared. The key point is this: property rights over a standard do not automatically make it a closed one. They give its owners a choice regarding whether and to what extent the standard will be shared with others. The following grid summarizes these points.

Table 1: Strategy Grid³³

	OPEN	CLOSED
Proprietary	Adobe Acrobat; ³⁴ Lizardtech DjVu format ³⁵	Apple iTunes music format; ³⁶ Lizardtech MrSID graphics format ³⁷
Non-Proprietary	Open source software, e.g., Linux Operating System ³⁸	Encase Forensic Disk Analysis software ³⁹

In some markets, particularly small or niche markets, closed standards are quite useful. Closed standards can ensure code integrity, allow greater control for features such as digital rights management (“DRM”), and make it easier to direct the development of a standard.

Often, however, open standards are more beneficial to an industry. One of the driving forces toward open standards is economic: a standard freely disseminated has a better chance of being widely adopted than one with restricted access. Another driving force is industry reliance: a widely adopted standard seems more trustworthy in terms of reliability, utility, and long-term support than one used by only a few industry actors. For example, nearly every computer has software that implements the HyperText Transfer Protocol⁴⁰ (“HTTP”) standard used to transmit web pages, as well as the HyperText Markup Language⁴¹ (“HTML”) standard used to describe them. Making these standards widely available spurred their adoption because many different software authors were able to implement them and felt they were sufficiently reliable to adopt.

A standardized, even playing field facilitates true technological innovation in the software industry, much as standards in the physical world facilitate

33. Robert P. Merges, *Software and Patent Scope: A Report from the Middle Innings*, 85 Tex. L. Rev. 1627, 1674 (2007).

34. Adobe, Adobe Acrobat Family, <http://www.adobe.com/products/acrobat/> (last visited Aug. 28, 2008).

35. Wikipedia, DjVu, <http://en.wikipedia.org/wiki/DjVu> (last visited Sept. 7, 2008).

36. Wikipedia, FairPlay, <http://en.wikipedia.org/wiki/FairPlay> (last visited Sept. 7, 2008).

37. Wikipedia, MrSID, <http://en.wikipedia.org/wiki/MrSID> (last visited Sept. 7, 2008).

38. Wikipedia, Linux, <http://en.wikipedia.org/wiki/Linux> (last visited Sept. 7, 2008).

39. Guidancesoftware, EnCase Forensic, http://www.guidancesoftware.com/products/ef_index.asp (last visited Sept. 7, 2008).

40. See Wikipedia, Hypertext Transfer Protocol (HTTP), <http://en.wikipedia.org/wiki/HTTP> (last visited Sept. 7, 2008).

41. See Wikipedia, HTML, <http://en.wikipedia.org/wiki/HTML> (last visited Sept. 7, 2008).

commerce. Open standards are particularly useful for spurring adoption of a technology when no single firm is sufficiently powerful to dictate standards.⁴² The emergence of a standard—particularly an open one—can harm market incumbents but help consumers through reduced uncertainty, reduced lock-in, increased competition *within* the market (rather than *for* the market), increased competition on price (rather than features), competition for proprietary extensions, and competition for components (rather than entire systems).⁴³ In some cases, no doubt, multiple standards make sense; competition between firms that control rival proprietary standards will in these cases adequately protect consumers.⁴⁴ Even where multiple standards make sense, however, the availability of at least one open standard may often benefit firms and consumers. Competition—even potential competition—between open and closed standards may very effectively constrain pricing and other standards-related behavior. In such cases, as with all situations involving an open standard, it is essential that those who champion standards be able to make credible long-term commitments regarding the terms on which the standard can be used. Standards estoppel is a doctrine designed to serve this important goal.

Several strategies allow standards to benefit not only consumers but also firms. One strategy is specialization in complementary products and services. A standard component, such as an operating system or a programming language, can create a larger market for proprietary products that “plug in” to a standard. For example, IBM champions the Linux operating system under the logic that IBM has a strong position in the market for products and services that complement Linux.⁴⁵ Another strategy is specialization in the creation or maintenance of standard technologies. For example, Microsoft specializes in personal computer operating systems and Qualcomm specializes in cell phone technology.⁴⁶ Microsoft’s Windows operating system provides a standardized platform for many types of software, and Qualcomm is the inventor of many widely adopted cellular communications standards.⁴⁷

In sum, standards are integral to the software industry and provide a necessary platform on which further innovation may build. Standardization is thus a key concern that should not be neglected when crafting innovation policy for computer software.

II

42. Shapiro & Varian, *supra* note 15, at 199.

43. *Id.* at 227-33; *see also* Urs von Burg, *supra* note 20 (discussing the victory of the open, non-proprietary Ethernet standard over IBM’s Token Ring standard for network communication).

44. *See* Robert P. Merges, Intellectual Property Rights and Technological Platforms (June 1, 2008) (unpublished manuscript, on file with author).

45. *See* Robert P. Merges, *A New Dynamism in the Public Domain*, 71 U. Chi. L. Rev. 183 (2004).

46. *See infra* Part II.C.

47. *See id.*

PATENT HOLDUP—STRATEGIC USES OF PATENTS

The intersection of patent law and standardization in the software industry produces countervailing effects. On the one hand, patents can provide powerful incentives for the very innovation that leads to new standards. On the other hand, patents asserted against entrenched, ostensibly open standards can levy substantial costs against the industry as a whole. Formal standard-setting organizations (SSOs) employ various tactics to mitigate the risk of patent infringement.⁴⁸ However, de facto standards remain unprotected from patent infringement, and even SSOs cannot protect against certain strategic assertions of patent rights against standards.

As we have shown, the software industry adopts standards that fall on a dual spectrum: proprietary to non-proprietary, open to closed.⁴⁹ This adoption reflects a rational choice regarding the marginal benefits of the new technological standard in relation to the marginal costs of switching and patent royalties. The trouble arises when, well after the industry has agreed to the price and is locked into a new standard, a firm seeks to increase the price by asserting patent rights against adopters of the standard in a manner not contemplated in the original bargain.⁵⁰ This is a familiar patent strategy based on the logic of what may be called an economic “holdup.” A patent holdup can occur when a standard owner unexpectedly increases the cost, which we call bait-and-switch, or when some third party unexpectedly asserts a patent, which we call snake-in-the-grass.

File formats, such as MP3, JPEG, and GIF, are common types of standards in the software industry and are useful for illustrating such behavior. GIF is a lossless graphics compression format used heavily in the early days of the Internet.⁵¹ Though a proprietary format owned by Unisys, GIF once enjoyed a certain level of openness due to Unisys granting royalty-free patent licenses to developers of free and non-commercial software.⁵² After GIF became widely used, however, Unisys unexpectedly terminated these licenses and requested royalties from all software developers implementing GIF—a perfect example of the bait-and-switch technique.⁵³

The JPEG file format, in contrast, was ostensibly open for its entire

48. For example, SSOs typically require disclosure of relevant patents during the standard setting process. Participants usually must also promise to license any patents legitimately unknown during standard setting on reasonable and non-discriminatory terms.

49. See *supra* Part I.A.

50. See, e.g., *Dell Computer Corp.*, 121 F.T.C. 616, 626 (1996) (holding that the entire industry was faced with potential harm when Dell asserted a previously concealed standard against an ostensibly open standard).

51. See Wikipedia, Graphics Interchange Format (GIF), <http://en.wikipedia.org/wiki/GIF> (last visited Sept. 7, 2008) [hereinafter Wikipedia, GIF].

52. *Id.*

53. *Id.*

history.⁵⁴ Like GIF, JPEG is also used to store graphical data, but in a “lossy” compression format that emphasizes small file size over perfect quality, giving it a somewhat different purpose.⁵⁵ In 2002, Forgent Networks asserted a patent (filed in 1986) against users of the JPEG format after its worldwide entrenchment.⁵⁶ Fortunately for the industry, Forgent’s snake-in-the-grass technique was unsuccessful; Forgent abandoned its enforcement actions in November 2006, one month after its patent expired.⁵⁷

Both bait-and-switch and snake-in-the-grass harm the industry and fail to advance the primary goal of patent law: providing incentives for innovation. By forcing the industry to pay more than was bargained for in adopting a standard, these strategies are inefficient. Likewise, they are inequitable because they transfer wealth from good-intentioned standards adopters to bad actors who exploit lock-in and network effects, thereby springing traps upon the industry.

A. Bait-and-Switch

The bait-and-switch strategy refers to a patentee encouraging the general public to adopt a standard by claiming either that no patent reads on the standard, or that any patent it owns that applies to the standard will not be enforced. Then, once the standard has been adopted and the industry is locked-in, the patentee seeks to enforce patents against the standard in contradiction of their earlier pledge. For example, some patentees offer a general promise that the relevant patents are ‘dedicated to the public’ or will otherwise never be enforced.⁵⁸ Other patentees grant royalty-free licenses to developers of free and non-commercial software.⁵⁹ Still other patentees claim to own no patents that cover a standard.⁶⁰ Finally, a patentee may guarantee a particular royalty

54. See Wikipedia, JPEG, <http://en.wikipedia.org/wiki/JPEG> (last visited Sept. 7, 2008).

55. *Id.*

56. *Id.*

57. *Id.* Forgent had not met with much success at the time it abandoned its attempts at enforcement, but the ultimate outcome of patent suits is often difficult to predict and may take years to develop. However, the expiration of Forgent’s patent meant that injunctive relief was no longer an option. Patent infringement suits against standards often yield low damage awards because standards adopters typically do not profit directly from implementing a standard. However, an injunction against the use of a vital standard is a powerful bargaining tool because, due to lock-in, standards adopters have little choice but to pay for a license.

58. See, e.g., *IBM Proposes a Patent Commons for Royalty-Free Open Source Software Development*, Cover Pages, Jan. 13, 2005, <http://xml.coverpages.org/ni2005-01-13-a.html> (discussing IBM’s release of 500 patents to the open source community); Peter Galli, *Sun License to Give Developers Patent-Use Rights*, eWeek.com, Jan. 19, 2005, <http://www.eweek.com/article2/0,1895,1752675,00.asp> (discussing Sun’s grant of patent-use rights to the open source community); *Microsoft and Novell Announce Broad Collaboration on Windows and Linux Interoperability and Support*, Microsoft.com, Nov. 2, 2006, <http://www.microsoft.com/presspass/press/2006/nov06/11-02MSNovellIPR.msp> (discussing the newfound partnership between Microsoft and Novell as well as Microsoft’s agreement to “not assert its patents against individual noncommercial open source developers”).

59. See, e.g., Wikipedia, GIF, *supra* note 51.

60. See *Dell Computer Corp.*, 121 F.T.C. 616 (1996).

scheme to assuage fears that it would hike the rates once the industry adopted a standard.

These representations are effective marketing statements, but their legal foundation is not rock solid. Would anything prevent a company—or its successor—presently claiming to forgo its patent rights from seeking to later enforce these same patents against standards adopters? Protecting against strategic behavior is even more difficult where the company originally, credibly, and in good faith pledged openness. Suppose that, over time, the company's prospects worsen severely. Or imagine that the company assigns or licenses the relevant patent(s) to another firm whose *raison d'être* is “monetizing” patents. Would any legal rule discourage this revocation of a “freedom to use” pledge? The discussion in Part IV argues that current legal rules leave a conceptual hole that fails to cover either situation squarely.⁶¹

An example of a bait-and-switch strategy is the *Dell Computer* case.⁶² Dell participated in a standard-setting organization that required its members to disclose any intellectual property.⁶³ During the standard-setting process, Dell twice certified in writing that it had no intellectual property rights related to the standard.⁶⁴ Dell then asserted its concealed patents against adopters of the standard and sought an ongoing royalty.⁶⁵ In litigation before the FTC on charges that its conduct was anticompetitive, Dell agreed to a consent decree that prevented it from enforcing its patents against adopters of the standard.⁶⁶ However, strategic behavior like this should not require antitrust enforcement; patent law can deal with it more directly and judiciously.⁶⁷

61. For two other possible solutions see Merges, *supra* note 45, at 197, 201. One method is a “creative commons” type of solution, which uses contracts that follow the patent to explicitly set forth the terms of use, potentially including use by the public. *Id.* Another method is a statutory provision permitting sellers to waive current and future patent rights by affixing a “Patent Waived” notice to “items to be sold, or information to be published.” *Id.*

62. See *Dell Computer Corp.*, 121 F.T.C. 616; Robert Pitofsky, Chairman, Fed. Trade Comm'n, Prepared Remarks for the Antitrust, Technology and Intellectual Property Conference (Mar. 2, 2001), available at <http://www.ftc.gov/speeches/pitofsky/ipf301.shtm> (“The complaint alleged that the ‘bait-and-switch tactics’ adopted by Dell threatened to retard the development and adoption of standards in this particular matter and to discourage in the future efficient standard-setting efforts.”).

63. Pitofsky, *supra* note 62.

64. *Id.*

65. *Id.*

66. *Id.*

67. Patent law defenses do not typically require proof of market power, restraint of trade, and other complex economic inquiries that are difficult for many patent defendants to establish. Moreover, the DOJ and FTC Guidelines primarily contemplate ex ante disclosure and licensing rules at SSOs to mitigate the holdup problem. But these mechanisms do not account for cases in which the patentee makes promises to the industry outside the SSO context, cases in which those agreements are insufficient or absent, or cases in which the patentee uses a snake-in-the-grass strategy (discussed in the next Part). See U.S. Dep't of Justice & Fed. Trade Comm'n, Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition ch. 2 (2007), available at <http://www.usdoj.gov/atr/public/hearings/ip/222655.pdf>.

Dell, Unisys, and others like them did not promise openness for nothing. In exchange for assurances that the adopted standard would be open, the industry adopted standards based on Dell and Unisys technology—a move that surely benefited the two companies. Part III.B.1 will demonstrate how courts can use this quid pro quo to fashion an estoppel doctrine that takes into account the importance of standards in the software industry.

B. Snake-in-the-grass

The snake-in-the-grass strategy refers to patentees hiding the existence of patents in order to assert them against industry members who become locked into a standard. By waiting to assert its rights, the patentee can force standards adopters to pay more in royalties than they would have otherwise agreed to had they known of the patents beforehand and had the opportunity to truly bargain at arm's length.

This strategy is often employed in the SSO context, and the much-discussed *Rambus*⁶⁸ case provides examples of such behavior. Rambus participated in a standard-setting process with other members of an SSO without revealing that it owned patents that covered the standard.⁶⁹ After the SSO adopted the standard, Rambus asserted the undisclosed patents and sought royalty payments.⁷⁰ *Ex post* damage calculations almost certainly would have been higher than any royalty resulting from *ex ante*, arm's length negotiation.⁷¹ In fact, the SSOs likely would have altered the standards to avoid the Rambus patents unless Rambus agreed to not enforce them against those who adopted the standard.⁷²

To widespread applause, antitrust authorities cracked down on this blatant attempt to deceive an SSO.⁷³ However, antitrust is not always the appropriate

68. *Rambus, Inc.*, Docket No. 9302, (Fed. Trade Comm'n Feb. 2, 2007) (final order), <http://www.ftc.gov/os/adjpro/d9302/070205finalorder.pdf>; *Rambus, Inc.*, Docket No. 9302, (Fed. Trade Comm'n Feb. 2, 2007) (opinion of the Commission on remedy) <http://www.ftc.gov/os/adjpro/d9302/070205opinion.pdf> (limiting the patent royalty rates Rambus may charge licensees).

69. See sources cited *supra* note 68.

70. See *id.*

71. See *id.*

72. See *id.*

73. See, e.g., W. Stephen Smith & Jenny M. Maier, *Overview of FTC's Rambus Decision*, Morrison & Foerster: Legal Updates & News, Aug. 2006, <http://www.mofo.com/news/updates/files/update02229.html>; Jeny M. Maier, *FTC Compels Rambus to License Patented Technology and Limits Royalty Rates*, Morrison & Foerster: Legal Updates & News, Feb. 2007, <http://www.mofo.com/news/updates/files/update02322.html> (explaining the royalty structure dictated by the FTC decision); Alden F. Abbott & Theodore A. Gebhard, *Standard-Setting Disclosure Policies: Evaluating Antitrust Concerns in Light of Rambus*, 16 *Antitrust* 29 (2002); Janice M. Mueller, *Patent Misuse Through the Capture of Industry Standards*, 17 *Berkeley Tech. L.J.* 623 (2002); Nicos L. Tsilas, *Toward Greater Clarity and Consistency in Patent Disclosure Policies in a Post-Rambus World*, 17 *Harv. J.L. & Tech.* 475 (2004); Peter David G. Sabido, *Defending Against Patent Infringement Suits in Standard-Setting Organizations: Rambus Inc. v.*

instrument with which to analyze the behavior of patentees. Patent law sacrifices some amount of competition in exchange for innovation incentives. Rather than risk a clash between the somewhat antithetical bases of the two areas of law, antitrust authorities typically give broad deference when patents are involved. The substantially different results in different courts during the protracted Rambus litigation illustrate the difficulty in dealing with patentee behavior through antitrust law. Indeed, the United States Court of Appeals for the District of Columbia Circuit recently reversed the FTC's ruling that Rambus acted anticompetitively by failing to disclose its patents,⁷⁴ bolstering the conclusion that antitrust law is ill-equipped to handle even straightforward disputes involving patents and standards. Antitrust law should only be a backstop to other mechanisms for preventing strategic behavior; patent law must police many harmful patent abuses on its own.⁷⁵

Though contract law might seem to offer an appealing substitute for an independent mechanism of control within patent law, its actual efficacy is limited. As SSOs and commentators quickly grew wise to these games, most SSOs now insert contractual provisions requiring disclosure of patents and setting penalties for non-disclosure.⁷⁶ Contractual provisions are useful, but damages for contractual breach may be difficult to calculate and will often be inadequate due to the unique role standards play in the software industry.⁷⁷ In addition, many customers who adopt patented standards may never enter into formal contractual relationships with relevant patent owners, so it makes no sense for them to look to contract law for a remedy. Indeed, the lack of formal legal privity is one important rationale for the doctrine we are espousing in this article.

Snake-in-the-grass is a game that could also be played outside the SSO context. Suppose, for example, that a company with several old and generally unknown patents simply sits back and watches as the industry adopts an ostensibly open standard. Rather than asserting the patents at an early stage, the owner waits until the industry is locked in and customer switching costs are high.⁷⁸ As long as the patent owner requests a royalty that is less than the

Infineon Technologies AG, 13 Fed. Cir. B.J. 635 (2004). *But see* Joseph Kattan, *The IP/Antitrust Intersection: Promoting Competition and Innovation*, 16 *Antitrust* 22, 27 (2002) (arguing that *In re Independent Service Organizations Litigation* (ISO), 203 F.3d 1322 (Fed. Cir. 2000) may afford a significant defense to those wishing to challenge single-firm standard-setting conduct on antitrust grounds).

74. *Rambus, Inc. v. FTC*, 522 F.3d 456 (D.C. Cir. 2008).

75. Despite being generally unsuited as a mechanism by which to police patent law, antitrust law is still relevant to standards estoppel. For further explanation, see *infra* Part III.B.2.a.

76. See Lemley, *supra* note 18; *infra* Part III.B.

77. The traditional rule in contract law is to award specific performance where money damages are difficult to calculate for a breach of contract. In this sense, standards estoppels can be seen as a form of quasi-contractual specific performance, giving standards adopters the open standard they initially bargained for.

78. This situation could also arise when a successor acquires patents from a previous owner

switching costs, users of the standard would likely pay the royalty rather than switch standards. However, the royalty here is still artificially high—certainly much higher than would result from ex ante negotiation when the industry still had the option to avoid adopting the patented standard entirely.

A perfect example of a patentee employing the snake-in-the-grass tactic is Forgent's assertion of patents against the well-established JPEG standard.⁷⁹ Part III.B.2 will argue that if Forgent had deliberately, from the beginning, sought to use network effects and industry lock-in as a means to impose rents on an unsuspecting industry, then courts should punish this bad behavior by disallowing enforcement of the patents against adopters of the standard. Even if Forgent had not intended to exercise such a strategy, a court faced with enforcement against an open standard should conduct an equitable analysis, as described in *eBay*, to determine whether an injunction, damages, or ongoing royalties are appropriate in the particular situation.

C. Legitimate Enforcement Actions

Not all enforcement actions by a patent holder against an adopted standard are illegitimate. Though the costs to industry from the bait-and-switch and snake-in-the-grass strategies can be quite large, these strategies represent only a small subset of patent enforcement actions, even among suits related to standards. Cabining the type of behavior we contemplate is important.

For example, a patent holder may legitimately assert a patent covering standards technology when an industry adopted it with full knowledge of such coverage. The recent dispute between Qualcomm and Nokia exemplifies this.⁸⁰ Mobile phones throughout the Americas employ Qualcomm's patented Code-Division Multiple Access (CDMA) standard to communicate over networks.⁸¹ Handset manufacturers, such as Nokia, license CDMA patents to produce phones using CDMA.⁸² Recently, Nokia and Qualcomm disputed the terms of the license agreement, and eventually Qualcomm filed suit for patent infringement.⁸³ In response, Nokia filed a complaint of its own seeking "fair [and] reasonable" licensing terms.⁸⁴ Based on the public information about the

and suddenly adopts a strategy different than that of the previous owner.

79. See *supra* Part II.

This example, originally discussed *supra*, will be further detailed in Part III.B.3.

80. Nancy Gohring, *Nokia, Qualcomm Squabble Over CDMA License*, InfoWorld, Apr. 20, 2006, http://www.infoworld.com/article/06/04/20/77592_HNpatentsquabble_1.html; Kevin J. O'Brien, *The Nokia-Qualcomm Disconnect*, Int'l Herald Trib., Apr. 8, 2007, <http://www.iht.com/articles/2007/04/08/technology/wireless.php>; Peter Sayer, *Qualcomm Files More Suits Against Nokia*, Wash. Post, Apr. 3, 2007, <http://www.washingtonpost.com/wp-dyn/content/article/2007/04/03/AR2007040300892.html>.

81. Sayer, *supra* note 80.

82. *Id.*

83. Katie Fehrenbacher, *Timeline: Qualcomm, Nokia Duel*, GigaOM.com, Apr. 4, 2007, <http://gigaom.com/2007/04/04/timeline-of-the-qualcomm-nokia-duel/>.

84. *Id.*

case, this seems like a legitimate assertion of patent rights. The industry adopted the CDMA standard with a full appreciation of Qualcomm's proprietary standards. The litigation reflects differences that arose in how firms valued Qualcomm's patents in light of new intellectual property of their own rather than any illegitimate concealment or promise of non-enforcement of a patent followed by an assertion of that patent. The point is not that Qualcomm is in the right in this particular case; nor that Nokia is. Rather, this is simply a case where conventional patent principles—validity, infringement, and remedies—ought to be applied without reference to the notion of standards estoppel.

Another legitimate assertion of a patent on standards technology occurs when the patent holder is trying to retain control of its standard. The recent antitrust and patent infringement litigation between Sun Microsystems (Sun) and Microsoft provides a real-world example.⁸⁵ Sun allowed users to freely download the tools needed to read and write programs in the Java programming language.⁸⁶ This popular language allows programmers to write programs that run on different platforms, such as Linux, Windows, and Apple's operating systems.⁸⁷

Sun licensed Java technology to Microsoft for inclusion in Microsoft's Windows operating system.⁸⁸ However, Microsoft adopted a strategy of "embrace and extend" that threatened to undermine Sun's control of Java.⁸⁹ Specifically, Microsoft implemented *additional* features in Java that were not part of Sun's standard.⁹⁰ If programmers wrote software that took advantage of the extra features then their programs would run only on Microsoft's implementation of Java, thus destroying the cross-platform compatibility for which Sun was aiming.⁹¹ Sun sued, alleging patent infringement and antitrust violations.⁹² As with Qualcomm, Sun's suit is an instance of legitimate enforcement of standards patents, although directed to a different end. Instead of seeking higher royalty payments, Sun wanted to maintain control over Java rather than ceding it to Microsoft.⁹³

85. James Niccolai, *Sun, Microsoft Settle Java Lawsuit*, Network World, Jan. 23, 2001, <http://www.networkworld.com/news/2001/0123msjava.html>.

86. *Id.*

87. *Id.*

88. *Id.*

89. John Markoff, *Microsoft Adding to Java and to Sun Rift*, N.Y. Times, Mar. 11, 1998, <http://query.nytimes.com/gst/fullpage.html?res=9807EFD71330F932A25750C0A96E958260>; see also Niccolai, *supra* note 85.

90. Markoff, *supra* note 89.

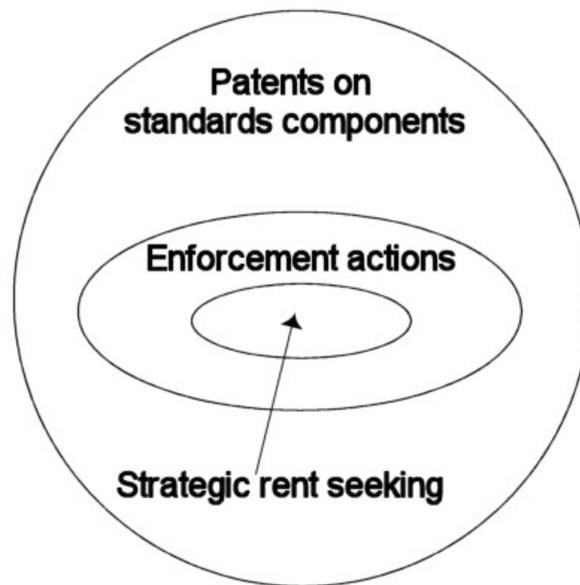
91. *Id.*

92. Scarlet Pruitt, *Sun, Microsoft Make a Billion Dollar Deal*, PC World, Apr. 2, 2004, <http://www.pcworld.com/article/id,115510-page,1/article.html>. Microsoft and Sun eventually entered into a complex settlement agreement dealing that included this issue, as well as many others. *Id.*

93. Markoff, *supra* note 89.

To reiterate: patents on standards components are not usually a problem. Most enforcement actions for such patents are completely legitimate. The problem lies only with strategic rent seeking. This limited scope of illegitimate activity is illustrated in Figure 1.

Figure 1: Strategic rent seeking



III

ESTOPPING STRATEGIC USE OF PATENTS ON STANDARDS

Patent law should encourage the development of reliable open standards while retaining incentives for innovation. Part III.A provides a theoretical justification for protecting the interests of good-faith standards adopters. Part III.B discusses how a standards estoppel doctrine would function, including remedies for certain specific behaviors. Part III.C further develops the practical application of standards estoppel as applied to participants in the standards process. Finally, Part III.D discusses the duration of the protection offered by a standards estoppel defense.

A. Protecting Adopters' Interest in Standards: A Theoretical Defense of a "User Reliance Interest" In Technical Standards

Although the doctrine we propose is in many ways just common sense, the need for it suggests something interesting about the structure of

entitlements in our legal system. Our legal system traditionally has a difficult time recognizing claims based on the collective effort of dispersed contributors—people spread across space (and sometimes time) who together, en masse, create or sustain something of value.⁹⁴ Property law favors readily identifiable “focal point” owners because it is easier to find the one true owner and strike a deal for use of the property. Critics have often complained that this concept, as it plays out in intellectual property (“IP”) law, results in the “myth of the romantic author.”⁹⁵ The “myth” has evolved not only for reasons of efficiency, the critics claim, but as a covert tool of powerful interests who deploy it strategically to further their economic interests.⁹⁶ Dispersed contributors are disfavored *on purpose*, in other words, and not just as some accidental byproduct of the structure of legal rules. Despite the concerns of these critics, the concept of a focal point works well in most cases: the contributions of “minor players” are ignored, and property rights are assigned to those who expend the “lion’s share” of effort.⁹⁷ Economic logic and fairness both point toward the conventional preference for unitary focal point owners. In many cases, the cost of assigning ownership interests to small contributors and then administering and managing these additional ownership rights is not worth whatever gain (in incentives or fairness) it might bring.

What about the situation where a property owner invites someone to contribute effort by adding to an asset the owner already owns? Such cases are usually decided under principles of contract law. The “invitee” can fend for him or herself in any dispute with the property owner, with the result typically determined under the terms of the relevant contract or, in some cases, common law principles that derive largely from implied contract reasoning.⁹⁸

94. See Robert P. Merges, *Locke for the Masses: Property Rights and the Products of Collective Creativity*, 36 Hofstra L. Rev. (forthcoming Oct. 2008) (“Idea” section). The problem of collective creativity is also an important component in discussions of the need for intellectual property protection of traditional medicines, folklore, crafts, and other deeply rooted products of communal wisdom. See, e.g., Michael F. Brown, *Who Owns Native Culture?* (2003).

95. James Boyle, *Shamans, Software and Spleens: Law and the Construction of the Information Society*, 51-60 (1996).

96. See *id.*

97. In patent law, for example, “each joint inventor must generally contribute to the conception” of at least one claim. Robert Patrick Merges & John Fitzgerald Duffy, *Patent Law and Policy* 1274 (3rd ed. 2002) (quoting *Ethicon, Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1460 (Fed. Cir. 1998)). Although this test includes as co-inventors contributors whose work would not be independently patentable, it excludes from co-inventorship contributors who functioned only as a “pair of hands” or assisted in reduction to practice but not conception. *Id.* at 1287.

In copyright law, joint authorship yields to each contributor “undivided ownership in the entire work.” 1 Melville B. Nimmer & David Nimmer, *Nimmer on Copyright* § 6.03 (2008). Joint authorship requires “joint laboring in furtherance of a preconcerted common design” with at least “a significant contribution” that is “something more than the minimal copyright standard of ‘distinguishable variation.’” *Id.* (citing *Picture Music, Inc. v. Bourne, Inc.*, 314 F. Supp. 640 (S.D.N.Y. 1970), *aff’d on other grounds*, 457 F.2d 1213 (2d. Cir. 1972)).

98. See generally Robert P. Merges, *The Law and Economics of Employee Inventions*, 13 Harv. J. L. & Tech. 1 (1999).

But this arrangement breaks down in cases where many dispersed contributors *collectively* make a major contribution at the behest of a property owner, but without perhaps entering into a formal contractual relationship. There is no single focal point person, no contracting party, to defend against the property owner's claims. Those who work to adopt and implement a standard fit this description perfectly. They are invited to add some value to a property owner's asset, yet they fall outside the protection of a formal contractual relationship.

How much work does it really take to adopt a standard? At a minimum, it requires writing new software and updating existing software. For example, to adopt a new media file standard, developers must first learn how to implement a new movie file format and then write separate plug-ins or additions for every software media player that uses it. Encryption algorithms, communication protocols, compression routines, and other standardized procedures typically carry even greater burdens since often developers must thoroughly understand *why* the procedures work in order to implement them efficiently and securely.⁹⁹ Each version of the standards-implementing software must then undergo the same types of testing and debugging that all other software must endure. In short, writing software that does little else but implement well-known and well-documented standards takes a lot of work.¹⁰⁰

In these cases, we have a mismatch: there is labor—often prodigious amounts of it—but that labor (unlike in much of our law of property) does not lead to a legal claim on the part of the laborers. No entitlement follows from this effort, even though it is envisioned and even invited by the owner of the property, i.e., the standard. The standards estoppel doctrine is an effort to address this problem in a most important context.¹⁰¹

This idea is not completely novel. It shows up, for example, in Judge

99. Cryptography, for example, is an ever changing field that absorbs new advances from computer science, mathematics, and information theory. Implementing protocols in a way that is actually secure rather than only appearing to be so is difficult even for experienced computer scientists. Peter Gutmann, *Lessons Learned in Implementing and Deploying Crypto Software*, Proceedings of the 11th USENIX Security Symposium (Aug. 5-9, 2002), *available at* http://www.usenix.org/publications/library/proceedings/sec02/full_papers/gutmann/gutmann.pdf.

100. To take one example, Pidgin is a popular open source program that implements a variety of instant messaging protocols. It does very little that proprietary instant messaging programs do not do except aggregation of many protocols into a single program. However, as can be seen from the various documents on the Pidgin developer's webpage, there is a lot left to do even with a thriving community of developers. Pidgin Support & Development, <http://developer.pidgin.im/> (last visited Aug. 28, 2008).

101. In this Part, the proposed doctrine is explained in terms of the labor theory of philosopher John Locke. *See* John Locke, *Second Treatise on Government* §§ 27, 36 (1689), reprinted in Locke: *Two Treatises of Government* (Student Ed., 1988) (Peter Laslett, ed.), at 287-288, 292-293. In this instance as in many others, however, the Lockean normative framework overlaps quite substantially with a utilitarian or incentives account. In other words, the doctrine we espouse is not only normatively correct (in a Lockean sense), but leads to more effective incentives (in a utilitarian sense).

Michael Boudin's concurrence in the 1995 case of *Lotus v. Borland*.¹⁰² Judge Boudin, in denying Lotus's claim to ownership of macros in the 1-2-3 spreadsheet, explicitly mentioned his concern with the efforts of the many users who labored to make these macros work with the Lotus program.

If Lotus is granted a monopoly on this pattern, users who have learned the command structure of Lotus 1-2-3 or devised their own macros are locked into Lotus, just as a typist who has learned the QWERTY keyboard would be the captive of anyone who had a monopoly on the production of such a keyboard. . . .

But if a better spreadsheet comes along, it is hard to see why customers who have learned the Lotus menu and devised macros for it should remain captives of Lotus because of an investment in learning made by the users and not by Lotus.¹⁰³

Other commentators have also noted the idea of a "reliance interest" in various forms of property, a notion close to the idea we propose here.¹⁰⁴ We are proposing a "right" that protects a dispersed class of users against the assertion of the patentee's right when those users have, by their efforts, created part of the patent's value.¹⁰⁵ The standards estoppel doctrine works to protect the class because the users' decision to adopt a standard and their efforts in implementing it creates much of the standard's value, and because the choice to adopt a particular standard comes at the behest of the standard owner.¹⁰⁶ The

102. *Lotus Dev. Corp. v. Borland Int'l Inc.*, 49 F.3d 807 (1st Cir. 1995), *aff'd*, 516 U.S. 233 (1996) (4-4 decision) (per curiam).

103. *Id.* at 821.

104. See, e.g., Joseph William Singer, *The Reliance Interest in Property*, 40 Stan. L. Rev. 611 (1988); see also Tom Allen, *Compensation for Property Under the European Convention on Human Rights*, 28 Mich. J. Int'l L. 287 (2007); Krystilyn Corbett, *The Rise of Private Property Rights in the Broadcast Spectrum*, 46 Duke L.J. 611, 635-639 (1996); Kent Greenfield, *The Place of Workers in Corporate Law*, 39 B.C. L. Rev. 283 (1998); Peter Lee, *The Evolution of Intellectual Infrastructure*, 83 Wash. L. Rev. 39, 69-75 (2008); Nathalie D. Martin, *Noneconomic Interests in Bankruptcy: Standing on the Outside Looking in*, 59 Ohio St. L.J. 429 (1998); Kary L. Moss, *The Privatizing of Public Wealth*, 23 Fordham Urb. L.J. 101 (1995); Jeremy Paul, *The Hidden Structure of Takings Law*, 64 S. Calif. L. Rev. 1393, 1429 (1991); Joseph William Singer, *Real Conflicts*, 69 B.U. L. Rev. 1 (1989).

105. Formally, standards estoppel would appear to create something more akin to a privilege or defense—a legal protective mechanism that kicks in when someone else asserts a right against the favored or privileged class. There is a property-like aspect to this defense, however, because it arises outside a formal contractual relationship. The main point here, however, is not taxonomic; it is that whatever label one uses for it, the right to defend against an assertion of patent infringement inures to those who have invested resources in the adoption of a standard, in the good faith belief that those investments have been encouraged and invited by the patent owner's pledge to maintain an open standard.

106. The invitation by the standard owner is crucial here. It is what makes the standards case different from cases where users or consumers digitally "remix" established works without encouragement or invitation by owners of those works. Remixers in this setting have no plausible right to remix. See Robert P. Merges, *Locke Remixed ;-*), 40 U.C. Davis L. Rev. 1259 (2007). Many such owners of established works also voluntarily waive their rights to build user interest in their works—a situation that is closely akin to standards owners encouraging standard adoption. It

straightforward Lockean formula—property follows labor—requires the recognition of a legal entitlement arising from the users’ collective efforts: the doctrine of standards estoppel.¹⁰⁷

B. Accommodating Standards in the Estoppel Doctrine

Several commentators have argued for policies that will promote creation and use of standards,¹⁰⁸ but no proposal addresses the problems we have identified. The estoppel doctrine in patent law traditionally deals only with promises made from the patentee to a particular actor who is in a relationship with the patentee. However, the importance of standards in the software industry and the new types of strategic behaviors that emerge in the standards context suggest that courts should expand the estoppel doctrine to include some instances where either the relationship or promise elements are tenuous. This

is thus reasonable that something like the standards estoppel doctrine espoused here would be appropriate if an owner of established works *changed his or her mind* after users have expended effort in making remixes.

107. To be sure, there is much more to Lockean labor theory than this crude formula. Briefly, Locke also *limits* property rights over assets, even where labor has been expended to secure or transform those assets. *See, e.g.*, John Locke, *Second Treatise of Government*, §§ 31 (no one should appropriate more than he or she can use effectively—the spoilage or “waste” proviso), 33 (no one should appropriate resources unless “enough, and as good” is left for others after the appropriation—the sufficiency proviso), and John Locke, *First Treatise on Government* § 42, reprinted in Laslett, *supra* note 101, at 170 (destitute people have a claim on resources even after an appropriator labors on them—the “charity” proviso). Various readers of Locke describe his limitations and “provisos” differently, but all agree that Locke is no absolutist when it comes to property claims. *See, e.g.*, A. John Simmons, *The Lockean Theory of Rights* (1992); Jeremy Waldron, *The Right to Private Property* (1988). For present purposes, two points will suffice: (1) Locke is a big believer in contract as well as property (which is why he can defend an employee’s or “servant’s” lack of property rights when he or she labors on a thing owned by an employer), and so it is no stretch to say that a Lockean theorist would recognize that the *invitation* to adopters to add labor to a standard over which property is expressly disclaimed puts adopters on a very different footing than an employee working on assets owned by an employer; and (2) because the labor of adopters results only in a negative right (a privilege or immunity from suit by a patent owner), the labor in no significant way limits the rights of others, and hence does not run counter to any of the Lockean provisos.

108. *See, e.g.*, Mark A. Lemley, *Ten Things To Do About Patent Holdup of Standards (and One Not To)*, 48 B.C. L. Rev. 149 (2007). Professor Lemley argues that SSOs should require members to agree to license their patent rights for patents that are essential to a new standard on reasonable and nondiscriminatory terms prior to the standard’s formulation using clear license agreements. Further, members should agree to a cap on the total royalty charged for a standard between all the members, impose penalty defaults for nondisclosure of vital patents, and innovative means of determining royalty rates. These suggestions require antitrust law to allow SSOs to discuss price. Outside of the SSO context, the PTO should limit abuse of continuation practice, while courts should limit findings of willfulness and calculate reasonable royalty rates and damages in a way that accounts for the fact that many patents may read on a single standard. In contrast, antitrust law may be an inappropriate tool to solve patent holdup because of the deference courts often show to patent law as well as the evidentiary difficulties in proving an antitrust violation. *See* Janice M. Mueller, *Patenting Industry Standards*, 34 J. Marshall L. Rev. 897 (2001) (arguing that firms that conceal patents in the standard-setting process should be subject to compulsory licensing).

Part will discuss three categories of behavior in the standards context, and the effects those behaviors should have on patent enforcement and remedies.

Courts should first look to whether a patent holder has either pledged not to enforce patents related to a particular standard or represented that it has no patents related to a standard.¹⁰⁹ As discussed in Part III.B.1, *infra*, courts should hold that such pledges and representations constitute a binding implied license that estops subsequent attempts to enforce the patents in question.

Courts should then look to whether a patentee has acted with bad faith or anticompetitive intent by acquiring patents to assert against an open standard in the hopes of extracting excessive rents after industry lock-in. As discussed in Part III.B.2, *infra*, courts should estop patentees from enforcing patents that they held or acquired to strategically assert against an open standard.

Finally, absent pledges of openness or anticompetitive intent, courts should determine whether awarding damages, granting injunctive relief, or assessing ongoing royalties would be the most equitable remedy. As discussed in Part III.B.3, *infra*, courts should consider limiting remedies where patentees knew or should have known of the adoption of an open standard that infringed its patents.

1. Estopping the Bait-and-Switch : Estoppel Based on Pledges of Non-enforcement or Nonexistence of Standards-relevant Patents

Rational firms do not offer something for nothing. Nothing requires a patentee to pledge non-enforcement of patents nor to categorically deny holding IP rights that a standard in development might infringe. Pledges of openness represent an entirely new type of bargain enabled by the importance of open standards, where an effective license to an entire class of users is exchanged for widespread adoption of a company's technology. By disclaiming or limiting enforcement of certain patents, a company may be able to assuage industry fears that the company would charge high rents after the industry is locked into the standard. This may facilitate widespread adoption of a standard that might otherwise receive only a lukewarm reception. Widespread adoption of its technology may allow the company to capitalize on implementing the standard, developing complementary products, or providing support for implementations of the standard.¹¹⁰ This quid pro quo is important, as it

109. For the most part, these pledges are self-evident; they often take the form of notices on websites or widely disseminated press releases. Timothy Wu in a recent paper observes that in the world of online content, our legal system appears to be moving toward an unorthodox property system, in which content is presumed open and free for use unless and until its owner provides explicit notice. Wu calls this system "an 'opt-in' system . . . that is in property terms a rare species of *ex post* notice right." Tim Wu, *Tolerated Use 1* (Columbia Law Sch. Center for Law and Econ. Studies, Working Paper No. 333, 2008), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1132247.

110. A similar quid pro quo often occurs in the copyright context in the form of open source software. *See, e.g., Jacobsen v. Katzer*, 535 F.3d 1373, 1379 (Fed. Cir. 2008) ("There are

justifies holding the patentee to his promise. The bargain only works if the patentee's promise is believable.

A bait-and-switch strategy provides an easy case for expanding the estoppel doctrine. Bait-and-switch refers to a patentee agreeing to entirely or partially not enforce a particular patent.¹¹¹ That the patentee made the promise to the industry at large rather than to an individual actor should not allow him to escape liability.¹¹² Network effects and high switching costs mean that the industry's choice to adopt the standard is, to a certain extent, irrevocable,¹¹³ the patentee's assurances should likewise be binding. In order for patent law to accommodate this new type of bargain, courts should estop any enforcement of the patents against the standard and hold that the patentee has granted an irrevocable license to use the patent to all actors who fall within the ambit of the patentee's promise.¹¹⁴

Normally estoppel requires a relationship demonstrated by an affirmative communication between two parties. Its remedy is an implied license that runs only to the protected class—the people to whom the patentee communicated. In the SSO context, for example, this may include only other SSO members. Thus, courts must relax the requirement in the standards context because the entire industry—all present and future adopters of a standard—must be able to rely on the patentee's statements. Otherwise a patentee can easily evade estoppel.

Enforcing standards estoppel will also require an expanded notion of contractual privity. Traditional privity of contract extends only between well-defined parties to an explicit agreement, but privity in the standards context should extend to the entire network of standards adopters, past and future.¹¹⁵ At the time of suit, past adopters of a particular standard may have only joined the

substantial benefits, including economic benefits, to the creation and distribution of copyrighted works under public licenses that range far beyond traditional license royalties.”)

111. See *supra* Part II.A.

112. It is possible to make a blanket representation to all members of the public which may be construed as a binding offer. This offer is accepted, resulting in a contract, by specified acts or statements on the part of recipients. The standards context does not lend itself to this conventional contractual analysis, however. There is no single act required on the part of “offerees” who adopt a standard. Instead, adopters create a reliance interest in a standard collectively, over time. This reliance interest is one reason that the user interest whose protection we describe in this Article is best characterized as a property (or perhaps quasi-property) interest rather than a creature of contract law.

113. See *supra* Parts I.A & I.B.

114. Stating the estoppels rule this way makes clear that it is intended to go beyond situations where an implied license would normally exist. The pledge of openness, in other words, need not rise to the level of a unilateral offer under contract law, nor need it be directed at specific parties or occur in the context of a contractual or semi-contractual relationship.

115. From the perspective of legal theory, this proposal can be seen two ways. It might be described as a looser form of the concept of contractual privity—what might be thought of as “network privity.” Or it could be conceived as a form of quasi-property right held by standards adopters that is “good against the world,” i.e., against any entity that later tries to break the pledge of openness with respect to the patents covering the adopted standard. We favor the latter characterization, for reasons explained throughout this Article.

network because of the pledge of openness. Future adopters often have little choice but to adopt the industry standard. Future adopters should therefore get the same bargain as the initial adopters who made the technology in question a standard in the first place.¹¹⁶

Holding patentees to their promises does not harm incentives to innovate. Rather, much like contract law, enforcing pledges of openness facilitates a free market. The knowledge that a party (and that party's successors) will neither assert nor allow assertion of its patents against a particular standard is an extremely valuable.¹¹⁷ Enforcing pledges of nonexistence, non-enforcement, or pre-determined royalty schemes allows patentees to make deals in which openness is exchanged for something else of value, such as adoption of a standard. Standards estoppel helps patentees by making these pledges highly *credible*, thus allowing patentees to more fully exploit the true value of their patents. Estoppel removes any technical defenses to enforceability of the pledge of openness. Thus both parties ultimately benefit.

2. *Estopping the Snake-in-the-grass—Estoppel Based on Bad Faith*

Even absent pledges of openness, acquiring or concealing patents to strategically assert them later against an open industry standard indicates anticompetitive intent or bad faith that contradict the purpose of patent law. Patents exist to provide incentives for innovation. Negotiating the licensing terms of a propriety standard up front, with an SSO or the industry at large, is the appropriate framework in which to legitimately capitalize on the value of a patent. Waiting until the industry is irrevocably locked in to a particular standard before springing a patent trap falls outside this framework. This snake-

116. This is another reason why standards estoppel as we envision it is different from a conventional contract formed by an offer made to the general public. A conventional contract offer can, like any offer, be revoked prior to acceptance. In the standards context, this would allow changes in the terms of a public notice (on a website, for example), announcing that the patents formerly rendered free and open will henceforth not be free and open. Such changes would, under standard contract law, eliminate the protection of openness from subsequent adopters of a standard. Under our doctrine, however, subsequent adopters could ignore this public notice, *assuming* the standard in question had become solidly established before the patentee tried to change its policy on openness. Prior to this point, i.e., before the standard has become well established, it would seem that conventional contract principles might sensibly be applied. But after this point—after the collective effort of multiple adopters has firmly established the patented technology as a standard—our doctrine disallows the patentee to change course. Instead, the collective reliance interest we describe militates against the normal freedom of action permitted to a patentee. A change in the “offer” from a patentee has no effect beyond this point, which is why standards estoppel as we envision it is something other than a novel species of implied contract. The collective effort that makes a standard calls into being something other than a series of individual quasi-contract rights: it creates something more akin to a property interest that vests in all adopters, present and future.

117. *See supra* Parts I.A & I.B. Technological development requires that standards be as trustworthy as possible. The industry, through SSOs and the efforts of individual companies, works hard to ensure open standards. Insofar as it is possible while retaining incentives to innovate, patent law should foster, not hinder, efforts to retain open standards.

in-the-grass patent enforcement is strategic rent-seeking that results in excessive returns to the patentee, and should therefore be estopped by the courts.¹¹⁸

In this Part we discuss several types of bad faith that could give rise to estoppel. The first, explicit bad faith, deals with active intent on the part of the patent holder to deprive the industry of the information necessary to make a fully informed decision regarding whether to adopt a particular standard. The second, implicit bad faith, deals with patentees who do not intend to adopt such a strategy at the outset, but rather who simply let events take their course and later decide to assert previously unknown patents against the standard. Finally, we discuss equitable considerations that might militate against permitting certain enforcement actions even in cases where evidence of bad faith is weak.

a. Explicit Bad Faith

Determining explicit bad faith, which might be thought of as anticompetitive intent, is not an easy task, but courts are well acquainted with it. One type of information relevant to determining anticompetitive intent is timing. If, for example, a patentee filed for a patent (or amended a pending application) soon after it appeared that the industry might adopt a standard on the underlying technology, then a court should be more willing to impute bad faith. Another source of information is internal company documents. Courts should take a cue from *Grokster* in evaluating the evidence: if documents reveal that a company acquired or concealed the patents with the intent to strategically assert them, then a court should find bad faith even if the action may not have been objectionable standing alone.¹¹⁹ Of course, acquisition of patents with anticompetitive intent could include not only assignment but also prosecution, reexamination, or reissue of patents with the intent that the newly issued claims read on an established standard.

Courts can also look to the antitrust literature, especially the *Rambus* line of cases, for methods of determining anticompetitive intent.¹²⁰ Analyzing *Rambus*'s behavior from an antitrust perspective proved difficult for courts, as the long line of disparate analyses and results demonstrates. Antitrust defenses against patent enforcement typically have a high bar,¹²¹ but commentators were united in condemning this type of behavior as detrimental to the industry.¹²² In

118. See *supra* Part I.B.

119. See *MGM Studios, Inc. v. Grokster, Ltd.*, 545 U.S. 913 (2005) (adopting a similar mode of analysis to find contributory copyright infringement).

120. See, e.g., sources cited *supra* note 68.

121. See, e.g., *Walker Process Equipment, Inc. v. Food Mach. & Chem. Corp.*, 382 U.S. 172 (1965) (holding that Part 2 of the Sherman Act allows claims for monopolization or attempted monopolization based on enforcement of a patent obtained by knowingly and deliberately concealing from the Patent Office prior art that the applicant knew would have resulted in a denial of its application).

122. See, e.g., source cited *supra* note 73.

doing so, these commentators have provided useful descriptions of exactly what types of behaviors are inefficient and should be prevented.¹²³ Rather than using the backstop of antitrust law, our solution addresses the problem directly through patent law—strategic assertion of patents against standards should be estopped.

Explicit bad faith ultimately hinges upon an intent to deprive the industry of the knowledge necessary to make an informed decision. If a company asserts patents before the nearly irrevocable adoption of the standard, or at least makes them publicly known, then adopters can make an informed choice. A company that makes its patents and their relation to an open standard known as soon as possible could thus not be accused of anticompetitive intent. A company that conceals or acquires patents to extort inefficiently high rents, however, should not be rewarded.

b. Implicit Bad Faith

A patent grants an exclusive right to make and use an invention; the burden of ensuring that a particular technology does not infringe a patent, however, generally lies with the adopter of such technology. After all, a patentee cannot keep abreast of what everyone else is doing. The technology adopters have the information and should have incentives to ensure that they do not infringe. In normal situations, one patentee is attempting to regulate the behavior of many firms, and the information asymmetries mean the burden of avoiding infringement is rightly placed on the many rather than the one.

However, the standards context inverts the information asymmetries. An industry or SSO looking to adopt an open standard publicizes the standard as much as possible and seeks to bulletproof it against every patent, many of which are generally unknown. The infringing activity is not carried out in quasi-secrecy within one firm but rather is broadcast to the world, often in stages as standards are under development. The infringer is not trying to get away with as much as possible but is instead actively trying to mitigate the possibility of infringement due to the potentially high cost of the injury resulting from ongoing royalties or damages. Standards bodies thus have every incentive to give extensive notice regarding technical standards. In this context, the patentees (as opposed to the potential infringers) possess information as to infringement, since they are the ones who would almost certainly be aware that the industry is adopting a standard based on their patented technology. Consequently, secret or unpublicized standard-setting would not fall under our analysis here. Also, courts should still hold patents unenforceable with respect to the standard if those patents are asserted after a patent holder silently held its patents without intending, at least initially, to later spring them upon adopters of a well-publicized standard.

123. See, e.g., *id.*

Courts should thus apply a ‘knew or should have known’ standard in determining bad faith. If a company knew or should have known that the industry was adopting a standard believed to be open, when in fact the standard infringed the company’s patents, then the company must make that fact known as soon as possible, preferably to the standard-setting body whose standard appears it may read on the company’s patent.¹²⁴ A company that makes its relevant patents known can bargain at arm’s length for the adoption of its technology at a time when the standards adopter can either pay the patentee’s requested royalty or change the design so as not to infringe. What the company should not be able to do is to remain silent and later decide to exploit the industry’s ignorance and honest efforts to avoid infringement.

Of course, applying such a standard would not entirely shift the burden of searching for potential infringement to the patentee. After all, standards adopters still face potential infringement liability and switching costs in the initial stages of promulgation and adoption of a standard, so it is likely that the present level of searching will continue. Moreover, a patentee would be unlikely to qualify for this sort of implicit bad faith where a standard-setting body does not publicize its standard. A patentee who does not know about a standard cannot be faulted for keeping quiet about a relevant patent.

3. *Equitable Considerations*

Even absent a finding of bad faith, courts should carefully consider whether some form of standards estoppel may be appropriate to protect good faith adopters of a well-established and necessary industry standard. In particular, standards-related suits often have several features that militate against injunctions under the four-factor test reiterated in *eBay Inc. v. MercExchange, L.L.C.*¹²⁵ Also, lock-in and switching costs suggest that courts should carefully calculate any damages or ongoing royalties in line with an ex ante negotiation process because the industry often adopts an open standard strictly on the premise that it can use the standard royalty-free.

a. Injunctive Relief

Injunctive relief is one of several remedies available for patent infringement and is a particularly powerful remedy that courts should apply

124. It should be stressed that this situation could develop without active anticompetitive intent, since a firm that knows of the standard but has no bad intent (i.e., no explicit bad faith) could simply change its strategy later or assign its patents to another firm with a more aggressive patent strategy.

125. See 547 U.S. 388, 391 (2006). The essence of *eBay* is what might be called disproportionate leverage. A patent of modest intrinsic value can come to have very substantial value due to heavy up-front investments that cannot be recouped without use of the patented technology. Standards estoppel, like the injunction analysis in *eBay*, insures that patent law does not inadvertently reward disproportionate leverage obtained for reasons other than the intrinsic merits of the patented technology.

carefully to well-established industry standards. To merit an injunction under *eBay*, the plaintiff must satisfy a four-factor test.

First, the plaintiff must demonstrate “that it has suffered an irreparable injury.”¹²⁶ Lower courts have held that, after *eBay*, a patentee is not entitled to a presumption of irreparable harm, even after his patent is found valid and infringed.¹²⁷ Technical standards that infringe upon a plaintiff’s patent may not cause much actual harm to his business. Technical standards often embrace many different technical components. A patent may cover only one of these components. In such a situation, where an injunction would typically cover the entire standard (notwithstanding that the patented component is only a small part of the whole), the strategic value of a patent may far outstrip its intrinsic value since it could be used to hold hostage the entire standard. Granting an injunction in such a case may well over-reward the patentee, in effect granting far more economic power than the patent intrinsically merits. The situation may be compounded where the patentee (or assignee of the patentee) is a company set up explicitly to search out and leverage strategically valuable patents. Where such a patentee does no research and development work, contributes nothing of value to technical progress, or does not itself make and market an actual product, as with the *eBay* plaintiff, courts should be especially wary of granting an injunction.

Second, the plaintiff must demonstrate “that remedies available at law . . . are inadequate to compensate for [the] injury.”¹²⁸ In the standards context, this will usually not be the case. An ongoing royalty payment or damage award will typically be more than adequate to compensate the patentee. This is best demonstrated by the fact that so many patentees routinely accept a running royalty for all users of a standard.¹²⁹

Third, the plaintiff must show that “considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted.”¹³⁰ Enjoining an open standard would likely cause considerable hardship to the industry due to lock-in and high switching costs.¹³¹ Moreover, an injunction against a particular adopter of a standard would unfairly burden that standard adopter in relation to the rest of the industry.¹³² As mentioned earlier, because a standard is naturally limited in scope, it probably does not compete directly with the plaintiff’s business, further weighing against the necessity of injunctive relief.

126. *Id.* at 391.

127. *Paice, L.L.C. v. Toyota Motor Corp.*, No. 2:04-CV-211-DF, 2006 U.S. Dist. LEXIS 61600 (E.D. Tex. Aug. 16, 2006).

128. *eBay*, 547 U.S. at 391.

129. *See, e.g.*, text accompanying *supra* note 7 (discussing National’s original deal to license its Ethernet technology for a one-time fee of \$1,000 for any adopter).

130. *Paice*, 2006 U.S. Dist. LEXIS 61600, at *4.

131. *See supra* Part I.B.

132. *See Paice*, 2006 U.S. Dist. LEXIS 61600.

Fourth, the plaintiff should demonstrate that a permanent injunction would not harm the public interest.¹³³ Of the four *eBay* factors, this most clearly weighs against the patent holder's right to injunctive relief in the standards context. Since interoperability is sometimes one of the chief benefits of software products, and since adoption of a given technology can result from network effects,¹³⁴ enjoining a standard that the industry requires to function can only harm the public interest.

The four equitable factors for determining whether injunctive relief is warranted will thus often weigh strongly against enjoining the use of a well-established industry standard. Even when warranted, an injunction should be carefully crafted to give the industry sufficient time to switch standards. Otherwise standards adopters would likely be at an extreme disadvantage in licensing negotiations due to the presence of lock-in.

b. Damages and Ongoing Royalties

For several reasons, courts should also take extra precautions in calculating damages and ongoing royalties for open standards that infringe patents. First, accurate damages are likely lower in suits involving an industry standard than in traditional enforcement suits. Second, though the industry might be willing to pay a higher ongoing royalty rate than is actually fair due to the presence of lock-in, courts should not allow patentees to impose such high rents by means of damages in lawsuits.

Some standards are only viable when they are royalty-free and adopted by the industry explicitly on this condition.¹³⁵ Moreover, standards are often conventions as much as technological breakthroughs. That a particular technology has developed to the point where an industry can agree on its general implementation suggests that the technology may not uniquely serve a particular function. Hence, alternatives often existed before network effects and lock-in took over. Under *Grain Processing Corp. v. American Maize-Products Co.*, an infringer can argue that he would have chosen a non-infringing technology instead had he known the technology adopted infringed the patent.¹³⁶ Thus, the defendant should have the benefit of that retrospective information, which means that any damages should be calculated in relation to other options available at the time. In the standards context, network effects mean that the choice to adopt different technology typically may not have been available to a particular standards adopter, even though it was available to the industry as a whole. An accurate damage calculation is thus likely to produce lower royalties than what would otherwise result from infringement outside the

133. *eBay*, 547 U.S. at 391.

134. *See supra* Part I.A.

135. *Id.*

136. 185 F.3d 1341 (Fed. Cir. 1999).

standards context.¹³⁷

A similar analysis should apply in calculating an ongoing royalty. Courts should look to see whether free or low-cost standards are available as a substitute for the patented standard at issue. Also, courts should not allow patent holders to take advantage of high switching costs to impose inordinately high ongoing royalties.

C. Practical Application of Standards Estoppel

In analyzing an infringer's assertion of standards estoppel as an affirmative defense, courts should first determine whether the industry, by adopting an ostensibly open standard, has relied on the patentee's promises of openness.¹³⁸ If so, then the analysis should end there, and courts should refuse to enforce the patent against the standard.¹³⁹ An affirmative promise gives rise to a *per se* affirmative defense of standards estoppel because patentees should not be able to benefit from industry adoption and then withdraw the benefit of the bargain once lock-in effects have set in.¹⁴⁰

In the absence of an affirmative promise, the analysis becomes more nuanced. Courts should focus first on the behavior of the industry in promulgating and adopting the standard, then on the economic characteristics of the standard itself, and finally on the behavior of the patentee. We discuss these three factors and their effects on the available remedies below.

1. The Behavior of the Standard Promulgators

First, standards estoppel should be available as an affirmative defense only if the standard promulgators labored under a good faith belief that the standard did not infringe a patent. Because of the multitude of software patents, courts should recognize only "real threats" of infringement as overcoming this presumption of good faith. Real threats fall into one of two categories: (1) standard promulgators who know that the standard likely infringes a particular

137. Patentees are entitled to lost profits as a measure of damages if lost profits can be proven to a reasonable certainty, but damages should be "in no event less than a reasonable royalty." 35 U.S.C. § 284 (2000). However, the nature of most standards (i.e., broadly adopted but limited in scope) suggests that lost profits will usually be an inappropriate measure of damages as well as nearly impossible to calculate. Moreover, courts should take care when calculating reasonable royalty to avoid overcompensating patentees given the potentially far-reaching effects on the industry. *See, e.g.*, Mark Lemley, *Distinguishing Lost Profits from Reasonable Royalties 2* (Stan. Pub. Law & Legal Theory Working Paper Series, Paper No. 1133173), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1133173 (arguing "that courts have distorted the reasonable royalty measure in various ways, adding 'kickers' to increase damages, artificially raising the reasonable royalty rate, or importing inapposite concepts like the 'entire market value rule' in an effort to compensate patent owners whose real remedy probably should have been in the lost profits category").

138. *See supra* Part III.B.1.

139. *Id.*

140. *Id.*

patent; and (2) standard promulgators who know that the standard may infringe a particular patent, where the patentee has provided sufficient notice and cause for the standard promulgators to have standing in a declaratory judgment action to resolve the ambiguity should they choose to do so.¹⁴¹ This factor recognizes that the industry's ability to promulgate standards without undue fear of patents lurking around the outskirts of a standard is vital. To ensure that ability, the patentee should either provide clear and early notice of infringement or else risk losing her chance to exact infringement damages from the standard later.

Second, standard promulgators must provide adequate notice and description of the standard to industry members and those whom promulgators reasonably believe or should know may have a relevant patent. Under this factor, an SSO or single company¹⁴² that promulgates a standard has an advantage over distributed promulgators of a de facto standard since a single entity can clearly define and publicize a standard, providing notice of its existence to any reasonably alert patentee.¹⁴³ The patentee will then be responsible for ascertaining whether a standard infringes. Moreover, it is easier to target, notify, or file an early infringement suit against a single promulgator before lock-in and network effects take over than it would be to take such action against a diffuse group of distributed promulgators. However, adopters of well-known, clearly defined de facto standards should not be excluded from recourse to a standards estoppel defense under this factor since patentees, who are usually industry participants, will often have entirely adequate notice of the development of de facto standards.

Third and finally, adoption of a different, non-infringing standard by the standard promulgators must have been possible had the promulgators known that the standard was infringing. Otherwise, if the industry had no other real options, then the earlier ignorance of the patent did not place the industry in a materially worse position. For example, standards estoppel would not prevent standards adopters from infringing a patent that was directed to *any* method of achieving a specific technical result, although it could protect against infringing a patent that was directed to a *particular* method of achieving that result. Whether licensing of other patents would have been required for the alternative technologies is irrelevant. The point is not the elimination of costs to the industry, but rather the awareness of costs up front and the ability to negotiate them ex ante rather than paying damages ex post.

Of course, infringing standards adopters will claim that there are

141. The ability to proceed in a declaratory judgment action is no longer a very high bar. *Medimmune, Inc. v. Genentech, Inc.*, 546 U.S. 1169 (2006).

142. For example, Sun is the guardian of the Java programming language, while Adobe has promulgated its PDF standard.

143. A normal standard-setting process will usually provide notice sufficient to meet the requirements of standards estoppel. Standard-setting is usually a lengthy process involving many actors and by nature involves publicizing the standard.

alternatives to every technology, while patentees will claim that the very nature of patents implies the uniqueness of the technology at issue. These theoretical arguments will typically fall to a practical analysis of the standards adoption process. In particular, situations where several viable technologies competed for adoption¹⁴⁴ or the standard represented a somewhat arbitrary choice rather than a technological advance¹⁴⁵ represent easy cases where alternative technologies were available. By contrast, a standard that covers a recent technological breakthrough is an unlikely candidate for standards estoppel. However, cases in which alternative technology is unavailable would seem to be rare as the very nature of standard setting entails defining a particular approach among many possible approaches.

2. The Economic Characteristics of the Standard

Standards estoppel should apply only to those situations where standards adopters are locked in due to high switching costs.¹⁴⁶ Switching costs should be evaluated not with respect to a particular infringer but rather with an eye to the net cost of all adopters switching to a non-infringing technology. Net costs may include both the direct costs of switching and secondary costs, such as promulgating an alternative standard that uses the alternate technology. The costs are high if switching to an alternate technology at the time of the infringement lawsuit is significantly more burdensome than it would have been to adopt alternate technology when the infringing standard was originally promulgated. This cost analysis thus mirrors the economic prejudice prong of equitable estoppel, but is applied to the industry in the aggregate.

Switching costs will typically be higher in the presence of network effects, which are present under both of two conditions. First, the defendant is only one of many adopters of the standard. Second, moving to a less prevalent, non-infringing technology would constitute a significant burden to the infringer because the benefits of using a technology also used by many others are lost.

3. The Behavior of the Patentee

Absent an affirmative promise, the patentee's behavior should assume only marginal importance. The important feature of standards estoppel is the safe harbor provided to those who adopted standards publicly, openly, and in good faith, even if that safe harbor lessens a patentee's right to exclude.

144. For example, the early computer industry could have adopted IBM's token ring, the open Ethernet standard, or possibly several other technologies as a networking protocol, but it settled on the Ethernet protocol. Urs von Burg, *supra* note 20.

145. Just as the choice of precisely what volume constitutes a liter is largely arbitrary though driven by some practical considerations, certain standards in the software industry, such as transfer protocols, are composed of many arbitrary decisions. For these standards, the primary value is not in a technological advance but rather than everyone agrees.

146. See *supra* Part II.

However, evidence that the patentee strategically acquired a patent in order to assert it against an industry standard should tip the scales in borderline cases in favor of standards estoppel.¹⁴⁷ Prime examples of such bad behavior are buying patents in bankruptcy, purchasing patents under false pretenses, or concealing the existence of patents, all with the proven intention of asserting them against a standard once the industry could not practically switch. Here, courts should use their discretion to determine whether the patentee is unfairly seeking rent.

Whether the standard arose *de facto* or through promulgation by an SSO, whether only one or several standards gained widespread adoption, whether the standard was entirely open or partially closed, or whether the standard was proprietary or non-proprietary are factors largely irrelevant to this inquiry. The key consideration is reasonable industry reliance on a degree of open access to a standard—reliance that was violated by an unexpected infringement suit that threatens significant costs due to lock in of the standard.

4. The Effects on Remedies

An infringement suit of the snake-in-the-grass or bait-and-switch types as described in Parts II.A and II.B should give rise to standards estoppel, in turn preventing the granting of an injunction. Standards estoppel works under a principle similar to equitable estoppel to deny the plaintiff an inequitable injunction. However, in contrast to equitable estoppel where an action by the defendant is required, no affirmative act by the patentee is necessary; the widespread adoption of a standard sufficiently proves that the patentee should have known of the infringement. Because the costs to industry of switching from a well-settled standard are so high, imposing an affirmative duty on the patentee to take action before industry lock in is reasonable. Furthermore, a lone firm should not be singularly enjoined from practicing an industry standard, particularly as the standard arose through the actions of the industry as a whole. Denying grants of inequitable injunctions against standards is vital for the growth and development of the software industry and is in line with recent Supreme Court precedent that realigns the remedy of patent injunctions with its equitable roots.¹⁴⁸

In most cases, however, the patentee seeks royalties rather than an injunction. This allows the value of the standard to continue increasing, as the value is linked with a standard's widespread adoption and effectively enhanced by each new adopter, not created by the patentee. A court finding standards estoppel applicable would limit or eliminate the availability of damages (including royalties), thus preventing patentees from misappropriating this value.

The limitation on damages is similar in principle to laches, but with

147. *See supra* Part III.B.2.

148. *See* eBay v. MercExchange, 547 U.S. 388 (2006).

several key differences.¹⁴⁹ First, is a matter of timing: the clock for a standards estoppel defense starts when the standardized technology is adopted, not when the patentee becomes aware of infringement as in laches. This can be important if, for instance, a new patent that reads on a well-established standard is issued. Second, the time period necessary to bar an award of damages must remain flexible and reflect the needs of the industry. While theoretically flexible, laches effectively functions as a statute of limitations for patent law with a fairly strict six year bar. Under standards estoppel, however, industry lock-in would prohibit damages as soon as it occurs. The software industry's efforts to establish standards with some degree of openness demonstrates that monopoly rents on powerful network goods can be too high a price to pay. Patent law should not extract from the industry ex post a level of rent vastly above what the industry would have been willing to pay prior to adoption of the standard.

D. The Duration of the Implied License From Standards Estoppel

1. Assignment

In order to provide meaningful protection to good-faith standards adopters, standards estoppel should not terminate upon assignment of a patent. Otherwise, a patentee could entirely circumvent the defense by assigning the patent to a third party who could choose to enforce despite the reliance interest established by standards adopters. Standards estoppel is based on the reasonable expectations of standards adopters with respect to a particular patent, not with respect to the owner of the patent at any given time.¹⁵⁰ As will be discussed in this Part, the state of the law with respect to implied licenses after assignments is somewhat unclear. But questions that arise from the law of implied license should be irrelevant since standards estoppel parallels the logic of laches and equitable estoppel—doctrines that provide ample ground for extending the protection even after an assignment.

Patent licenses are contractual arrangements. A patentee who assigns a patent that is subject to an ongoing licensing obligation and who is unable to fulfill the terms of that license is in violation of the licensing contract. The

149. The topic of laches will be discussed in more depth in Part IV.B, *supra*. As will be discussed in that Part, fairly rigid requirements that must be met to successfully assert a laches defense to patent infringement, despite its equitable nature. However, the basic principles of laches—significant harm caused by unjust or unreasonable delay in filing suit—provide fertile ground for new ways to protect those who unintentionally infringe the rights of others. *See generally* Jason R. Swartz, Comment, *When the Door Closes Early: Laches as an Affirmative Defense to Claims of Copyright Infringement*, 76 U. Cin. L. Rev. 1457 (2008) (arguing that the Supreme Court should hold the doctrine of laches applicable to copyright infringement, thus resolving a circuit split).

150. Standards estoppels can be seen, then, as creating a right that “runs with the patent,” or more properly with adoption of a patented technology, and is not dependent on a relationship with a particular patent owner. In this respect patent ownership becomes an *in rem* right.

assignee of the patent may or may not be subject to the licensing obligation, depending primarily on whether the assignee has notice of the license agreement. The result is not so clear with implied licenses, which arise when the patent owner's behavior implicitly authorizes use of the patented technology. Because courts typically hesitate to recognize implied licenses and even then construe them narrowly, cases in which an assignee sues the beneficiary of an implied license from the assignor (likely a potential customer) are rare. Such a case would raise difficult questions, such as the extent to which the assignee should be charged with notice of the implied license.

Standards estoppel resolves these difficulties. Under general principles of equitable estoppel, the holder of the right is estopped from asserting the right at any time after the relying party changes his or her position in reliance on the rightholders' assurances.¹⁵¹ The purpose of a robust estoppel doctrine would be frustrated if assignment could void the estoppel. Moreover, the scope and duration of an implied license depend on the circumstances that created the license.¹⁵² The nature of standards estoppel suggests that the scope of the license should extend to the standard in question and the duration should be indefinite, extending to include the life of any relevant patents involved.

A comparison to laches, a more clearly defined area of law than implied licenses, further helps illustrate the need for standards estoppel to survive patent assignment. In laches, "[i]t is well-settled" that in determining the length of delay, a transferee "must accept the consequences of the dilatory conduct of immediate and remote transferors."¹⁵³ A patentee cannot evade laches by assigning the patent. "While this rule may operate harshly on good faith purchasers, the primary purpose of the laches doctrine is to protect accused infringers from stale claims."¹⁵⁴ By analogy with laches, then, it is quite clear that the user rights created by standards estoppel ought to survive a patent assignment.

This result is also supported by the structure of patent assignment recordation rules. Patent assignees may record patent assignments with the United States Patent and Trademark Office ("USPTO"). Under 35 U.S.C. § 261, unrecorded assignments are void after three months against subsequent bona fide purchasers. One effect of this rule is that it places on an assignee the burden of investigating whether a patent has already been assigned to someone else; a subsequent assignee is on constructive notice of a prior assignment that has been recorded.¹⁵⁵ Although patentees may record licenses, this is not

151. See generally *infra* Part IV.A.

152. See *Carborundum Co. v. Molten Metal Equip. Innovations, Inc.*, 72 F.3d 872, 878 (Fed. Cir. 1995).

153. 6 Donald S. Chisum, *Chisum on Patents* § 19.05[2][a][ii] (2007).

154. *Id.*

155. See generally Alice Haemmerli, *Insecurity Interests: Where Intellectual Property and Commercial Law Collide*, 96 Colum. L. Rev. 1645, 1701 n.282 (1996) (describing patent recordation statute as a "notice" rule as opposed to "race-notice" rule).

statutorily required. All patent assignees take their patents subject to prior licenses whether or not those licenses are recorded.¹⁵⁶ It is not clear from the established legal authorities whether the assignee of a patent subject to an implied license takes it explicitly subject to that implied license. But the structure of rules governing patent assignment bespeaks a clear norm under which the burden is on assignees to make inquiries as to pre-existing behavior that would give rise to any limitation on a patent received by the assignee.

Standards estoppel should follow this norm. Patent assignees should take their patents subject to—rather than free of—any reliance interests created by the behavior of the assignor or licensor. Of course, the assignee and assignor could contract for a private remedy, such as a warranty that the assignor has not engaged in activity that would give rise to standards estoppel. This allocation of the burden both prevents patentees from evading the restrictions of standards estoppel by assigning a patent and protects an assignee against the risk that a patent is subject to standards estoppel.

2. Bankruptcy

Bankruptcy is a more difficult case than assignment for the standards estoppel doctrine because bankruptcy law often permits estates to either assume or reject IP licenses.¹⁵⁷ When a licensor enters bankruptcy, “[t]he licensee loses continued use of the licensed intellectual property and is left with a pre-petition claim for contract damages.”¹⁵⁸ If bankruptcy courts categorize use of patented technology permitted by standards estoppel as a license, then standards adopters could unexpectedly and unfairly lose their safe harbor through no fault or action of their own.

Even more worrisome is the fact that a bankruptcy estate has far different interests than did the original company. Bankruptcy estates have a fiduciary duty to the company’s creditors and have incentives to maximize short-term profits at the expense of long term relationships. When the only significant assets remaining in a company’s possession are IP, litigation becomes an attractive course of action.¹⁵⁹ Thus, although a company like Adobe has every reason to avoid litigation when its business model for PDF is built primarily on reputation and trust, this behavior might change if the company fell on hard times and entered bankruptcy proceedings. Indeed, the fiduciary duty to creditors might give the bankruptcy estate little choice but to extract rents and sue for infringement wherever possible.

156. *Sanofi, S.A. v. Med-Tech Veterinarian Prods., Inc.*, 565 F. Supp. 931, 940 (D.N.J. 1983).

157. See Peter S. Menell, *Bankruptcy Treatment of Intellectual Property Assets: An Economic Analysis*, 22 Berkeley Tech. L.J. 733 (2007).

158. *Id.* at 769.

159. See Elizabeth Montalbano, *Novell Won't Pursue Unix Copyrights*, PCWorld.com, Aug. 15, 2007, <http://www.pcworld.com/article/id,135959-c,unix/article.html>.

Bankruptcy would thus become an attractive target and leave a large loophole in the doctrine if it terminated standards estoppel. The need for standards estoppel to persist through and beyond bankruptcy proceedings is similar to the need for it to persist through assignment, as discussed in the previous Part. When the patentee's action (or inaction) gives rise to a user's reasonable expectation that he may continue his use unmolested, courts should not vitiate this reliance interest merely because the patent changes hands or the patentee enters bankruptcy.

The key issue in a bankruptcy proceeding concerning IP is categorizing the contractual relationships involving the IP. The debtor's real property and chattel automatically enter the bankruptcy estate.¹⁶⁰ In contrast, completed sales are excluded from the bankruptcy estate.¹⁶¹ IP licenses fall in between and are categorized as "executory contracts" that "may constitute net assets or net liabilities of the estate," depending on the contractual obligations that remain unfulfilled.¹⁶² Protection by way of standards estoppel, as with an implied license, does not reflect the type of ongoing relationship between the parties that should be categorized as an executory contract. Protection by way of standards estoppel is more like a completed sale that a bankruptcy court should treat as final. In a manner similar to adverse possession or promissory estoppel, standards adopters build up a property-like reliance interest in use of the patented technology. Compromising that interest in bankruptcy would be at odds with the fundamental purpose of standards estoppel, namely to provide a safe harbor for good faith standards adopters.

Bankruptcy courts could classify standards estoppel as a form of irreversible asset depreciation, like a sale. If the patented technology was treated as if it had been adversely possessed, such as in a snake-in-the-grass scenario, then the patentee waives ownership over the IP. In this case, the bankrupt patentee cannot regain ownership over the patent any more than a bankrupt real estate owner could regain possession of adversely possessed land. If instead standards estoppel arises through promises of openness, as in a bait-and-switch strategy, then the patentee permanently reduces the value of the patent in exchange for industry adoption. Again, the deal is done and the option of renegeing should not be available to the bankruptcy estate.

Alternatively, bankruptcy courts could categorize standards estoppel as an implied license. Here, too, the implied license obligation should survive a bankruptcy filing for public policy reasons. Although obligations that survive bankruptcy for public policy reasons are rare in bankruptcy law, they certainly exist. For example, child support obligations and most taxes are categorized as priority debts that are non-dischargeable because they have complex ethical,

160. Menell, *supra* note 157, at 754.

161. *Id.*

162. *Id.*

social, and public implications that transcend the merely commercial.¹⁶³ Standards estoppel is similar. The doctrine of standards estoppel is necessary not to punish the patentee for bad behavior, although bad behavior will often be present. Rather the doctrine is necessary to protect market participants who adopted a standard with a good-faith belief that the standard was open and who now can only switch with considerable expense. The finances of a particular patentee are therefore irrelevant, as in the case of priority debts.

IV

A COMPARISON WITH EXISTING DOCTRINES IN PATENT LAW

Existing doctrines fail to squarely address the bait-and-switch or snake-in-the-grass problems discussed in Part II.¹⁶⁴ Traditional estoppel can excuse continued infringement but is even more difficult to prove than laches because it requires affirmative conduct by the patentee. Laches is triggered by a patent holder's delay in filing suit, but the formalistic structure of a laches defense is difficult to align with the software industry's specific needs. The patent misuse doctrine prevents patentees from deploying patents for anticompetitive ends, but antitrust-like abuses of licensing, market power, and tying arrangements typify its case law, rather than cases of strategic delay in filing suit.

Standards estoppel fills this gap. This doctrine combines the triggering events of laches (a delay in filing suit) and estoppel (conduct by the patentee) with the policy rationale of discouraging patent misuse (strategic, anticompetitive uses for which patents were not intended). The equitable considerations that tilt heavily away from injunctions, high damages, or royalty payments also give the standards estoppel doctrine a flavor reminiscent of adverse possession.¹⁶⁵ Ultimately, the key difference between standards estoppel and traditional patent defenses is that standards estoppel protects an entire class of infringers—all present and future adopters of a particular standard—as opposed to simply protecting an individual standards adopter. This wider protection is vital to protecting the reliance interest established by use of the standard.

163. See 11 U.S.C. §§ 507(a)(1), 507(a)(8), 523(a)(1), 523(a)(5) (2000 & Supp. V 2007). In a similar vein, student loans are dischargeable only for "undue hardship," although they are classified as non-priority debts. See *id.* § 523(a)(8) (Supp. V 2007).

164. For a related analysis of a specific patent non-assertion pledge, see Bryan James Mechell, *Understanding Patent Non-Assertion Agreements: The Enforceability of Microsoft's Open Specification Promise*, 36 AIPLA Q.J. 179, 199 (2008) (describing limitations of conventional equitable estoppels and laches doctrines).

165. However, unlike actual adverse possession, standards estoppel does not convey ownership of the core right at issue (i.e., the right to exclude) to the infringer of that right. See, e.g., Amie N. Broder, Student Note, *Comparing Apples to APPLs: Importing the Doctrine of Adverse Possession in Real Property to Patent Law*, 2 NYU J.L. & Liberty 557 (2007) (arguing that in certain situations, infringers should actually acquire the patent infringed).

A. Compared to Equitable Estoppel

Under equitable estoppel, an infringer can escape liability entirely if he both relied upon the patentee's representations that the patent would not be enforced and his reliance harmed him in a significant or material way. As with laches, certain features of equitable estoppel, namely its equitable nature and emphasis on reliance interests, suggest it could be useful in the standards context. However, equitable estoppel has inherent limitations that preclude its effectiveness against snake-in-the-grass or bait-and-switch tactics. The primary defects are its requirements of: (1) misrepresentation by the patentee to the infringer; (2) reasonable reliance on those promises by the infringer; and (3) material reliance. Good-faith standards adopters need complete protection from unfair and anticompetitive patent enforcement, and equitable estoppel does not provide this. To see why, we examine the elements of equitable estoppel in the following Parts.¹⁶⁶

1. Misrepresentation

Estoppel requires some communication or representation by the patentee regarding the infringing products.¹⁶⁷ In *A.C. Aukerman Co. v. R.L. Chaides Construction Co.*, plaintiff Aukerman set a deadline for defendant Chaides to license Aukerman's patent or risk suit.¹⁶⁸ Chaides declined to take a license, and nine years later Aukerman filed suit. The district court granted summary judgment for Chaides on the ground that Aukerman's actions gave rise to equitable estoppel.¹⁶⁹ The Federal Circuit reversed, finding genuine issues of material fact as to misrepresentation and reliance.¹⁷⁰

The appellate court held that the issue in misrepresentation is whether the patentee's conduct reasonably gave rise to an inference that the patent would not be enforced.¹⁷¹ The court also held that "silence alone will not create an estoppel unless there was a clear duty to speak" or the silence reinforced the inference that the defendant would not be sued.¹⁷² At a minimum, then, the misrepresentation element of equitable estoppel requires some communication or relationship between the parties, since the infringer must know of the relevant patent in order to reasonably infer that the patentee acquiesced in the allegedly infringing activity.¹⁷³

The type of misrepresentation required for equitable estoppel is—

166. Since material reliance is also a requirement for laches and will be covered in Part IV.B.3, *infra*, here we focus on the first two elements of equitable estoppel.

167. *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419 (Fed. Cir. 1997).

168. 960 F.2d 1020, 1043 (Fed Cir. 1992).

169. *Id.*

170. *Id.* at 1044.

171. *Id.* at 1043.

172. *Id.* at 1043-44.

173. *Id.* at 1042-43.

surprisingly—often lacking in the bait-and-switch tactic. Patentees often file suit against standards adopters who had no relationship with the patent holder. Thus, even if the patentee has made representations to specific members of a standard-setting body, late-comers or industry members outside the body could remain liable. There seem to be no cases where a court has treated statements made to the industry as a whole as creating a relationship giving rise to misrepresentation for the purposes of equitable estoppel.

In the snake-in-the-grass scenario, misrepresentation is entirely absent. Here, the patentee's strategy is to lie in wait until the infringer is locked in to the patented technology. In most snake-in-the-grass situations, the owner of the as-of-yet-unknown patent does not participate in the standard-setting process at all and thus never promises that he does not own a patent that touches upon the standard. The harm here is caused by silence, rather than an affirmative misrepresentation.

Standards estoppel modifies the direct relationship requirement for misrepresentation. Instead of requiring a direct relationship between the patentee and a particular infringer, the standards estoppel doctrine looks for a relationship between the patentee and the industry as a whole. Either promises of openness or a long period of silence, in the face of an industry standard that infringes a patent, should create a relationship. Because software is a network market, analytically isolating a particular standards adopter in the vacuum of infringement litigation makes no sense.

2. Reasonable Reliance

Successfully evading liability by asserting equitable estoppel requires the infringer to prove he reasonably relied upon the patentee's misleading conduct. "To show reliance, the infringer must have had a relationship or communication with the plaintiff which lulls the infringer into a sense of security in going ahead."¹⁷⁴ Moreover, the infringer must prove a nexus between its infringement and the patentee's waiver.¹⁷⁵

Infringers have successfully raised an equitable estoppel defense in suits involving industry standards, but the patentees typically had participated in the standards process and made representations of openness. For example, in *Wang Laboratories v. Mitsubishi Electronics America*, Mitsubishi successfully argued for equitable estoppel, resulting in an implied license, based on Wang's promotion of a standard through the JDEC SSO.¹⁷⁶ Similarly, the FTC limited

174. *Id.* at 1043.

175. *Stickle v. Heublein, Inc.*, 716 F.2d 1550, 1559 (Fed. Cir. 1983); *see generally* *Qualcomm, Inc. v. Broadcom Corp.*, No. 2007-1545 (Fed. Cir. Dec. 1, 2008), *available at* <http://www.cafc.uscourts.gov/opinions/07-1545.pdf> (implied waiver doctrine prevents patentee from enforcing patents that were not disclosed during standard setting proceedings, a version of the snake-in-the-grass strategy described in this Article).

176. *Wang Labs., Inc. v. Mitsubishi Elecs. Am., Inc.*, 103 F.3d 1571, 1580 (Fed. Cir.

the extent to which Rambus can enforce its standards-relevant patents based on deception in the standards setting process.¹⁷⁷ However, this ruling antedated a finding of fraud and failure to disclose pending patent applications despite an affirmative duty to disclose these applications.¹⁷⁸ Equitable estoppel thus offers only limited protection to good-faith adopters, applicable *after* a patentee has made promises of openness to a standards body and *only* to adopters who participated within the standards body.

Reliance is different in network markets. Most standards adopters typically do not rely on promises directly from the patentee. Instead, an open standard is usually promulgated, at least in part, based on promises of openness to a subset of industry participants. Then, industry participants who may not have yet participated in the standard-setting process (and to whom no promises have been made) ‘join the bandwagon’ and adopt the standard, sometimes because they have little choice in a network market. Thus, the patentee is often once removed from the infringer, diffusing the original privity arising from the patentee’s promise.

Standards estoppel tweaks the ideas of privity and reliance by treating a patentee’s pledges of openness to the industry as binding, which is justified by the value that the patentee garners in exchange for openness. Reliance differs in network markets because the entire industry, rather than just the particular players who arranged the standard, rely on either silence or promises of openness to adopt a standard. ‘But for’ the reasonable belief in an open standard, the industry would have likely adopted a different technology. Standards estoppel modifies the estoppel doctrine by updating the definition of misrepresentation and reliance to accommodate modern technology practices.

B. Compared to Laches

If no misrepresentation is present, standards estoppel falls back on a laches doctrine, the element of unreasonable delay again modified to account for the fast-paced software industry. Under laches, an infringer can partially escape liability if the patentee unreasonably and inexcusably delayed filing a suit after the patentee knew or should have known of the claim against the defendant and that delay harmed the infringer in a significant or material way.¹⁷⁹ The length of time necessary to establish a laches defense is not

1997). The *Wang* case was decided under conventional equitable estoppel principles, but it is important to point out that the doctrine espoused in this Article goes further. The facts in *Wang* show a direct relationship between patentee Wang and standards adopter Mitsubishi, together with very substantial reliance investments by Mitsubishi; the doctrine of standards estoppel described in this Article would apply even where no direct contractual relationship exists, and even where the reliance of the standards adopter is less substantial than that in *Wang*.

177. *Rambus, Inc. v. Infineon Techs. AG*, 318 F.3d 1081, 1084 (Fed. Cir. 2003), *cert. denied*, 540 U.S. 874 (2003).

178. *Id.*

179. *Intirtool, Ltd. v. Texar Corp.*, 369 F.3d 1289, 1297 (Fed. Cir. 2004) (citing A.C.

precisely fixed,¹⁸⁰ and courts will “weigh[] the equities in order to assess whether laches should apply to bar those damages that accrued prior to suit.”¹⁸¹ A patentee can overcome the laches defense, however, by providing a valid excuse for the delay in filing suit.¹⁸²

Although certain features of the laches defense suggest it could be useful in the standards context—particularly its equitable nature and its emphasis on the “reliance” of accused infringers¹⁸³—the laches doctrine has inherent limitations that prevent it from being a full and effective solution to either the snake-in-the-grass or the bait-and-switch tactic. There are three primary defects. First, laches only *limits damages* to the post-laches period, rather than completely barring any remedy against an infringer, leaving standards adopters still open to liability.¹⁸⁴ Second, laches operates only when a patentee knew or should have known of a *particular* infringer’s infringing activity, which means that laches cannot fully protect a group of standards adopters. Third, infringers may have difficulty satisfying the “material prejudice” requirement, as it may be hard for them to present persuasive evidence that they adopted a standard *specifically* in reliance on the patentee’s actions or statements rather than for other reasons (such as the technical superiority of the standard). Thus, laches fails to provide true safe harbor, a legal rule that would fully shield good-faith standards adopters from unexpected and unfair legal liability. To see why laches fails, we consider each of the doctrine’s major elements in the Parts that follow.

Aukerman Co. v. R.L. Chaides Construction Co., 960 F.2d 1020, 1028 (Fed. Cir. 1992)).

180. Ecolab, Inc. v. Envirochem, Inc., 264 F.3d 1358, 1371 (Fed. Cir. 2001).

181. State Contracting & Eng’g Corp. v. Condotta Am., Inc., 346 F.3d 1057, 1065 (Fed. Cir. 2003).

182. See, e.g., Vaupel Textilmaschinen KG v. Meccanica Euro Italia S.P.A., 944 F.2d 870, 877 (Fed. Cir. 1991) (holding that the patentee’s delay was excusable because the patent owner was engaged in reissue proceedings in which the infringer participated).

183. One recent development in laches case law that parallels how standards estoppel should function was the subject of *Serdarevic v. Advanced Med. Optics, Inc.*, 532 F.3d 1352 (Fed. Cir. 2008). Under *Serdarevic*, the time period for laches is not reset upon reexamination of a patent if reexamination does not change the possibility of plaintiff’s claim. Similarly, if a patentee could conceivably sue standards adopters before reexamination, then reexamination should not reset the time period for standards estoppel. In both cases, the claims could conceivably be amended to eliminate the cause of action during reexamination. However, in the absence of evidence of a change in a potential claim, reexamination should not have any bearing on equitable bars to remedies for infringement.

Of course, this development does not help in situations where the patentee had no claim against the standard before reexamination but then amended the claims in order to relate to the standard. However, the bar against broadening claims in reexamination offers some protection here. Such activity on the part of patentee would also likely fall into the category of bad faith acquisition, discussed in Part III.B.2.b, *supra*.

184. “In patent cases, when applied, laches bars only pre-filing damages; it will not bar post-filing damages or injunctive relief.” *Lucent Techs. Inc. v. Gateway, Inc.*, 470 F. Supp. 2d 1187, 1190 (S.D. Cal. 2007) (citing *Aukerman*, 960 F.2d at 1040).

1. Remedies Limited to Post-laches Period

Even when successful, a laches defense does not eliminate damages but rather only limits them to the post-laches period.¹⁸⁵ Thus, in network situations where infringement is ongoing and widespread, damages begin to accrue once the patentee files suit.¹⁸⁶ Laches also offers no protection against injunctive relief.¹⁸⁷ “Mere delay or acquiescence cannot defeat the remedy by injunction in support of the legal right, unless it has been continued so long and under such circumstances as to defeat the right itself.”¹⁸⁸

Limiting remedies to the post-laches period insufficiently protects software standards. Patentees know that pre-suit damages for standards are often inconsequential compared to the possibility of a permanent injunction. If standards adopters had many equivalent, non-infringing alternatives—which is often the case—lost profit damages may be close to nothing. However, network effects and lock-in mean that the cost of switching to these alternate standards is often quite high. A patentee can therefore use an injunction, or even the threat of an injunction, to extract unreasonably high rents going forward. Thus it is probably no coincidence that Forgent ceased its attempts to enforce its patents against the JPEG standard soon after Forgent’s patent expired, since the availability of injunctive relief terminates with the expiration of a patent (even though damages for the pre-expiration period are still available).¹⁸⁹

When an industry has adopted a standard because the standard was either free or cheap to license, and thus widely available, a sudden rent imposed by a strategic patentee can wreak havoc. Presumably the industry was not prepared to pay the higher now-requested rent for the standard and would not have adopted it if the cost were clear at the outset. Moreover, the standard may be so widely adopted (such as in widely-used open source software, fundamental file formats, or common transfer protocols implemented all across the Internet) that most producers of infringing software could little afford to pay even those damages limited only to the post-laches period and would certainly be injured by injunctive relief. Patentees could thus use the threat of suit to impose high royalty rates upon these infringers. Because “more is required in the overall equities than simple laches if an alleged infringer seeks to wholly bar a patentee’s claim,” laches cannot offer standards adopters the full protection they need.¹⁹⁰

185. *Id.* at 1190 (citing *Aukerman*, 960 F.2d at 1040). But if the last infringing activity was before the laches period began, the plaintiff is entitled to no damages and is essentially barred from making their claim.

186. *Aukerman*, 960 F.2d at 1040-41 (citing *George J. Meyer Mfg. v. Miller Mfg.*, 24 F.2d 505, 507 (7th Cir. 1928); *Naxon Telesign Corp. v. Bunker Ramo Corp.*, 686 F.2d 1258, 1264 (7th Cir. 1982)).

187. *Id.*

188. *Id.* (quoting *Menendez v. Holt*, 128 U.S. 514, 523-24 (1888)).

189. *See supra* note 57 and accompanying text.

190. *Aukerman*, 960 F.2d at 1040.

2. Knowledge of a Particular Infringer's Activity

Courts refuse to permit a laches defense in the absence of actual or constructive knowledge of infringement.¹⁹¹ In *IXYS Corp. v. Advanced Power Technology, Inc.*, for example, APT asserted a laches defense when it was sued by IXYS for infringing IXYS's patent on a high-frequency power transistor design.¹⁹² IXYS responded by claiming that it had no knowledge of APT's infringement before 1998 and thus laches was inappropriate.¹⁹³

APT and IXYS competed within the field of semi-conductor devices and "presumably maintained at least a passing familiarity with each others' products and progress."¹⁹⁴ IXYS collected data sheets describing APT devices, and publications "describing the technical specifications of APT's products" were in circulation.¹⁹⁵ Moreover, the court held that:

It is undisputed that APT has been manufacturing dual-metal MOSFET devices that include an aluminum layer overlying the gate polysilicon layer (and otherwise bear a strong resemblance to the invention described in IXYS's patents) since long before 1996. In addition to its general awareness of these products, it appears that IXYS was testing APT's devices—at least for the purpose of characterizing them—as early as 1992.¹⁹⁶

However, the district court denied summary judgment on the laches defense because it found no evidence that IXYS had actually examined the composition of APT's devices in sufficient detail to determine infringement.¹⁹⁷ Therefore, APT failed to meet its burden of proving that IXYS either had actual knowledge of infringement or had a habit of conducting the kind of tests that would have led to such knowledge.¹⁹⁸ Despite IXYS's familiarity with and testing of APT's products, the court held that permitting a laches defense for the time period in question would be tantamount to unfairly "impos[ing] upon IXYS a requirement to 'polic[e] the industry.'"¹⁹⁹

If a defendant asserts the laches defense for a delay of fewer than six years, the defendant bears the burden of proving that the delay was unreasonable. In cases where the defendant is successful, the patentee typically takes some affirmative action that is inconsistent with a later enforcement action. In upholding a denial of laches in a different case, the Federal Circuit explained:

191. *Wanlass v. Gen. Elec. Co.*, 148 F.3d 1334, 1337 (Fed. Cir. 1998).
192. 321 F. Supp. 2d 1156 (N.D. Cal. 2004).
193. *See id.* at 1161.
194. *Id.* at 1161.
195. *Id.*
196. *Id.*
197. *Id.*
198. *Id.* (citing *Wanlass v. Gen. Elec. Co.*, 148 F.3d 1334, 1336 (Fed. Cir. 1998)).
199. *Id.* (quoting *Wanlass v. Fedders Corp.*, 145 F.3d 1461, 1465 (Fed. Cir. 1998) (substitution in original)).

Here, the patentee (1) “did not take an express position and then attempt to alter that position at a later time”, (2) “did not expressly threaten litigation and then delay bringing suit for several years”, and (3) “offered evidence of reasons (negotiating with his attorney, negotiating with other parties for licenses) for his delay.”²⁰⁰

Thus the requirement that a patent holder take affirmative action would often mean that laches provides no help for standards adopters.²⁰¹ In network markets, typically no relationship exists between a standards adopter and the patentee and the patentee has rarely examined a particular standards adopter’s products.

3. The Special Problem of Economic Prejudice

a. When Economic Prejudice Arises

To successfully assert a laches defense, an alleged infringer must demonstrate material prejudice, which requires proof of either evidentiary or economic prejudice. Evidentiary prejudice is a kind of harm not commonly suffered by standards adopters as it typically relates to the unavailability of witnesses or documents. Standards adopters are therefore usually limited to proving that they have suffered economic prejudice.

However, courts evaluating a laches defense typically do not recognize the particular type of economic prejudice that standards adopters suffer. Courts usually find economic prejudice only when the infringer invested and expanded production in reliance upon continued access to the infringing technology. The infringer must demonstrate a nexus “between the patentee’s delay in filing suit and the expenditures.”²⁰² That is, the infringer must show that he changed his position because of the patentee’s delay and that the sunk costs or damages “likely would have been prevented by earlier suit.”²⁰³

Courts generally do not view the cost of infringing as a form of economic prejudice. They tend to reject the argument that an infringer “was prejudiced

200. Chisum, *supra* note 153, §1905[2][a][iii] (quoting *Meyers v. Asics Corp.*, 974 F.2d 1304, 1307 (Fed. Cir. 1992)).

201. Laches may impose some duty on the patentee to police the market for infringement, but the precise extent of this duty is unclear. *See generally* Aaron B. Rabinowitz, *Keep Your Eye on Your Ball: Patent Holders’ Evolving Duty to Patrol the Marketplace for Infringement*, 5 *Nw. J. Tech. & Intell. Prop.* 192 (2007) (arguing that the Federal Circuit’s case law on the level of policing required under laches is inconsistent and proposing a new formulation of the duty to police). In any case, the duty to police under laches is insufficient to protect standards adopters against the strategic tactics discussed in this Article.

202. *State Contracting & Eng’g Corp. v. Condotta Am., Inc.*, 346 F.3d 1057, 1066 (Fed. Cir. 2003) (quoting *Hemstreet v. Comp. Entry Sys. Corp.*, 972 F.2d 1290, 1294 (Fed. Cir. 1992) and citing *Gasser Chair Co. v. Infanti Chair Mfg. Corp.*, 60 F.3d 770, 775 (Fed. Cir. 1995)).

203. *Id.* (citing *A.C. Aukerman Co. v. R.L. Chaides Construction Co.*, 960 F.2d 1020, 1033 (Fed. Cir. 1992)).

because it lost opportunities to avoid infringement at an early stage.”²⁰⁴ This is a major shortcoming of the laches doctrine in the standards context. The onset of lock-in due to network effects means that switching costs for network goods are significantly higher than switching would otherwise be for normal goods and costs generally increase as the standard becomes more entrenched. Thus, in the standards context, the “lost opportunit[y]”²⁰⁵ that is ignored as a cost in the laches context is often the most salient cost of all.

Likewise, regardless of investment by the infringer, courts typically deny laches when the infringer would have continued development and sales regardless of the patentee’s actions.²⁰⁶ If an infringer does not submit evidence that it has stopped selling an infringing product after a patentee filed suit, courts can infer that filing at an earlier time would not have caused the infringer to act differently.²⁰⁷ Of course, a firm that uses a standard can hardly afford to stop using that standard at the first sign of any lawsuit. The economic prejudice factor thus places the standards adopter in a dilemma: either (a) incur a significant competitive disadvantage relative to other firms by incurring high switching costs and dropping a standard that may not even ultimately be found to infringe or (b) lose the opportunity to assert a potentially valid defense.

Furthermore, courts evaluating a laches defense often assume that the defendant “takes his chances” with infringement if he has notice of the patentee’s claims.²⁰⁸ “[The] requirement [of proving economic prejudice] is almost impossible to meet when the accused infringer knew about the patent and received notice that it would face litigation if it persisted.”²⁰⁹ For instance, in *In Re Mahurkar*, the court noted that continued use in the face of knowledge of infringement amounted to gambling on the part of the standards adopter:

[N]othing about the timing of this suit affected [the infringer’s] conduct, let alone caused it to make expenditures in detrimental reliance on delay. [It] knew about the patent, knew [the patentee’s] position, knew the risks, and took them. It sought profit, and if it had been right in believing that [the] patents were invalid, it would have been entitled to the rewards of entrepreneurship. But [it] turned out to be wrong, so [the patentee] is entitled to damages. [The infringer] gambled and lost. Its risk-taking does not prevent [the patentee] from enforcing his statutory rights.²¹⁰

204. *Laitram Corp. v. Rexnord, Inc.*, 15 U.S.P.Q.2d 1161, 1164 (E.D. Wis. 1990), *rev’d on other grounds*, 939 F.2d 1533 (Fed. Cir. 1991).

205. *Id.*

206. *See Meyers v. Brooks Shoe, Inc.*, 912 F.2d 1459, 1463 (Fed. Cir. 1990).

207. *See Maxwell v. J. Baker, Inc.*, 875 F. Supp. 1371, 1390 (D. Minn. 1995), *aff’d in part, rev’d in part, vacated in part & remanded*, 86 F.3d 1098 (Fed. Cir. 1996), *cert. denied*, 520 U.S. 1115 (1997).

208. *See* text accompanying n.177 in Chisum, *supra* note 153, § 19.05[2][c][ii].

209. *In re Mahurkar*, 831 F. Supp. 1354, 1379 (N.D. Ill. 1993), *aff’d*, 71 F.3d 1573 (Fed. Cir. 1995).

210. *Id.* at 1380.

The court's reliance on notice to deny laches presents a significant problem for software standards. Patent-holding companies regularly give notice to standards adopters hoping to garner a quick settlement, even when, as is common in the software industry, the likelihood that the patent is both valid and infringed is quite uncertain. Moreover, as discussed above, a company using a widely-adopted standard cannot afford to stop at the first sign of trouble.

Finally, the speed of innovation in the software industry makes it difficult to prove economic prejudice in a way that would protect standards adopters. Although a presumption of material prejudice arises after six years, proving material prejudice after a lesser period can be difficult. Even a delay of two whole years after the infringer provided direct notice to the patentee that the product may be infringing could be insufficient to prove economic prejudice.²¹¹

b. The Types of Injury Recognized as Prejudice

Economic prejudice as defined in the laches context neglects two factors crucial to infringement actions against practitioners of industry standards. First, standards adoption includes investments not easily documented, such as time, effort, and indirect investments. Calculating the costs of standards adoption is similar to calculating expectation damages in contract law, which hinge upon causation and foreseeability—abstract ideas that are often difficult to apply in a specific case.²¹² This difficulty is exacerbated because the connection between a standard, a company's costs, and a company's profits are very real (owing to the interoperability function of standards) but also often quite diffuse or attenuated. Competitors often must agree to engage in a collaborative standard-setting process rather than compete between standards. Companies must then spend time and resources adopting standards, thus incurring a significant opportunity cost as those resources could have been directed to developing or implementing a different standard. Finally, companies typically rely on standards by developing or purchasing complementary goods. To put the issue more concretely: the aggregate industry investment cost for a standard as ubiquitous as, for example, Adobe PDF, quickly becomes incalculable.

The second factor for which traditional economic prejudice fails to account is that standards adoption typically consists of many small investments by a widely dispersed class of users. Most of these will necessarily not be named directly in an infringement dispute. As discussed in Part I.B, network

211. See, e.g., *Ecolab, Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1371-72 (Fed. Cir. 2001) (granting summary judgment against laches and estoppel defenses was not an abuse of discretion where plaintiff filed suit two years after an accused infringer sent plaintiff a notice of possible infringement). The district court found that the delay in filing suit in the case had produced no economic prejudice, and the infringer's expenses in introducing the new, infringing product were "merely business decisions to capitalize on a market opportunity." *Id.*

212. Joseph M. Perillo, *Corbin on Contracts: Damages* § 56.1 (rev. ed. 2005).

effects often result in broad-based standards adopted by the majority of the software industry. Thus, while any single firm may not suffer from economic prejudice, the software industry can suffer enormous damage in the aggregate. In sum, the traditional equitable analysis breaks down in the face of widespread industry reliance because traditional economic prejudice analysis typically takes into account only damage incurred by parties to the suit.

C. Compared to Limiting Injunctive Relief

Courts may be more willing to deny injunctive relief in the wake of *eBay*.²¹³ Under *eBay*, courts must employ the aforementioned four-factor test to determine whether an infringement merits equitable relief.²¹⁴ However, equitable limits on injunctive relief insufficiently protect open standards. Although judicial discretion in crafting equitable remedies to patent infringement is a positive development, the software industry needs more certainty than the *eBay* test provides. Good-faith standards adopters need a reliable safe harbor that protects them from unfair and anticompetitive litigation. They need protection against damages as well as the knowledge that they are safe from the imposition of ongoing royalties. In addition, good-faith standards adopters need a defense that can be asserted much earlier in the course of patent litigation. The *eBay* standard is no doubt helpful, but it is applied only after a finding of validity and infringement—in the average case, a long time after the suit is first filed (except perhaps where a preliminary injunction is sought). A standards estoppel doctrine would provide both the certainty and the protection against damages and royalties that existing limitations on injunctive relief do not. It would also come earlier in the course of litigation.

D. Responding to Criticism

Standards estoppel might seem like a severe limitation on remedies that would decrease incentives for innovation. We disagree. Whenever a firm adopts some technology, there is a risk that the firm infringes a patent, since actual infringement is indeterminate before suit. Successful litigation merits not only an injunction against future infringement but damages for past infringement.²¹⁵ Under *Grain Processing*, however, the infringer may prove that if he had known that his technology infringed he would have adopted a different, non-infringing technology.²¹⁶

In a case where standards estoppel applies, the industry as a whole, rather than a single firm, chooses to adopt a technology. Typically there are many to

213. 547 U.S. 388 (2006).

214. *Id.* See also Part III.B.3.a.

215. See *Dennison Mfg. Co. v. Panduit Corp.*, 475 U.S. 809 (1986).

216. See *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 185 F.3d 1341 (Fed. Cir. 1999).

choose from, yet each involves some risk of infringement. In an infringement suit, the adopting industry as a whole, like an infringer under *Grain Processing*, should be given the opportunity to argue that it could have easily avoided infringement by adopting a different, non-infringing standard. Where an argument like this is persuasive, it tends to show that the patented technology was not particularly unique, in which case it is inefficient to bestow an extremely valuable legal award on the patentee. An award like this is not really an incentive to create valuable technology; it is an incentive to identify technically modest but strategically valuable patents—which is not what the patent system is really all about.

Bait-and-switch or snake-in-the-grass tactics could impede the normal course of industry growth by preventing network industries from negotiating up front for input costs to establish a level playing field. Preventing these abusive tactics is critical to ensuring that patent law continues to provide efficient incentives for innovation in the software industry.

CONCLUSION

While the doctrinal hole we seek to plug is modest in some ways, the potential for mischief in this area is very large. On Feb. 22, 2007, a district court awarded \$1.52 billion in patent damages, the largest patent award in history, over infringement of the proprietary MP3 music format.²¹⁷ Though Microsoft has licensed MP3 from Fraunhofer, Alcatel-Lucent claimed that this license did not cover Alcatel-Lucent's patents.²¹⁸ Many other companies, such as Apple and RealNetworks, also rely on the Fraunhofer license and are thus now also at risk of infringement suits.²¹⁹ MP3 is a well-established, proprietary standard, but the precise extent to which patents owned by different entities applied to MP3 has always been in question.²²⁰ The industry needed a reliable format for storing music and each infringing company made every effort to obtain the appropriate licenses. Only after the MP3 standard was well-entrenched did Alcatel-Lucent attempt to exact a rent. The district court later set aside the verdict and ruled for Microsoft as a matter of law, a decision which the federal circuit recently affirmed.²²¹ Still, the jury verdict alone shows that the result was far from certain at the outset.

A doctrine of standards estoppel would prevent companies from strategically asserting patents to gain inefficiently high rewards for their patents. However, it would not prevent the assertion of all patents against

217. Joe Wilcox, *Microsoft's Patent Disputes with Alcatel-Lucent, AT&T Make Waves*, eWEEK.com, Feb. 23, 2007, <http://www.eweek.com/article2/0,1895,2098063,00.asp>.

218. *Id.*

219. *Id.*

220. *Id.*

221. *Lucent Tech, Inc. v. Gateway, Inc.*, Nos. 2007-1546, 2007-1580, 2008 WL 4349236 (Fed. Cir. Sept. 25, 2008).

standards. Only companies with patents that might cover an emerging standard would be required to make those patents known at an early stage by publicizing them, disclosing them in standards-setting, or asserting them promptly in litigation. Yet, as a result, companies will save billions of dollars by avoiding litigation and reducing damages. Meanwhile, incentives are fully preserved for legitimate innovations—which is, after all, what the patent system is really all about.