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Abstract

Technical standards, such as interface protocols or file formats, are extremely important in the “network industries” that add so much value to the world economy today. Under some circumstances, the assertion of patent rights against established industry standards can seriously disrupt these network industries. We have in mind two particularly disruptive tactics: (1) the “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; (2) the “bait and switch” ploy where a patentee encourages adoption by offering royalty-free use of standard-related patents, and then, after the standard has gone into widespread use, begins to enforce its patents against adopters of the standard. We propose to counteract these tactics with a simple solution: over time, adopters of a standard ought to build up a “reliance interest” in the standard. Under our approach—which we call “standards estoppel”—non-assertion of a patent right in the presence of widespread adoption should create immunity from patent infringement. The fundamental idea behind this doctrine is to prevent “strategic” assertions of patents that exploit the logic of network “lock-in.” As we explain, though this is a simple doctrine based on deeply held common law principles, various gaps in the current doctrinal structure make this 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/antitrust. With this 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.

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I. Introduction

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

PDF is a complex format with many capabilities. While no patents are thought to cover the core of PDF, Adobe owns several patents that relate to PDF-related compression algorithms and extended feature sets, such as transparency. Thus, Adobe uses patents not to enforce against competitors who create PDF-related software, but to maintain control of and continue to develop and profit from the PDF standard. Adobe's strategy illustrates that the existence of patents that touch upon a standard does not imply that the standard is closed. Indeed, Adobe has used its intellectual property to craft a standard open to the entire industry 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 the good will it had built up, Adobe could drastically increase the price of its PDF-related software and pursue an aggressive patent enforcement strategy against others in the industry. Large companies with millions of documents in PDF format that had relied upon the full range of PDF features would have little choice but to pay whatever price Adobe charged. We call this strategic use of patents a "bait & switch" tactic. Far from a theoretical construct, it has seriously affected the computer software industry in the past.¹ Moreover, the mere threat of such a strategy seriously affects the process of software standard formation and adoption.

"Bait & switch" is not the only way that patents are asserted strategically against standards. Consider, for example, the facts in the recent FTC decision, *In the Matter of Negotiated Data Solutions LLC*.² N-Data's business consists primarily of licensing patents that it acquires through purchase; the patents at issue in the case come from National Semiconductor Corporation

¹ See, e.g., Unisys and GIF, discussed *infra* Section II.C.

² File No. 051-0094 (Jan. 23, 2008) (Kovacic and Majoras dissenting).

(National). These patents cover National's NWay technology, which allows compatibility between devices made by different manufacturers and between different generations of Ethernet technology. In 1994, National made a commitment to IEEE in exchange for IEEE's adopting a standard based on National's patented technology. National agreed to license the Ethernet patents for a one-time royalty of \$1,000 per licensee to any company that made or sold products that use the standard. N-Data refused to honor this commitment after purchasing the patents and requested substantially higher payments under threat of suit. We call this strategic behavior a "snake-in-the-grass" tactic.

The FTC condemned N-Data for anticompetitive patent assertion in a 3-2 decision, although the Commissioners failed to establish a rigorous standard for when to find unfair competition in standard setting.³ However, certain factors seem relevant to the Commission's decision. First, N-Data knew of National's commitment prior to purchasing the patents. Second, N-Data exploited industry lock-in by waiting until switching costs were high to demand higher royalties than the industry would have paid otherwise. Third, N-Data's conduct would be harmful to consumers because firms would be less likely to participate in standard setting, because firms would not be able to rely on standards, and because consumers would be forced to pay higher prices. The FTC's difficulty in reaching a unanimous opinion when the presence of anticompetitive behavior seems so clear indicates that antitrust may be inappropriate for dealing with strategic assertion of patent rights against standards.

Technical standards, such as interface protocols or file formats, are extremely important in the "network industries" that add so much value to the world economy today. Under some circumstances, the assertion of patent rights against established industry standards can seriously disrupt these network industries. We have in mind two particularly disruptive tactics: (1) the "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; (2) the "bait and switch" ploy where a patentee encourages adoption by offering royalty-free use of standard-related patents, and then, after the standard has gone into widespread use, begins to enforce its patents against adopters of the standard.

³ See *id.* (Majoras dissenting).

We propose to counteract these tactics with a simple solution: over time, adopters of a standard build up a “reliance interest” in the standard. Under our approach – which we call “standards estoppel” – intentional non-assertion of a patent right in the presence of widespread adoption should create immunity from patent infringement. The fundamental idea behind this doctrine is to prevent “strategic” assertions of patents that exploit the logic of network “lock-in.” As we explain, 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/antitrust. 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.

Part II illustrates the importance of standards to the software industry as well as the lock-in downsides to network effects. It shows that a small subset of patent enforcement actions present a huge danger to standard setting within the software industry. Part III demonstrates how to identify strategic rent-seeking behavior and proposes a solution – an expanded estoppel doctrine. It also shows that no other patent doctrines protect against strategic behavior in the standards context and addresses criticisms to an expanded estoppel doctrine. Part IV elaborates on our proposal, including a series of case studies, timelines, and applications.

II. Standards in the Software Industry

A. *The Value of Software Standardization*

Standardization is important to the software industry because it allows different software components to work together – or “interoperate.”⁴ 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

⁴ See David Alban, *Rambus v. Infineon: Patent Disclosures in Standard-Setting Organizations*, 19 BERKELEY TECH. L.J. 309, 309 (2004); Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889 (2002).

technical specification that may be implemented in software for interoperability (e.g., file formats, file systems, programming languages, protocols).⁵

Standards may be controlled by a single firm, a group of firms, a non-profit organization, or by the industry at large.⁶ 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 one that is widely shared, and a closed standard is one that is not widely shared – at the limit, it may be private to one firm or organization. It is important not to confuse these two issues. Some fully proprietary standards are widely shared; some are not. 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 standard. 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 Grid⁷

	OPEN	CLOSED
Proprietary	Adobe Acrobat; ⁸ Lizardtech DjVu format ⁹	Apple iTunes music format; ¹⁰ Lizardtech MrSID graphics format ¹¹
Non-Proprietary	Open source software, e.g., Linux Operating System	Encase Forensic Disk Analysis software ¹²

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 DRM, and make it easier to direct the development of a standard. Often, however, open standards are more

⁵ See, e.g., Lemley, *supra* note 4, at 1896.

⁶ 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).

⁷ From Robert P. Merges, *Software and Patent Scope: A Report from the Middle Innings*, 85 Tex. L. Rev. 1528 (2007).

⁸ Adobe.com, Adobe Acrobat Family, <http://www.adobe.com/products/acrobat/> (last visited Jan. 5, 2008).

⁹ Wikipedia.com, DjVu, <http://en.wikipedia.org/wiki/DjVu> (last visited Jan. 5, 2008).

¹⁰ Wikipedia.com, FairPlay, <http://en.wikipedia.org/wiki/FairPlay> (last visited Jan. 5, 2008).

¹¹ Wikipedia.com, MrSID, <http://en.wikipedia.org/wiki/MrSID> (last visited Jan. 5, 2008).

¹² Guidancesoftware.com, EnCase Forensic, http://www.guidancesoftware.com/products/ef_index.asp (last visited Jan. 5, 2008).

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 Protocol¹³ (HTTP) standard used to transmit web pages as well as the HyperText Markup Language¹⁴ (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 commerce. Open standards are particularly useful to spur adoption of a technology when no single firm is sufficiently powerful to dictate standards.¹⁵ 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.¹⁶

Standards not only benefit consumers; there are several strategies that allow firms to benefit from the power of standards as well. The first strategy is to specialize in complementary products. A standard component – such as an operating system or programming language – can create a larger market for proprietary products that “plug in” to a standard. For example, this is the logic behind IBM’s championing of the Linux operating system; IBM has a strong position in the market for products that complement Linux.¹⁷ The second strategy is to specialize in the creation or maintenance of standard technologies, as Microsoft does for personal computer operating systems and Qualcomm does for cell phones.¹⁸

B. Network Effects and Standards Adoption

¹³ See Wikipedia.com, HTTP, <http://en.wikipedia.org/wiki/HTTP> (last visited Jan. 5, 2008).

¹⁴ See Wikipedia.com, HTML, <http://en.wikipedia.org/wiki/HTML> (last visited Jan. 5, 2008).

¹⁵ CARL SHAPIRO & HALL R. VARIAN, INFORMATION RULES, A STRATEGIC GUIDE TO THE NETWORK ECONOMY 199 (1999).

¹⁶ *Id.* at 227-33. See also URS VON BURG, THE TRIUMPH OF ETHERNET (2001) (discussing the victory of the open, non-proprietary Ethernet standard over IBM’s Token Ring standard for network communication).

¹⁷ See Robert P. Merges, *A New Dynamism in the Public Domain*, 71 U. CHI. L. REV. 183 (2004).

¹⁸ See *infra* Section II.D.

Software is a “network product,” which means that its value increases as more users adopt it.¹⁹ 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 it often makes more sense to adopt a technology already widely used rather than a relatively untried technology without an “installed base” of adopters.²⁰

Like other “network goods,” technological standards are different from “normal goods.” For most of the things that people buy, it makes very little difference how many other people buy them. In general, I do not care much whether many or few buy the same laundry detergent I buy. But with network goods, I do care. When I participate in a network, it matters to me how many other people are on it: generally, the more the better. 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 to do my presentation. This is why, unlike in the case of laundry detergent, when I am deciding which network good to buy I do care about what others choose.

The networks we are interested in are known as “two way virtual networks.”²¹ Software is an example: I can use a product such as PowerPoint on my own, but it has even more value if others use it as well; I can share files, for example, or show my presentation on someone else’s computer. And the more people that join a network, the more valuable it is for others.²² In this

¹⁹ Alban, *supra* note 4, at 309.

²⁰ Lemley, *supra* note 4, at 1896.

²¹ 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. OF IND. 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 Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479, 488 (1998); CARL SHAPIRO & HALL R. VARIAN, *INFORMATION RULES, A STRATEGIC GUIDE TO THE NETWORK ECONOMY*, (1999). 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 have independent value as well as value that increases with network growth. Economides, *supra* note 21, at 675. See also, Michael L. Katz & Carl Shapiro, *Systems Competitions and Network Effects*, 8 J. ECON. PERSP. 93, 94-95 (1994).

²² 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 in that a relatively narrow technology, such as Ethernet, may be easier to

sense, individual decisions to join benefit others. In the language of economics, they create “externalities,” spillover effects that impact the economic situation of others.²³

The key to the benefits of networks is compatibility. While standards provide widespread benefits through compatibility, there is a dark side: 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.²⁴ One type of lock-in occurs with “information and databases,” and takes the form of “converting data to [a] new format.”²⁵ This type of cost “tends to rise over time” as the collection of data stored in the format increases.²⁶ Standardization presents another type of lock-in cost – collective switching costs.²⁷ If everyone else uses a particular standard, unilaterally switching becomes cost prohibitive. In effect, the entire network is locked in. It would be too difficult, for example, to persuade all users of one software product to switch instantaneously to a superior replacement.²⁸ Knowing this, people stay loyal to a no-longer-optimal system for far longer than they otherwise would.²⁹ At a minimum, the prospect of lock-in suggests that market participants should bargain hard prior to being locked in to a new technology and then take steps to minimize that lock-in over the course of the technology cycle.³⁰

In network markets, much of the value comes from the existence of a large installed user base.³¹ Sellers of network goods know this, of course, which is why they compete so hard to establish their network as the dominant one. Indeed, one rationale for the “standards estoppel” doctrine is the possibility that a seller will encourage network-building by permitting free use of

develop in an open, non-proprietary way than an expansive and highly complex technology, such as an operating system, where Windows maintains a clear market lead over Linux. See Urs von Burg, *supra* note 16, at 199-212.

²³ Economides, *supra* note 21, at 678. The positive feedback networks enjoy leads to a new sort of economic effect, one that may be termed “demand side economics of scale.” Shapiro & Varian, *supra* note 21, 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).

²⁴ Shapiro & Varian, *supra* note 15, at 116.

²⁵ *Id.* at 117. 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.

²⁶ *Id.*

²⁷ Shapiro & Varian, *supra* note 15, at 184.

²⁸ Witness the difficulty, for example, in effecting the switch from IPv4 to IPv6. Carolyn D. 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>.

²⁹ See, e.g., *id.*

³⁰ *Id.* at 136.

³¹ See *id.* at 108.

a standard, and then, after a large network is in place, switch its approach abruptly and begin charging high access fees.

Buyers know it too. One strategy, already mentioned, is to take this “lock-in effect” into account when initially bargaining with a seller by seeking a lower price or a long-term agreement. But this has its limits, particularly for buyers who worry that they will not be able to foresee all the creative techniques the seller may employ later, once the network is firmly in place. In the face of this uncertainty, another approach can be appealing: participating in the building of an *open access* network – one which is not controlled by a competitive rival. This is the basic idea behind open standards.

The backers of an open standard understand that it is not safe to grant any single entity absolute control over access to a valuable network. Their solution is to replace single-entity control, usually 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, and are often created through the collaboration of far-flung contributors, rather than a tightly organized group of patentees. Yet even open source software requires a committee structure of some kind, to evaluate potential additions and changes to the standard, and to decide on “official” versions of the software.

C. 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 can lead 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 (SSO’s) employ various tactics to mitigate the risk of patent infringement.³² However, de facto standards remain unprotected from patent infringement, and even SSO’s cannot protect against certain strategic assertions of patent rights against standards.

³² For example, SSO’s 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.

As we have shown, the software industry adopts standards that fall on a dual spectrum: proprietary to non-proprietary, open to closed.³³ 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 in to a new standard, some firm seeks to increase the price by asserting patent rights against adopters of the standard in a manner not contemplated in the original bargain.³⁴ This is a familiar patent strategy, based on the logic of economic “holdup.” 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 a common type of standard in the software industry and are useful for illustrating the behavior we contemplate. GIF is a lossless graphics compression format used heavily in the early days of the internet.³⁵ 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.³⁶ After GIF became widely used, however, Unisys unexpectedly terminated these licenses and requested that all software developers pay a royalty for implementing GIF, a perfect example of the “bait and switch” technique.³⁷

The JPEG file format, in contrast, was ostensibly open for its entire history.³⁸ JPEG is similar to GIF in the sense that it is also used to store graphical data, though JPEG is a lossy compression format that emphasizes small file size over perfect quality and thus has a somewhat different purpose.³⁹ In 2002, Forgent Networks asserted a patent (filed in 1986) against users of the JPEG format, after the format was well entrenched worldwide.⁴⁰ 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.⁴¹

³³ See *supra* Section II.A.

³⁴ See, e.g., *In re Dell Comp. 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).

³⁵ See Wikipedia.com, GIF, <http://en.wikipedia.org/wiki/GIF> (last visited Jan 5, 2008).

³⁶ *Id.*

³⁷ *Id.*

³⁸ See Wikipedia.com, JPEG, <http://en.wikipedia.org/wiki/JPEG> (last visited Jan 5, 2008).

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Id.*

As we will explain in Section III.A, *infra*, both the snake-in-the-grass and bait-and-switch strategies harm the industry and fail to advance the primary goal of patent law – providing incentives for innovation. The strategies are inefficient for the industry because they force the industry to pay much more than was bargained for in adopting a standard. Likewise, the strategies are inequitable because they transfer wealth from good-intentioned standards adopters to bad actors who take advantage of lock-in and network effects to spring traps upon the industry.

D. Legitimate Enforcement Actions

Though the costs to industry from the “bait and switch” and “snake in the grass” strategies can be quite large, the enforcement actions related to such strategies represent only a small subset of patent enforcement actions, even among those related to standards. It is important to cabin the type of behavior we contemplate at the outset.

For example, a patent holder may legitimately assert a patent on standards technology when the industry adopted the standard knowing full-well that it was covered by a patent. The recent dispute between Qualcomm and Nokia represents a completely legitimate enforcement action regarding a standards patent.⁴² Mobile phones throughout the Americas employ Qualcomm’s patented Qualcomm’s Code-Division Multiple Access (CDMA) standard to communicate over networks.⁴³ Handset manufacturers, such as Nokia, license CDMA patents in order to produce phones that utilize the CDMA standard.⁴⁴ Licensing negotiations between large companies in the cellular phone industry are complex, and bargaining positions hinge upon the firms’ relative intellectual property contributions to industry technology.⁴⁵

Recently Nokia and Qualcomm disputed the terms of the license agreement, and eventually Qualcomm filed suit for patent infringement.⁴⁶ In response, Nokia filed a complaint of its own

⁴² Kevin J. O’Brien, *The Nokia-Qualcomm Disconnect*, INTERNATIONAL HERALD TRIBUNE, Apr. 8, 2007, <http://www.iht.com/articles/2007/04/08/technology/wireless.php>; Peter Sayer, *Qualcomm Files More Suits Against Nokia*, WASHINGTON POST, Apr. 3, 2007, <http://www.washingtonpost.com/wp-dyn/content/article/2007/04/03/AR2007040300892.html>; Nancy Gohring, *Update: Nokia, Qualcomm Squabble Over CDMA License*, INFOWORLD, Apr. 20, 2006, http://www.infoworld.com/article/06/04/20/77592_HNpatentsquabble_1.html.

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ Katie Fehrenbacher, *Timeline: Qualcomm, Nokia Duel*, GigaOM.com, Apr. 4, 2007, <http://gigaom.com/2007/04/04/timeline-of-the-qualcomm-nokia-duel/>.

seeking “fair and reasonable” licensing terms.⁴⁷ This type of litigation and licensing dispute over patented standards does not cause problems for the industry, but rather is a completely legitimate assertion of patent rights. The industry adopted the CDMA standard with a full appreciation of Qualcomm’s proprietary standards, and the litigation reflects differences that arose in how firms valued Qualcomm’s patents in light of new intellectual property of their own.

Another scenario in which a patent owner could legitimately assert a patent on standards technology is where 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.⁴⁸ Sun allowed users to freely download the tools needed to read and write programs in the Java programming language.⁴⁹ This popular language allows programmers to write programs that run on different platforms, such as Linux, Windows, and Apple’s operating systems.⁵⁰

Sun licensed Java technology to Microsoft for inclusion in Microsoft’s Windows operating system.⁵¹ However, Microsoft adopted a strategy of “embrace and extend” that threatened to undermine Sun’s control of Java.⁵² Specifically, Microsoft implemented *additional* features in Java that were not part of Sun’s standard.⁵³ If programmers wrote software that took advantage of the extra features, their programs would run only on Microsoft’s implementation of Java, thus destroying the cross-platform compatibility that Sun was aiming for with Java.⁵⁴ Sun sued alleging patent infringement and antitrust violations.⁵⁵ As with Qualcomm, Sun’s suit is a legitimate enforcement of standards patents, although directed to a different end. Instead of seeking higher royalty payments, Sun wanted to ensure that it maintained control of Java rather than ceding control to Microsoft.⁵⁶

⁴⁷ *Id.*

⁴⁸ James Niccolai, *Sun Microsoft settle Java lawsuit*, NETWORK WORLD, Jan. 23, 2001, <http://www.networkworld.com/news/2001/0123msjava.html>.

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ John Markoff, *Microsoft Adding to Java and to Sun Rift*, NEW YORK TIMES, Mar. 11, 1998, [nytimes.com](http://query.nytimes.com/gst/fullpage.html?res=9807EFD71330F932A25750C0A96E958260), <http://query.nytimes.com/gst/fullpage.html?res=9807EFD71330F932A25750C0A96E958260>.

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ 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>.

⁵⁶ Markoff, *supra* note 29.

To reiterate: Patents on standards components are in general are not a problem. Most enforcement actions for such patents are completely legitimate. The problem lies only with strategic rent seeking.

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. Section III.A lays out a framework for identifying strategic rent seeking behavior that courts should avoid rewarding with damages and injunctions. Section III.B discusses how an expanded estoppel doctrine would function, including the effects that certain behaviors should have upon remedies. Section III.C shows that no other patent doctrines protect against strategic assertion of patents against standards, and Section III.D addresses likely criticisms to expanding the estoppel doctrine.

A. Identifying Strategic Behavior

1. Bait & 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 that covers the standard will not be enforced in some way. 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 the pledge. For example, some patentees offer a general promise that the relevant patents are “dedicated to the public,” or will otherwise never be enforced.⁵⁷ Other patentees grant royalty-free patent licenses to developers of free and non-commercial software.⁵⁸ Still other patentees claim to own no patents that cover a standard.⁵⁹ Finally, a patentee could guarantee a particular royalty 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 – from making such statements in bad faith, seeking to later enforce these patents against standards adopters? Protecting against strategic behavior is even more difficult where the company originally made a pledge of openness in complete good faith. Suppose that, over time, the company’s prospects worsen severely. Or imagine that it assigns or licenses the relevant patent(s) to another firm – possibly a firm whose *raison d’être* is “monetizing” patents. Would any legal rule discourage this revocation of a “freedom to use” pledge? The discussion in the Section III.C argues that current legal rules leave a conceptual hole that fails to cover either situation squarely.⁶⁰

An example of a bait & switch strategy is the *Dell Computer* case.⁶¹ Dell participated in a standard setting organization that required its members to disclose any intellectual property.⁶² During the standard setting process, Dell twice certified that it had no intellectual property rights

⁵⁷ 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); 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 “not assert its patents against individual noncommercial open source developers”).

⁵⁸ See Wikipedia.com, GIF, <http://en.wikipedia.org/wiki/GIF> (last visited Jan 5, 2008).

⁵⁹ See *Dell Computer Corp.*, 121 F.T.C. 616 (1996).

⁶⁰ For two other possible solutions, see Robert P. Merges, *A New Dynamism in the Public Domain*, 71 UNIV. CHI. L. REV. 183, 197, 201 (2004). 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. 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.”

⁶¹ See *Dell Computer Corp.*, 121 F.T.C. 616 (1996); Antitrust, Technology and Intellectual Property Conference, Mar. 2, 2001, Prepared Remarks of Robert Pitofsky, Chairman, Federal Trade Commission, <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.”)

⁶² *Id.*

related to the standard.⁶³ Dell then asserted its patents against adopters of the standard and sought an ongoing royalty.⁶⁴ In litigation before the FTC on claims that its conduct was anticompetitive, Dell agreed to a consent decree that prevented it from enforcing its patents against adopters of the standard.⁶⁵ However, strategic behavior like this should not require antitrust enforcement; it can be dealt with more directly and judiciously through patent law.⁶⁶

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. Section 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.

2. Snake-in-the-grass

The snake-in-the-grass strategy refers to patentees hiding the existence of patents in order to assert against a standard to which the industry is already locked in. By waiting to assert, the patentee can force standards adopters to pay more in royalties than they would have agreed to if they had known of the patents before adopting the standard and could have bargained at arm's length.

This strategy is often employed in the SSO context, and the much-discussed *Rambus*⁶⁷ 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 technology included in the standard. After adoption of the standard, Rambus asserted the patents and sought royalty payments. Ex post damage calculations almost certainly would have been higher than any royalty

⁶³ *Id.*

⁶⁴ *Id.*

⁶⁵ *Id.*

⁶⁶ 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 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, which is discussed in the next section. *See* U.S. Dep’t of Justice & Fed. Trade Comm’n, Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition (2007), Chapter 2, *available at* www.usdoj.gov/atr/public/hearings/ip/222655.pdf.

⁶⁷ *In re Rambus, Inc.*, Docket No. 9302, Final Order, <http://www.ftc.gov/os/adjpro/d9302/070205finalorder.pdf>; *In re Rambus, Inc.*, Docket No. 9302, Opinion of the Commission on Remedy (Feb. 2, 2007) <http://www.ftc.gov/os/adjpro/d9302/070205opinion.pdf> (limiting the patent royalty rates Rambus may charge licensees).

resulting from ex ante, arms length negotiation. In fact, the SSO's likely would have altered the standards to avoid the Rambus patents unless Rambus agreed to not enforce the patents against adopters of the standard.

There was widespread applause when antitrust authorities cracked down on this blatant attempts to deceive an SSO.⁶⁸ However, antitrust is not the appropriate instrument with which to analyze the behavior of patentees. Patent law sacrifices some amount of competition in exchange for providing incentives for innovation. 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 difficulty in dealing with behavior of patentees through antitrust law is illustrated by the substantially different results in different courts during the protracted Rambus litigation. Antitrust law should be only a backstop to other mechanisms for preventing strategic behavior; patent law must police most harmful behavior on its own.

Of course, SSO's and commentators quickly grew wise to these games, and most SSO's now insert contractual provisions requiring disclosure of patents and setting penalties for non-disclosure.⁶⁹ Contractual provisions are useful, but damages for contractual breach are not the correct remedy for this type of bargain. The deceit inherent in the snake-in-the-grass strategy should give rise to more than contractual damages; it should implicate the very enforceability of the underlying patents.

It is also important to understand that "snake in the grass" is a game that could be played outside of 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 early in the process, the company waits until the industry is locked in and presented with high switching costs. As long as the company requests a

⁶⁸ See W. Stephen Smith & Jenny M. Maier, Overview of FTC's *Rambus* Decision (Aug. 2006) <http://www.mofo.com/news/updates/files/update02229.html>; Jonathan Gowdy & Jeny M. Maier, FTC Compels Rambus to License Patented Technology and Limits Royalty Rates, (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-SUM 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. Infineon Technologies AG*, 13 Fed. Cir. B.J. 635 (2003). *But see* Joseph Kattan, *The IP/Antitrust Intersection: Promoting Competition and Innovation*, 16-SUM 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.)

⁶⁹ See Lemley, *supra* note 4; *infra* Section III.B.

royalty less than the switching costs, the industry 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 is Fogent’s assertion of patents against the well-established JPEG standard, discussed supra in Section II.C. Section II.B.2 will show that if Fogent had taken this course of action deliberately from the beginning, seeking 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 stopping enforcement of the patents against adopters of the standard. Even if Fogent had not intended to exercise such a strategy, enforcement against an open standard should cause a court to conduct an *eBay*-type analysis to determine whether an injunction, damages, or ongoing royalties are equitable, as discussed in Section III.B.3.

B. Accommodating Standards in the Estoppel Doctrine

Several observers of the standards scene have argued for policies that will promote creation and use of standards,⁷⁰ 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 section will discuss three categories of behavior, and the effects those behaviors should have on patent enforcement and remedies.

Courts should first look to whether a patentee has pledged that it either will not enforce patents related to a particular standard or that it has no patents related to a particular standard. As

⁷⁰ 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 SSO’s should require members to agree to license their patent rights for patents that are essential to a new standard on reasonable and nondiscriminatory (“RAND”) 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 SSO’s 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 also Janice M. Mueller, *Patenting Industry Standards*, 34 J. MARSHALL L. REV. 897 (2002) (arguing that firms that conceal patents in the standard setting process should be subject to compulsory licensing).

discussed *infra* in Section III.B.1, courts should hold that such pledges constitute an implied license and that enforcement of patents in contradiction to the pledge should be estopped.

Courts should then look to whether a patentee has acted with bad faith or anticompetitive intent by acquiring patents in order to assert against an open standard in the hopes of extracting excessive rents once the industry is locked in. As discussed *infra* in Section III.B.2, courts should estopp patentees from enforcing patents that they acquired in hopes of strategically asserting against an open standard.

Finally, courts should apply *eBay* to determine whether, in the absence of pledges of openness or anticompetitive intent, granting damages, injunctive relief, or ongoing royalties would be inequitable. As discussed *infra* in Section III.B.3, courts should consider limiting remedies where patentees knew or should have known of the adoption of an open standard that infringed its patents.

1. Bait & Switch – Pledges of Nonenforcement or Nonexistence of Standards-relevant Patents

Rational firms do not offer something for nothing. 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 wide-spread 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 in to the standard. This may facilitate widespread adoption of a standard that might otherwise meet with 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. Recognizing this *quid pro quo* is important, as it provides a justification for holding the patentee to her promise – the bargain only works if the patentee’s promise is believable.

A bait & switch strategy provides an easy case for expanding the estoppel doctrine. Bait & switch refers to a patentee stating that it would not enforce a particular patent, either at all or in some limited context.⁷¹ That the promise was made to the industry at large rather than to an individual actor should not allow the patentee to escape being bound by the promise. The

⁷¹ Section III.A(2), *supra*.

presence of network effects and high switching costs mean that the industry's choice to adopt the standard is, to a certain extent, irrevocable;⁷² the patentee's assurances should likewise be binding. In order for patent law to accommodate this new type of bargain, courts should estopp any enforcement of the patents against the standard and hold that the patentee has granted an irrevocable and implied license to all actors who fall within the ambit of the patentee's promise.

Normally estoppel requires a relationship demonstrated by an affirmative communication between two parties. However, the remedy for estoppel is an implied license, which runs only to people in the protected class 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 must be able to rely on the patentee's statements. Otherwise a patentee can easily evade estoppel.

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. At the time of suit, past adopters of a particular standard may have only joined the network because of the pledge of openness. Future adopters often have little choice but to adopt the industry standard, and they should get the same bargain as the initial adopters.

Holding patentees to their promises does not harm incentives to innovate. After all, a patentee does not have to pledge to not enforce patents against a particular standard, and is not required to categorically deny having IP rights that an standard in development might infringe. Rather, much like contract law, enforcing pledges of openness facilitates a free market. The knowledge that a particular party will not assert, nor allow its patents to be asserted, against a particular standard is an extremely valuable commodity.⁷³ Enforcing pledges of nonexistence, nonenforcement, or pre-determined royalty schemes allows patentees to make deals in which openness is exchanged for something else of value, such as industry-adoption of a standard. In the end, both parties benefit, and patentees are able to more fully exploit the true value of their patents.

⁷² See Sections II.A & II.B, *supra*.

⁷³ See Sections II.A & II.B, *supra*. Technological development requires that standards be as trustworthy as possible. The industry, through SSO's 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, such efforts.

2. Snake-in-the-grass – Bad Faith

Even in the absence of pledges of openness, acquiring or concealing patents in order to later strategically assert them against an open industry standard is indicative of anticompetitive intent or bad faith that is contrary to the purpose of patent law. Patents exist to provide incentives for innovation. Negotiating up front with an SSO or the industry at large for the licensing terms of a proprietary standard is the appropriate framework in which to legitimately exploit the value of a patent. Waiting until the industry is irrevocably locked in to a particular standard before springing a patent trap is not – it is strategic rent-seeking that results in excessive returns to the patentee, and courts should estopp such enforcement actions.⁷⁴

a. Explicit Bad Faith

Determining anticompetitive intent is not an easy inquiry, but it is one with which courts are well acquainted. Timing, of course, is one type of information relevant to determining intent. If, for example, a patentee filed for a patent 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, and courts should take a cue from *Grokster* in evaluating the evidence.⁷⁵ 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 or may not have been objectionable standing alone. Acquisition of patents that read on standards is not limited to purchase, but also includes prosecution, reexamination, or reissue.

Courts can also look to the antitrust literature, including especially the *Rambus* line of cases, for methods of determining anticompetitive intent. 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,⁷⁶ but commentators were united in condemning this type of behavior as detrimental to the industry.

⁷⁴ See Section II.B, *supra*.

⁷⁵ See *MGM Studios, Inc. v. Grokster, Ltd.*, 545 U.C. 913 (2005).

⁷⁶ See, e.g., *Walker Process Eqpt., Inc. v. Food Machinery Corp.*, 382 U.S. 172 (1965) (holding that Section 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.).

Our solution is to address the problem directly through patent law rather than using the backstop of antitrust law – strategic assertion of patents against standards should be estopped.

If the company had asserted those patents before the nearly irrevocable adoption of the standard, or at least had made the patents publicly known, then standards adopters could have made an informed choice. A company that makes its patents and their relation to an open-standard known as soon as possible could not be accused of anticompetitive intent, but a company that conceals or acquires patents for the express purpose of extorting inefficiently high rents should not be rewarded for this behavior.

b. Implicit Bad Faith

A patent grants an exclusive right to make and use an invention, and the burden of ensuring that a particular technology does not infringe a patent 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 burden of avoiding infringement is rightly placed on the many rather than the one due to information asymmetries.

In the standards context, however, the information asymmetries are flipped. An industry or SSO seeking to adopt an open standard publicizes the standard as much as possible and seeks to make the one standard bulletproof 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 at large. The infringer is not trying to get away with as much as possible, but rather is actively trying to mitigate the possibility of infringement because the injury resulting from ongoing royalties or damage calculations is potentially so high. In the standards context, the information as to infringement lies in the hands of the patentees, since they would almost certainly be aware that the industry is adopting a standard based on their patented technology.

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 that it believed was open, while in fact the standard infringed the industry’s patents, then the company had a duty to make that fact known as soon as possible. If the company had done so, then it could

have bargained at arm's length for the adoption of its technology, but it should not be able to exploit the industry's ignorance and honest efforts to avoid infringement.

3. Snake-in-the-grass – Equitable Considerations

Even in the absence of pledges of openness or anticompetitive intent, courts should carefully consider whether remedies against a standards adopter are equitable. Standards-related suits often have several features that militate against injunctions under the 4-factor test reiterated in *eBay*.⁷⁷ As well, the presence of lock-in and switching costs suggests that courts should carefully calculate any damages or ongoing royalties in line with an *ex ante* negotiation process, since the industry often adopts an open standard only because it is widely believed that the standard can be used royalty free.

a. Injunctive Relief

To merit an injunction under *eBay*, the plaintiff must first show “that it has suffered an irreparable injury.”⁷⁸ Lower courts have held that, after *eBay*, a patentee does not have a presumption of irreparable harm, even after the patent is found valid and infringed.⁷⁹ The existence of a standard that infringes the plaintiff's patent may not actually harm the plaintiff's business. Although open standards are widely adopted, the technical specificity of standards means that the actual use of the patentee's technology may be narrow in scope. Thus, the standard may well not compete with the patentee's business model. This is particularly likely in the event that the patentee only licenses technology, as with the plaintiff in *eBay*. Even if an injunction is warranted, it should be carefully crafted to give the industry sufficient time to switch standards.

Second, the plaintiff must demonstrate “that remedies available at law are inadequate to compensate for [the] injury.”⁸⁰ 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.

⁷⁷ See *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837 (2006).

⁷⁸ *eBay*, 126 S.Ct. at 1839.

⁷⁹ *Paice v. Toyota* (E.D. Tex 2006).

⁸⁰ *eBay*, 126 S.Ct. at 1839.

Third, the plaintiff must show that “considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted.”⁸¹ An injunction on an open standard would likely cause considerable hardship to the industry due to lock-in and high switching costs.⁸² Moreover, an injunction against a particular adopter of a standard would serve as an unfair burden in relation to the rest of the industry. In contrast, many patents asserted against standards relate to only a small portion of the standard, which would make an injunction quite onerous.⁸³ It is also probable that the standard does not compete directly with the plaintiff’s business, as a standard is by its very nature limited in scope.

Fourth, the plaintiff should demonstrate that the public interest would not be disserved by a permanent injunction. Of all of the factors, this is the easiest. One of the chief values of software products is interoperability, and adoption of technology is usually a result of network effects.⁸⁴ Enjoining the use of a standard that the industry relies upon to function can do nothing but harm the public interest.

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 than in traditional enforcement suits. Second, the presence of lock-in suggests that the industry might be willing to pay a much higher ongoing royalty rate than is actually fair, but courts should avoid allowing patentees to impose such high rents.

Some standards are only viable when they are not subject to royalties, and the industry only agrees to adopt them on this condition.⁸⁵ Moreover, standards are often conventions as much as they are new technological breakthroughs, which means there were often alternatives before network effects and lock-in took over. Under *Grain Processing*, the defendant should have the retrospective benefit of the information, which means that any damages should be calculated in relation to other options available at the time. An accurate damage calculation is thus likely to be quite less than what would result from infringement outside the standards context.

⁸¹ *Paice v. Toyota* (E.D. Tex 2006).

⁸² *See* Section II.B, *supra*.

⁸³ *See Paice*.

⁸⁴ *See* Section II.A, *supra*.

⁸⁵ *Id.*

A similar analysis should apply in calculating an ongoing royalty. Courts should note the importance of free or low cost standards to the software industry and the efforts of the industry in promulgating such standards. Also, courts should not allow patent holders to take advantage of high switching costs to impose inordinately high ongoing royalties.

C. *Limiting Doctrines in Patent Law*

No doctrine seems to squarely address the bait & switch or snake-in-the-grass problems, discussed in Section III.A, *supra*. Laches is triggered by a delay in filing, but the formalistic structure is difficult to align to the specific needs of the software industry. Estoppel works to excuse continued infringement but is even more difficult to prove than laches because it requires affirmative conduct by the patentee. Misuse is based on the principle of preventing patentees from deploying patents for anticompetitive ends, but the current body of misuse case law is typified by antitrust-like abuses of licensing, market power, tying arrangements, and the like, rather than strategic delay in filing suit.

To fill the gap we have identified, we suggest a new doctrine: standards estoppels. The idea is to join the triggering event of laches and estoppel (delay in filing) with the policy rationale of misuse (strategic, anticompetitive uses for which patents were not intended). Standards estoppel also has an element of adverse possession, since patentees bear some burden of speaking up if it looks as if the industry is unwittingly adopting an open standard that might infringe the patentee's patent. The equitable considerations that tilt heavily away from injunctions or high damages or royalty payments also give the doctrine a flavor of adverse possession.

1. *Equitable Estoppel*

Under equitable estoppel, an infringer can escape liability entirely if he relied upon representations by the patentee that the patent would not be enforced, and if that reliance harmed the infringer in a significant or material way.

As with laches, certain features of equitable estoppel (its equitable nature; its emphasis on reliance interests) suggest it could be useful in the standards context. However, it too has inherent limitations that prevent it from protecting standards adopters from "snake in the grass" or "bait and switch" tactics contemplated here. The primary defects are: (1) it requires misrepresentation by the patentee to the infringer, which means a direct relationship between the two parties; (2) it requires reasonable reliance by the infringer on those promises, which means knowing of the

existence of the patent prior to standards adoption; and (3) it requires material reliance of the same type necessary for a successful laches defense. Good-faith standards adopters need complete protection from unfair and anticompetitive patent enforcement, and equitable estoppel does not provide a complete safe harbor. To see why, we examine the elements of equitable estoppel in the following sections.⁸⁶

(a) Misrepresentation

Estoppel requires some communication or representation by the patentee regarding the infringing products.⁸⁷ In *A.C. Aukerman Co. v. R.I. Chaides Construction Co.*, Aukerman set a deadline for Chaides to license Aukerman's patent or risk suit.⁸⁸ Chaides declined to take a license, and nine years later Aukerman filed suit. The district court denied granted summary judgment for Chaides on the ground that Aukerman's actions gave rise to equitable estoppel.⁸⁹

The Federal Circuit reversed, finding genuine issues of material fact as to misrepresentation and reliance.⁹⁰ The 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.⁹¹ 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.⁹² At a minimum, then, the misrepresentation element of laches requires that there be some communication or relationship between the parties, since the infringer must know of the relevant patent "reasonably infer that the patentee acquiesced to the allegedly infringing activity for some time."⁹³

Misrepresentation that would satisfy the requirement for equitable estoppel is, surprisingly, often lacking in the "bait and switch" tactic. Patentees often file suit against standards adopters who had no relationship with the patent holder. Even if the patentee has made representations to the members of a standard setting body, late-comers or industry members outside the body would remain liable.

⁸⁶ Material reliance will be covered in Section III.C.2.c, *infra*, so here we focus on the first two elements.

⁸⁷ *Id.* (citing *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419 (Fed. Cir. 1997)).

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

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² *Id.*

⁹³ *Id.*

Misrepresentation is absent entirely in the “snake in the grass” unfair surprise tactic. Here the patentee’s strategy is to lie in wait until the infringer is locked in to the patented technology. Even if a court stretched the doctrine to label as misrepresentation statements by the patentee that it owned no patent directed to a particular technology, these represent only a portion of “snake in the grass” cases.

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

(b) Reasonable Reliance

Successfully evading liability by asserting equitable estoppel requires that the infringer prove he reasonably relied upon the patentee’s misleading conduct.

“Reliance is not the same as prejudice or harm, although frequently confused. An infringer can build a plant being entirely unaware of the patent. As a result of infringement, the infringer may be unable to use the facility. Although harmed, the infringer could not show reliance on the patentee's 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 with building the plant.”⁹⁴

Moreover, the infringer must prove a nexus between its infringement and the patentee’s waiver.⁹⁵

Infringers have successfully employed equitable estoppel to defend suit over industry standards, but the patentees typically had participated in the standards process and made representations of openness. In *Wang Labs. v. Mitsubishi Elect. Am.*, Mitsubishi successfully argued for equitable estoppel resulting in an implied license based on Wang’s promotion of a standard through the JDEC SSO.⁹⁶ Likewise, the FTC limited the extent to which Rambus can

⁹⁴ *Id.* at 1042-43.

⁹⁵ *Id.* (citing *Stickle v. Heublein, Inc.*, 716 F.2d 1550, 1559 (Fed. Cir. 1983)).

⁹⁶ *Id.* (citing *Wang Labs., Inc. v. Mitsubishi Elec. Am. Inc.*, 103 F.3d 1571, 1580 (Fed. Cir. 1992)).

enforce its standards-relevant patents based on deception in the standards setting process. However, this ruling antedated a finding of fraud and failure to disclose pending patent applications despite an affirmative duty to do so.⁹⁷ Equitable estoppel thus offers only limited protection to good-faith adopters 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. 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. Then, industry participants who may not have participated in the process “join the bandwagon” and adopt the standard, sometimes because they have little choice in a network market. The patentee is thus often once removed from the infringer, and the original privity arising from the patentee’s promise is diffused.

Standards estoppel tweaks the ideas of privity and reliance by treating patentee pledges of openness to the industry at large as binding because of the value that the patentee garners in exchange for openness. Reliance is different in network markets because the entire industry, rather than particular players, rely on silence or promises of openness to adopt a standard. But for the reasonable belief in an open standard, the industry would have likely adopted different technology. Standards estoppel modifies the estoppel doctrine by updating the definition of misrepresentation and reliance to accommodate modern technology practices. If no misrepresentation is present, standards estoppel falls back on the element of unreasonable delay from laches, again modified to account for the fast-paced software industry.

2. Laches

Under laches, an infringer can partially escape liability if the patentee unreasonably delayed filing suit, and if that delay harmed the infringer in a significant or material way.⁹⁸ A patentee can overcome the defense, however, by providing a valid excuse for the delay in filing suit.

⁹⁷ *Id.* (citing *Rambus Inc. v. Infineon Techs. AG*, 318 F.3d 1081, 1084 (Fed. Cir. 2003), cert. denied, 540 U.S. 874 (2003)).

⁹⁸ DONALD S. CHISUM, *CHISUM ON PATENTS*, § 19.1 (citing *Intirtool, Ltd. v. Texar Corp.*, 369 F.3d 1289, 1297 (Fed. Cir. 2004) (“The laches defense has two underlying elements: first, the patentee’s delay in bringing suit must be ‘unreasonable and inexcusable,’ and second, the alleged infringer must have suffered ‘material prejudice attributable to the delay.’”) (quoting *A.C. Aukerman Col.*, 960 F.2d ___, 1028 (Fed. Cir. 1992); *State Contracting & Engineering Corp. v. Condotte America, Inc.*, 346 F.3d 1057, 1065 (Fed. Cir. 2003) (“To successfully invoke laches, a defendant must prove that the plaintiff delayed filing suit an unreasonable and inexcusable length of time after the plaintiff knew or reasonably should have known of its claim against the defendant and that the delay resulted in material prejudice to the defendant. . . . Once those factual premises are established, the court weighs the equities in

Although certain features of the laches defense (its equitable nature; its emphasis on the “reliance” of accused infringers) suggest it could be useful in the standards context, the doctrine has inherent limitations that prevent it from being a full and effective solution to either the “snake in the grass” or “bait and switch” tactics under consideration here. The primary defects are: (1) it only *limits damages* to the post-laches period, rather than completely barring any remedy against an infringer (which leaves standards adopters open to liability);⁹⁹ (2) it operates only when a patentee knew or should have known of a *particular* infringer’s infringing activity, which means that it is incapable of fully protecting a class or group of standards adopters; and (3) 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). What is needed is a true safe harbor – a legal rule that fully shields good-faith standards adopters from unexpected and unfair legal liability – and laches is not up to the job. To see why, we consider each of the doctrine’s major elements in the sections that follow.

(a) Damages 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.¹⁰⁰ Once the patentee files suit, damages begin to accrue.¹⁰¹ Laches also offers no protection against injunctive relief.¹⁰² “Mere delay or acquiescence cannot defeat the remedy by injunction or in support of the legal right, unless it has been continued so long and under such circumstances as to defeat the right itself.”¹⁰³

order to assess whether laches should apply to bar those damages that accrued prior to suit.”); *Ecolab, Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1371 (Fed. Cir. 2001) (“Laches requires proof that the patentee unreasonably and inexcusably delayed filing suit and that the delay resulted in material prejudice to the defendant. . . . The length of time that may be deemed unreasonable has no fixed boundaries, but rather depends on the circumstances of the case. . . . A presumption . . .”).

⁹⁹ “In patent cases, when applied, laches bars only pre-filing damages; it will not bar post-filing damages or injunctive relief.” *Lucent Technologies Inc. v. Gateway, Inc.*, 470 F.Supp.2d 1187 (S.D. Cal. 2007), citing *Aukerman*, 960 F.2d at 1040.

¹⁰⁰ *Lucent Technologies Inc. v. Gateway, Inc.*, 470 F.Supp.2d 1187 (S.D. Cal. 2007), citing *Aukerman*, 960 F.2d at 1040.

¹⁰¹ *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.*, 686 F.2d at 1264).

¹⁰² *Aukerman*, 960 F.2d at 1040-41.

¹⁰³ *Id.* (quoting *Menendez v. Holt*, 128 U.S. 514, 523-24 (1888)).

Limiting damages to the post-laches period is insufficient to protect software standards. When an industry adopted a standard because it was free or cheap to license and thus widely available, a sudden rent imposed by a strategic patentee can wreak havoc. The industry as a whole was not prepared to pay the rent for the standard and would not have otherwise adopted it. Thus, the standard is often being used in a way that makes payment nearly impossible, such as in widely-used open source software, fundamental file formats, or common transfer protocols implemented all across the net. Makers of these types of software cannot pay damages, even when limited only to the post-laches period, and would certainly be injured by injunctive relief. 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.¹⁰⁴

(b) Knowledge of a Particular Infringer’s Activity

Courts refuse to permit a laches defense in the absence of actual or constructive knowledge of infringement. In *IXYS Corp. v. Advanced Power Technology, Inc.*,¹⁰⁵ APT asserted a laches defense when it was sued by IXYS for infringing IXYS’s patent on a high-frequency power transistor design. IXYS responded by claiming that it had no knowledge of APT’s infringement before 1998, so laches was inappropriate.

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.”¹⁰⁶ IXYS collected data sheets describing APT devices, and publications “describing the technical specification of APT’s products” were in circulation.¹⁰⁷ 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

¹⁰⁴ *Aukerman*, 960 F.2d at 1040.

¹⁰⁵ 321 F. Supp. 2d 1156 (N.D. Cal. 2004).

¹⁰⁶ *Id.* at 1161.

¹⁰⁷ *Id.*

that IXYS was testing APT's devices--at least for the purpose of characterizing them--as early as 1992. *Id.*

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.¹⁰⁸ The court held laches inappropriate in the absence of evidence of actual knowledge of infringement or of a habit of conducting the kind of tests that would have led to such knowledge.¹⁰⁹ Despite IXYS's familiarity with and testing of APT's products, the court held that permitting a laches defense for the time in question would be tantamount to unfairly "impos[ing] upon IXYS a requirement to 'polic[e] the industry.'"¹¹⁰

If a defendant attempts to prove laches for a delay of fewer than six years, he bears the burden of producing evidence that the delay was unreasonable. Cases in which the defendant is successful are typically ones in which the patentee takes some affirmative action that is inconsistent with a later enforcement action. In upholding a denial of laches, the Federal Circuit stated that

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."¹¹¹

A requirement of affirmative action means that laches provides little assistance for standards adopters. Typically there is no relationship between a standards adopter and the patentee, and the patentee rarely has examined a particular standards adopter's products.

(c) The Special Problem of Economic Prejudice

(1) When Economic Prejudice Arises

In order to succeed in asserting a laches defense, an alleged infringer must demonstrate material prejudice, which requires proof of either evidentiary or economic prejudice. Evidentiary prejudice typically relates to the unavailability of witnesses or documents, which is not typically

¹⁰⁸ *Id.*

¹⁰⁹ *Id.* (citing *Wanlass v. Gen. Elec. Co.*, 148 F.3d 1334, 1336 (Fed. Cir. 1998)).

¹¹⁰ *Id.* (quoting *Wanlass v. Fedders Corp.*, 145 F.3d 1461, 1465 (Fed. Cir. 1998) (substitution in original)).

¹¹¹ *Chisum, supra* note 98 (quoting *Meyers v. Asics Corp.*, 974 F.2d 1304 (Fed. Cir. 1992)).

the kind of harm suffered by standards adopters. Instead, standards adopters suffer economic prejudice, although not in the way typically recognized by a court evaluating a laches defense. Courts typically find economic prejudice only if 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.”¹¹² That is, the infringer must show that he changed his position because of the patentee’s delay, and the sunk costs or damages “likely would have been prevented by earlier suit.”¹¹³

But courts frequently bar laches regardless of sunk costs by the patentee. Courts do not consider the cost of infringing as economic prejudice and generally reject the argument that an infringer “was prejudiced because it lost opportunities to avoid infringement at an early stage.”¹¹⁴ In the standards context, this “lost opportunit[y] to avoid infringement at an early stage” is precisely the issue.

Likewise, regardless of investment by the infringer, courts typically deny laches when the infringer would have continued development and sales regardless of action by the patentee.¹¹⁵ If an infringer does not submit evidence that they stopped selling an infringing product after a patentee filed suit, courts can deny laches based on an inference that earlier filing would not have caused the infringer to act differently.¹¹⁶ Of course, a firm practicing a standard can hardly afford to stop using it at the first sign of suit.

Furthermore, courts often assume that the defendant “takes his chances” with infringement if he has notice of the patentee’s claims.¹¹⁷ “[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.”¹¹⁸

“Nothing 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

¹¹² *State Contracting & Eng’g Corp. v. Condotte 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 *Aukerman*, 960 F.2d at 1033; *Gasser Chair Co. v. Infanti Chair Mfg. Corp.*, 60 F.3d 770, 773 (Fed. Cir. 1995)).

¹¹³ *Id.*

¹¹⁴ *Laitram Corp. v. Rexnord, Inc.*, 15 USPQ2d 1161, 1164 (E.D. Wis. 1990), *rev’d on other grounds*, 939 F.2d 1533 (Fed. Cir. 1991).

¹¹⁵ *Meyers v. Brooks Shoes*, 912 F.2d 1459, 1463 (Fed. Cir. 1990).

¹¹⁶ *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, 39 USPQ2d 1001 (Fed. Cir. 1996), cert. denied, 520 U.S. 1115 (1997)

¹¹⁷ See *Chisum*, *supra* note 98, at fn 177.

¹¹⁸ *In re Mahurkar*, 831 F. Supp. 1354, 1379-80 (N.D. Ill. 1993), *aff’d*, 71 F.3d 1573 (Fed. Cir. 1995).

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.”¹¹⁹

Using the presence of notice to deny laches is a significant problem for software standards because it is common for companies to give notice of infringement in hopes of garnering a quick settlement, even when, as is common in the software industry, the likelihood of infringement or validity is small. However, a company using an industry-wide standard cannot afford to stop at the first sign of trouble.

Finally, the speed of innovation in the software industry makes proving economic prejudice in a way that would protect standards adopters difficult. A presumption of material prejudice arises after six years, but proving prejudice after a lesser period can be difficult. Even a delay of two years after the infringer provided direct notice to the patentee that the product may be infringing could be insufficient.¹²⁰

(2) 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.¹²¹ The extent of expectation damages hinges on causation and foreseeability, abstract ideas that are often difficult to apply to a specific case.¹²² This difficulty is exacerbated in the standards context because the function of standards as a means for interoperability means

¹¹⁹ Chisum, *supra* note 98, quoting *In re Mahurkar*, 831 F. Supp. at 1379-80.

¹²⁰ See Chisum, *supra* note 98 (citing *Ecolab, Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1371-72 (Fed. Cir. 2001) (a district court did not abuse its discretion in granting summary judgment against a defense of laches and estoppel; after an accused infringer entered into a settlement of a patent owner's suit alleging infringement of a first product, the accused infringer developed a new product; the accused infringer asserted that it had sent a letter and a sample of the product to the patent owner a week before introducing the new product on the market, stating its belief on infringement, but had received no response from the patent owner; two years later, without warning, the patent owner filed suit for infringement, seeking an “immediate injunction.”; the district court found that the accused infringer had suffered no economic prejudice resulting from the patent owner's delay in filing suit. Its expenditures incurred in introducing the new product were “merely business decisions to capitalize on a market opportunity.”)

¹²¹ ARTHUR LINTON CORBIN, CORBIN ON CONTRACTS, § 11-56-1 (rev. ed. 1993).

¹²² *Id.*

that the connection between a standard and a company's costs and profits is very real, but often quite diffuse and attenuated. Competitors often must agree to engage in a collaborative standard setting process rather than competing between standards. Companies must then spend time and resources adopting a standards, thus incurring a significant opportunity cost because 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 investment cost to industry for a standard as ubiquitous as, for example, Adobe PDF, seems incalculable.

The second factor that traditional economic prejudice fails to account for is that standards adoption typically consists of many small investments, primarily to third parties to any infringement dispute. As discussed in Section II.B, network 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. The traditional equitable analysis breaks down in the face of widespread industry reliance because economic prejudice typically takes into account only damage to the parties at suit.

3. Injunctive Relief

Courts may be more willing to deny injunctive relief in the wake of *eBay Inc. v. MercExchange*.¹²³ Under *eBay*, courts must employ the traditional four-factor test to determine whether an infringement merits equitable relief.¹²⁴ However, *eBay* is insufficient to protect open standards. Although it is fortunate that courts have such discretion in crafting equitable remedies to patent infringement, 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.

¹²³ 126 S.Ct. 1837 (2006).

¹²⁴ *Id.*

4. Adverse Possession

Professors Bagley and Clarkson have suggested that courts could use adverse possession to resolve conflicts between antitrust and intellectual property.¹²⁵ One economic justification for adverse possession is a Lockean idea that it “tends to prevent valuable resources from being left idle for long periods of time by specifying procedures for a productive user to take title from an unproductive user.”¹²⁶ Thus, adverse possession in intellectual property law would protect markets from which the property owner did not choose to exclude participation by other firms.¹²⁷

Bagley and Clarkson’s conception of adverse possession as related to IP would apply to continuous, long-standing, noninfringing use of intellectual property.¹²⁸ If a firm had market power, the idea could be extended to refusals to deal using a rule of reason analysis and a variant of the “essential facilities” doctrine.¹²⁹ Essentially, their proposal is that intellectual property owners should enjoy the full scope of their property right, but that prolonged noninfringing use coupled with nonassertion should give rise to a right to continue such use.¹³⁰

Professor Carrier suggests a similar approach.¹³¹ According to Carrier, “the right to exclude is only partially necessary to achieve the stated goals for property and IP.”¹³² In industries such as “semiconductors, office equipment, motor vehicles, textiles, primary metals, instruments, food, printing/publishing, steel, and electric components,” firms often view patents as ineffective appropriability mechanisms and prefer market-based incentives such as branding, lead-time, and first mover advantage.¹³³ Particularly in network markets, patents play a less vital role in spurring innovation.¹³⁴

Several defenses already exist in patent law that push upon the right to exclude. First, state sovereign immunity and compulsory licensing protect against injunctions, particularly in cases of

¹²⁵ Constance E. Bagley & Gavin Clarkson, *Adverse Possession for Intellectual Property: Adapting an Ancient concept to Resolve Conflicts Between Antitrust and Intellectual Property Laws in the Information Age*, 16 HARV. J.L. & TECH. 327 (2003).

¹²⁶ *Id.* (citing ROBERT COOTER & THOMAS ULEN, LAW AND ECONOMICS 156 (1988), JOHN LOCKE, SECOND TREATISE OF GOVERNMENT § 25, in TWO TREATISES OF GOVERNMENT 336 (P. Laslett rev. ed. 1963) (1690)).

¹²⁷ *Id.* at 374-75.

¹²⁸ *Id.*

¹²⁹ *Id.* at 376.

¹³⁰ *Id.* at 392.

¹³¹ Michael A. Carrier, *Cabining Intellectual Property Through A Property Paradigm*, 54 DUKE L.J. 1 (2004).

¹³² *Id.* at 7.

¹³³ *Id.* at 40.

¹³⁴ *Id.*

“medical need, public sanitation, and transportation requirements.”¹³⁵ In addition, inequitable conduct, prosecution laches, patent misuse, exhaustion, implied license, repair, estoppel limits on the doctrine of equivalents, and the first inventor defense all contain equitable restrictions on the right to exclude.¹³⁶ Carrier argues that additional necessity considerations, such as public health emergencies, should allow circumvention of patent rights.¹³⁷

Standards estoppel shares with the proposals of Professors Carrier, Bagley, and Clarkson the underlying principle that the patentee builds up a sort of reliance interest when he uses a technology that is later determined to infringe a patent. However, standards estoppel is different in that it applies to a limited set of circumstances and is designed to protect against specific types of anticompetitive, strategic behavior. The purpose behind the standards estoppel doctrine is not to protect industry participants, but rather the software industry as a whole.

D. Responding to Criticism

Such severe limitations on remedies may seem to decrease incentives for innovation, but we believe that this is not the case. Whenever a firm adopts some technology, there is some risk that the firm infringes a patent, since actual infringement is indeterminate before suit. Generally the patentee receives the benefit of that information to the patentee, since a finding of infringement typically merits not only an injunction against future infringement, but damages for past infringement.¹³⁸ Under Grain Processing, however, the infringer can claim that if he had known that his technology infringed, he would have adopted a different, non-infringing technology. Thus, the benefit of the information shifts to the infringer where there were noninfringing alternatives to the patented technology. Here the industry as a whole, rather than a single firm, is choosing a technology to adopt. Typically there are many technologies to choose from, yet all bear some risk of infringement. Like an infringer under Grain Processing, the industry should be able to claim the benefit of the information.

Grain Processing has generally met with approval,¹³⁹ though it is not without its critics.¹⁴⁰ In particular, Grain Processing may allow an infringer to retroactively switch his decision to adopt

¹³⁵ *Id.* at 108.

¹³⁶ *Id.*

¹³⁷ *Id.* at 123.

¹³⁸ See *Dennison Mfg. Co. v. Panduit. Corp.*, 475 U.S. 809 (1986).

¹³⁹ See, e.g., John W. Schlicher, *Measuring Patent Damages by the Market Value of Inventions – The Grain Processing, Rite-Hite, and Aro Rules*, 82 J. PAT. & TRADEMARK OFF. SOC’Y 503, 532 (200).

the technology and thus enjoy a “free option” to use a potentially infringing technology without risk. However, an important consideration under standards estoppel is that the patentee would not be denied remedy so long as she spoke up before onset of industry lock-in and the attendant sunk costs. Additionally, when the industry formulates an open standard, it attempts to define a framework for competition between firms, not adopt a potentially infringing technology with which to compete with other firms as in Grain Processing. Patent law should adapt to reflect this pro-competitive purpose. Preventing a “snake in the grass” or “bait and switch” tactic to impede the normal course of industry growth is important to ensure that patent law continues to provide efficient incentives for innovation in the software industry.

IV. Amplification and Explanation

A. Requirements, Limitations, and Exceptions

The software industry and the companies that comprise it suffer injury when a patentee asserts a patent against an established standard to which the industry is “locked in.” This is inefficient because the perceived cost of the standard may be significantly lower than its real cost, which may not be revealed until long after the industry has adopted and relied upon the standardized technology. The presence of two factors should reduce or eliminate the availability of remedies in a patent infringement suit involving standardized technology.

First, the particular infringer and the industry as a whole easily could have chosen another technology but are now “locked in” due to network effects and high switching costs. This factor arises in cases where several viable technologies competed for adoption. Presumably in such a scenario, the industry settled on the technology with the maximum gain at the minimum cost, where the cost included any patent royalties necessary to implement the standard. For example, the computer industry easily could have adopted either IBM’s token ring or the open Ethernet standard as a networking protocol, but settled on the Ethernet protocol.¹⁴¹

Second, the industry as a whole, rather than a single defendant, has experienced economic prejudice from the adoption of the standardized technology. The benefits of standardization are

¹⁴⁰ See, e.g. Jerry A. Hausman, Gregory K. Leonard, & J. Gregory Sidak, Patent Damages and Real Options: How Judicial Characterization of Non-Infringing Alternatives Reduces Incentives to Innovate, 22 Berkeley Tech. L.J. ____ (2008).

¹⁴¹ Urs von Burg, *supra* note 16.

not without cost to industry.¹⁴² The industry tries to minimize this aggregate cost, often by creating an open standard where no firm can charge monopoly rents.¹⁴³ One can infer economic prejudice against the industry as a whole when this agreement suddenly changes, such as when a patentee unexpectedly asserts a patent against an entrenched industry standard.

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 generally irrelevant. 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 would yield significant costs due to “lock in” of the standard.

B. Effects on Remedies

An infringement suit of the type described in Section III.A should give rise to “standards estoppel,” which would prevent the patentee from being awarded 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, an affirmative act by the patentee is unnecessary because the widespread adoption of a standard is sufficient to prove that the patentee should have known of the infringement. Because the costs to industry are so high, it is not unreasonable to impose upon the patentee an affirmative duty to take action before industry “lock in.” Furthermore, a firm should not be enjoined from practicing an industry standard, particularly since 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.¹⁴⁴

In most cases, however, the patentee seeks royalties rather than an injunction because the value of the standard lies in its widespread adoption. A finding of standards estoppel would limit or eliminate the availability of damages, thus preventing patentees from misappropriating this

¹⁴² See *supra* Section II.C.

¹⁴³ As discussed in Section I.A, openness does not imply that a standard is non-proprietary. For example, a firm with rights in a proprietary standard might agree not to assert those rights at all, not to assert rights against non-commercial users, or not to assert rights against authors of open source software in order to spur adoption of the standard. For example, Adobe has quite successfully adopted such a strategy with its PDF format.

¹⁴⁴ See *eBay v. MercExchange*, 126 S.Ct. 1837 (2006).

value. The limitation on damages is similar in principle to laches, but there are several key differences. First, the clock starts for standards estoppel when the standardized technology is adopted, not when the patentee becomes aware of infringement. This can be important if, for instance, a new patent issues that reads on a well-established standard. 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, industry “lock-in” would prohibit damages as soon as it occurs. The very fact that the software industry works so hard 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 rents vastly above what it would have been willing to pay *ex ante*.

C. Assignment

In order to provide meaningful protection to good faith standards adopters, standards estoppel should not terminate at patent assignment. 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. Those doctrines provide ample ground for extending the protection afforded by standards estoppel through assignments.

Patent licenses are contractual arrangements. A patentee who assigned a patent that was the subject of an ongoing license and who was then unable to fulfill the terms of that license would thus have violated a contract. 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 treat them as having narrow scope, cases in which an assignee sues the beneficiary of an implied license from the assignor (likely a potential customer) are rare. However, equitable estoppel bars not only relief for past infringement but also future claims for infringement; the purpose of the doctrine would be frustrated if assignment could void the estoppel. Moreover, “[a]n implied license’s scope and duration depend on the circumstances that create the license.”¹⁴⁵ The nature of standards estoppel

¹⁴⁵ Chisum, *supra* note 98, ch. 16.03, § 2.b.v. (citing *Carborundum Co. v. Molten Metal Equipment Innovations, Inc.*, 72 F.3d 872 (Fed. Cir. 1995)).

suggests that the scope of the license should extend to the standard in question and the duration should be indefinite.

The case with laches is more clear. A patentee also cannot evade laches by assigning the patent. 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. . . . 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.”¹⁴⁶

Patent owners must record patent assignments with the USPTO. Under 35 U.S.C. § 261, unrecorded assignments are void after 3 months against bona fide purchasers. However, there are no recording rules for licensees, and the burden is on the assignees to make inquiries as to pre-existing behavior that would give rise to equitable estoppel or laches defenses. Standards estoppel should follow a similar analysis. The assignee and assignor can 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 prevents patentees from evading the restrictions of standards estoppel by assignment.

D. Bankruptcy

Bankruptcy is a more difficult case than assignment because bankruptcy law often permits estates to either assume or reject IP licenses.¹⁴⁷ 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.”¹⁴⁸ If bankruptcy courts categorize use of patented technology permitted by standards estoppel as a license, then standards adopters would 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 the original company had. 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

¹⁴⁶ Chisum, *supra* note 98, at ch. 19.05, § 2.ii (citing *Eastman Kodak Co. v. Goodyear Tire & Rubber Co.*, 114 F.3d 1547, 1559 (Fed. Cir. 1997)).

¹⁴⁷ See Peter S. Menell, *Bankruptcy Treatment of Intellectual Property Assets: An Economic Analysis*, 22 Berkeley Tech. L. J. 733 (2007).

¹⁴⁸ *Id.* at 769.

attractive course of action.¹⁴⁹ 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.

Bankruptcy would thus become an attractive target and leave a large loophole in the doctrine if bankruptcy terminated standards estoppel. The need for standards estoppel to persist through and beyond bankruptcy proceedings is similar to the need for implied licenses to persist through assignment. Both implied licenses and standards estoppel hinge on a reliance argument – the patentee’s action (or inaction) gives rise to a reasonable expectation in the user of the patented technology that he may continue his use unmolested.

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.¹⁵⁰ In contrast, completed sales are excluded from the bankruptcy estate. 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.¹⁵¹ Protection by way of standards estoppel, as with an implied license, does not reflect an ongoing relationship between the parties of the type that should be categorized as an executory contract. It 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 reliance interest in use of the patented technology. Compromising that interest in bankruptcy is at odds with the fundamental purpose of standards estoppel, which is 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 effectively adversely possessed, such as in the snake in the grass situation, then the patentee waived ownership over the IP in a certain context and cannot regain it, no more than a bankrupt real estate owner could regain possession of adversely possessed land. If instead standards estoppel arose through promises of openness, as

¹⁴⁹ See Elizabeth Montalbano, PCWorld.com, Novell Won’t Pursue Unix Copyrights, <http://www.pcworld.com/article/id,135959-c,unix/article.html> (Aug. 15, 2007).

¹⁵⁰ Menell, *supra* note 147, at 754.

¹⁵¹ *Id.*

in the bait and switch strategy, then the patentee permanently reduced the value of the patent in exchange for industry adoption. Here the deal is done, and the option of renegeing on the deal should be unavailable to the bankruptcy estate.

Bankruptcy courts could instead categorize standards estoppel as an implied license. Here too, though, the obligation should survive a bankruptcy filing for public policy reasons. Although such obligations 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, social, and public implications that transcend the merely commercial.¹⁵² 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, but rather to protect market participants who adopted a standard with a good faith belief that it was open and now can only switch with considerable expense. The finances of a particular patentee are irrelevant.

V. Conclusion

While the hole in the doctrinal fabric of patent infringement defenses is small in terms of the types of enforcement actions that should be estopped, the damage to the software industry is considerable.¹⁵³ 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. Though Microsoft has licensed MP3 from Fraunhofer, Alcatel-Lucent claims that this license does not cover Alcatel-Lucent's patents. Many other companies, such as Apple and RealNetworks, also rely on the Fraunhofer license and are thus now also at risk of infringement suits. 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. The industry needed a reliable format for storing music, and each of these companies made every effort to obtain the appropriate licenses. Only after the deal was well-settled did Alcatel-Lucent attempt to exact a surcharge.

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 their

¹⁵² In a similar vein, Student loans are dischargeable only for "undue hardship," although they are classified as non-priority debts.

¹⁵³ *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>.

assertion at all. Rather, companies with patents that might cover an emerging standard would be required to make known those patents at an early stage, either asserting them in an infringement suit or using them to participate in the standards process. Thus, the incentive to research innovations that result in standards-relevant patents is set at the optimal level while avoiding wealth transfer from companies that would otherwise spend the billions in litigation and damages on further innovation.