

REVERSE ENGINEERING OF COMPUTER
SOFTWARE AND U.S. ANTITRUST LAW

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I. INTRODUCTION

[T]he aims and objectives of [intellectual property] and antitrust laws may seem, at first glance, wholly at odds. However, the two bodies of law are actually complementary, as both are aimed at encouraging innovation, industry and competition.¹

Most efforts by firms to restrict reverse engineering of their software, and corresponding agreements by customers not to reverse engineer their supplier's software, are not likely to raise significant antitrust issues. If a customer, without authorization, were to reverse engineer software to produce a "knock-off" or identical copy of that software for use or sale, this would violate the software owner's copyright. Generally speaking, customers' agreements not to violate the basket of rights bestowed on the copyright holder by law raise no troubling antitrust issues.

Consider, however, the following three hypotheticals:

- (1) A small, start-up software company called Phoenix believes that its programmers have the skill to make major advances in a new spreadsheet program compared to those currently on the market. One of those existing products, called Calcpro, holds a dominant share (ninety percent) of the market for spreadsheet software. Calcpro was developed and is marketed by a very large software company, MicroBig. In order to facilitate development of its new, breakthrough spreadsheet, Phoenix desires to reverse engineer Calcpro. This reverse engineering is necessary because MicroBig has released no technical information regarding Calcpro, and Phoenix's engineers can learn little from simply running a copy of the commercial version. While the new program will be a competitive substitute for Calcpro, it will achieve its functionality and improvements without using in its code any of the protected expression in Calcpro. In order to obtain a copy of Calcpro, Phoenix must enter into a license agreement that restricts its right to copy the program and specifically prohibits reverse engineering *for any purpose*.

1. Atari Games Corp. v. Nintendo of Am., Inc., 897 F.2d 1572, 1576 (Fed. Cir. 1990).

- (2) Assume the same general setting as in hypothetical one except that Phoenix seeks to develop a complementary or "add-on" product, rather than a competitive substitute for Calcpro. This software program would work with the original spreadsheet to balance a checkbook. MicroBig does not have its own checkbook program but is planning to enter that market. MicroBig embeds software "locks" in Calcpro, solely designed to impede the reverse engineering of Calcpro and any interaction with elements needed to build a compatible checkbook program. At the same time, MicroBig fully discloses to its own programmers who are developing a checkbook product the information necessary to work around these obstacles.
- (3) The Alpha Company wishes to provide services that compete in a software product's "aftermarket." Alpha would like to reverse engineer the operating system and diagnostic software that have been developed by Zeta for its line of minicomputers. This reverse engineering would enable Alpha to better undertake maintenance, repair, and troubleshooting for Zeta computers owned by others. While Zeta computers represent only ten percent of the total market for minicomputers, Zeta's operating system software is used on over ninety percent of its minicomputers. Alpha lawfully possesses a copy of the operating system and diagnostic software that it seeks to reverse engineer by virtue of buying a Zeta computer and its bundled software. However, the terms of Alpha's shrink-wrap license limit the software's use to functions necessary to operate or maintain only the computer bought by Alpha. Zeta, which holds an eighty percent share of the service aftermarket for Zeta computers, first threatens and later sues Alpha for copyright infringement, seeking both declaratory and injunctive relief. Zeta alleges that Alpha has reverse engineered Zeta's operating system and diagnostic software and is illegally using knowledge gained therefrom to provide its services to third parties. Zeta ultimately loses the suit, but Alpha's revenues drop precipitously and its financial stability is jeopardized as a result of the threats and expensive litigation.

While these are but a few of the many contexts in which controversies involving the reverse engineering of software arise in today's software and related-products markets, each hypothetical points to an

area where antitrust and intellectual property law intersect in an uneasy fashion. Should the basket of rights conferred by copyright law be allowed to restrain competitive activities such as those suggested by the above scenarios? The courts have only just begun to grapple with these issues, resulting in an immature body of law where there are few clear guidelines for both the software industry and antitrust enforcement authorities. This Article presents an overview of how the laws prohibiting certain acts of monopolization, attempts to monopolize, refusals to deal, and tying arrangements might apply to restrictions and agreements on the reverse engineering of computer software. As a necessary foundation for this analysis, however, this Article first defines reverse engineering of computer software. It then briefly describes the contours of intellectual property protection for software, including the fair use and the copyright misuse doctrines. No competent antitrust analysis could be performed in isolation from these closely related bodies of law. Building upon this predicate, the antitrust analysis of each of the above scenarios is then presented.

II. REVERSE ENGINEERING OF COMPUTER SOFTWARE DEFINED

The concept of reverse engineering as applied to computer software normally refers to a variety of practices undertaken to understand how a software program is built and how it achieves its functionality. Unlike other forms of literary expression, such as books, software cannot be simply "opened up" and read or examined. In its finished state ("object code" form), computer software consists of machine-readable object code that is not meaningful to or comprehensible by humans. Most software is sold or leased to end-users in object code form. While software users can easily observe the outward functioning of the program, they cannot as easily perceive the ideas, processes, structures, or actual methods of operation of the program as it was written.

In the typical software development process, programmers write code in a programming language using alphanumeric characters that can be understood by a person familiar with the language. This form of the program is referred to as "source code." After the source code is written, it is translated by a "compiler" program into the machine-readable object code.

In order to understand the ideas and "inner workings" of a computer program, one must therefore obtain either the original source code or detailed written specifications from the program's developer. If these cannot be obtained, it becomes necessary to undertake a process of independently "decompiling" the object code back into source code. Because of factors inherent in the present technology, it is practically

impossible to decompile object code back into an exact replica of the original source code.²

For the purposes of copyright law analysis, it is important to understand that it is impossible to undertake the process of decompilation without at some point making a copy of either some or all of the program. Copying may take the forms of loading the program into computer memory, outputting it to a screen or printer, or copying it to other media.

The information provided by decompilation of software can be used for a variety of purposes. As will be discussed below, the particular purpose may well be dispositive in determining whether the process of reverse engineering in any given instance runs afoul of the copyright law. Briefly, the objectives of decompilation might be categorized as follows:

- **Copies.** Information regarding the structure, functions, ideas, and expression embodied in a program may be sought for the purpose of creating an identical or substantially similar substitute product.
- **Functional Equivalents.** Alternatively, the information could be sought for the purpose of creating a functionally equivalent, but not identical, product. The distinction between this type and the direct copy is that the developer of the new code aims to enable his program to perform the same function as the code that has been studied, but achieves that functionality by code structure and procedures developed independently (not copied) from the original code.³
- **Interoperable Products.** In addition to copies or functional equivalents, information about a program is frequently desired in order to build interoperable software or hardware products, or to provide service. Such interoperable products could enhance or add entirely new functionality to the original software. The need for such information is particu-

2. Thus, while we frequently refer to the process of "decompilation," it should be understood that there is no simple process or technology by which this can be accomplished.

3. In this context, reverse engineering is used in a "clean room" development process, in which one group of programmers studies the original (target) code, writes a set of functional specifications, and then gives those specifications to another group who never had access to the original code. These programmers, who were never exposed to the original, then develop their own code to achieve the desired functionality.

larly great when the software has obtained widespread acceptance in the market, has become a standard, represents a critical component in a larger system, or provides "low level" and highly functional services in a system.⁴

III. INTELLECTUAL PROPERTY CONTEXTS

A. *Intellectual Property Rights Relevant to Protection of Computer Software*

Computer software may be protected by trade secret, patent, copyright, or certain combinations thereof. Each body of law confers the potential to limit use of the protected software, with attendant consequences for the terms of competition in the marketplace. Over the years, U.S. jurisprudence and legislation have reconciled some of the inherent tensions between antitrust and intellectual property laws by recognizing that efforts to enforce intellectual property rights beyond their proper scope may give rise to antitrust liability.

Historically, courts have tended to draw few distinctions in the treatment of antitrust issues raised in patent and copyright cases.⁵ Recently, however, a few courts have begun to apply a more critical analysis recognizing some significant distinctions in the substantive protections and underlying objectives of the patent and copyright law.⁶ Nevertheless, because most software protection has been obtained and enforced in recent years through the application of copyright law, this Article will focus on antitrust analysis in the context of copyright law.

1. Basic Concepts of Copyright Law Applicable to Software

Our intention in this Article is to briefly note some of the basic concepts of copyright law relevant to our antitrust analysis. This Article therefore will not cover the substance of software copyright law in depth because this subject is discussed in great detail in other treatises and articles.

4. Examples include ROM BIOS or operating system software.

5. See, e.g., *United States v. Paramount Pictures, Inc.*, 334 U.S. 131 (1948) (applying rule of patent tying cases to block-booking of copyrighted motion pictures).

6. See Leslie Wharton, *Misuse and Copyright: A Legal Mismatch*, *COMPUTER L.*, Mar. 1991, at 1.

a. Scope of Copyright Protection Afforded Software

The applicability of copyright law to computer software was legislatively confirmed by the Software Copyright Act of 1980.⁷ While this Act settled the question of whether software could be protected under the copyright law, it did not specifically delimit the scope or nature of such protection. This task has been left to the courts, which have struggled to apply a body of law developed in the context of more traditional types of literary works.

b. Idea versus Expression

A substantive analysis of copyright law applied to software must begin with an understanding of a basic precept of copyright law: protection extends to an author's expression of a given idea, not to the idea itself. Section 102(b) of the Copyright Act states: "[i]n no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work."⁸ Courts asked to apply copyright law to software have had difficulty in determining exactly what is protectible expression versus what is an unprotectable idea or procedure in a given program. Indeed, there is no consensus on how to analytically approach the question.

c. The *Altai* Methodology

The leading case in this field of law is *Computer Associates International, Inc. v. Altai, Inc.*,⁹ in which the Second Circuit undertook a thoughtful and detailed consideration of how to both analyze and determine whether one piece of software infringed another.¹⁰ The *Altai* court first rejected the view, adopted in earlier cases, that there is but one idea embodied in a piece of software.¹¹ Instead, the court broke the

7. Act of Dec. 12, 1980, Pub. L. No. 96-517, sec. 10(a), 94 Stat. 3015, 3028 (amending 17 U.S.C. § 101 (1994)).

8. 17 U.S.C. § 102(b) (1994).

9. *Computer Assoc. Int'l, Inc. v. Altai, Inc.*, 982 F.2d 693 (2d Cir. 1992).

10. *See id.*

11. *See, e.g., Whelan v. Jaslow Dental Lab.*, 797 F.2d 1222 (3d Cir. 1986), cert. denied, 479 U.S. 1031 (1987). Nimmer indicates that, "[t]he crucial flaw in [Whelan's] reasoning is that it assumes that only one 'idea,' in copyright law terms, underlies any computer program, and that once a separable idea can be identified, everything else must be expression." 3 MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 13.03[F], at 13-62.34 (1991).

plaintiff's program into conceptually-separate modules, each potentially representing a non-protectible idea, and isolated the remaining protectible code for comparison with the defendant's code.

The *Altai* court also established the applicability of the "merger" doctrine to computer software, holding that copyright protection is not available in such instances where the module's idea cannot be separated from the creative and technical expression. Thus, the court found the plaintiff's expression here to be principally dictated by function, in that many of the similarities between the two programs stemmed from the functional requirement that they be fully compatible with an IBM mainframe and operating system. *Altai's* expression was therefore held not to be protected by copyright.

d. Fair Use

The Copyright Act generally allows anyone to engage in fair use of copyright protected works.¹² Controversy exists, however, over the scope of fair use. Specifically, is a person who lawfully possesses a copy of a work is entitled to use that work to understand its ideas, processes, and methods of operation?

Section 107 of the Copyright Act states that fair use covers reproductions for such purposes as criticism, comment, scholarship, or research.¹³ The statute specifies four criteria to be considered in determining whether a given use is covered by the fair use exception:

- (1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
- (2) the nature of the copyrighted work;
- (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
- (4) the effect of the use upon the potential market for or value of the copyrighted work.¹⁴

It is important to note that the Copyright Act makes clear that the above four factors are not exclusive and that others may be weighed in what is essentially an equitable defense.

The fair use exception has been applied and interpreted in several recent software copyright cases. *Atari Games Corp. v. Nintendo of*

12. See 17 U.S.C. § 107 (1994).

13. See *id.*

14. *Id.*

*America, Inc.*¹⁵ raised the question of whether certain efforts by Atari to develop its own program to unlock the Nintendo game console and allow an Atari game program to be run on the console violated Nintendo's copyrights in the locking software.¹⁶ The Federal Circuit ultimately upheld the grant of a preliminary injunction against Atari based on the copyright claim after clarifying the application of the fair use doctrine in cases of reverse engineering of copyrighted software. Most importantly, the Federal Circuit admonished the lower court for *assuming* that reverse engineering was copyright infringement and held that copying associated with reverse engineering was not *per se* infringement. The court stated that, "reverse engineering object code to discern the unprotectable ideas in a computer program is a fair use."¹⁷ The court reached this conclusion by noting that the underlying policy objectives of the Copyright Act were not to reward authors, but to promote the progress of science and encourage authors to share their works.¹⁸ The Federal Circuit was also persuaded by the fact that software in object code form cannot be understood without some intermediate copying, noting, "an individual cannot even observe, let alone understand, the object code on Nintendo's chip without reverse engineering."¹⁹ The decision in *Atari* required that a reverse engineering infringement analysis in the context of reverse engineering move beyond the question of intermediate copying to an examination of both the *purpose* of the decompiling and the resulting product itself.

The second major case in this field is *Sega Enterprises Ltd. v. Accolade, Inc.*,²⁰ which reached a similar conclusion. The Ninth Circuit held it is fair use to make intermediate copies of plaintiff's code provided there is no other way for defendant to study and understand the code, and there is no substantial similarity between the defendant's and the plaintiff's final products.²¹ In finding fair use the Ninth Circuit gave serious attention to the competition issues raised by the case, noting that,

15. 975 F.2d 832 (Fed. Cir. 1992).

16. *See id.* An original complaint was filed by Atari alleging unfair competition, antitrust violations, and patent infringement. *See id.* at 835. Nintendo later sued for unfair competition, copyright and patent infringement, and trade secret violations. *See id.* Nintendo was granted a preliminary injunction on its copyright claim and appeal was taken to the U.S. Court of Appeals for the Federal Circuit. *See id.*

17. *Id.* at 843.

18. *See id.* at 842.

19. *Id.* at 843-44. *But see* DSC Communications Corp. v. DGI Technologies, Inc., 898 F. Supp. 1183, 1188 (N.D. Tex. 1995) (finding that a *prima facie* showing of copyright infringement exists when the defendant's software is "virtually identical" to the plaintiff's software, unless the defendant can prove fair use to excuse the "disassembling or intermediate copying"), *aff'd*, No. 95-10850, 1996 WL 175511 (5th Cir. 1996).

20. 977 F.2d 1510 (9th Cir. 1992).

21. *See id.* at 1527.

"[Sega's] attempt to monopolize the market by making it impossible for others to compete runs counter to the statutory purpose of promoting creative expression and cannot constitute a strong equitable basis for resisting the invocation of the fair use doctrine."²² At least one other circuit court has since followed the Ninth Circuit's lead to expressly hold that disassembly of copyrighted software may be fair use.²³

While not directly affecting the fair use language of § 107 of the Copyright Act, a significant battle is now brewing in Congress over proposed § 1201 of the National Information Infrastructure Copyright Protection Act,²⁴ which seeks to amend U.S. copyright law to prohibit the manufacture, distribution, or importation of technologies which circumvent anticopying systems designed to protect copyrighted works. Thus if a software product included code to prevent decompilation, anyone who developed or distributed a product with "the primary purpose or effect" of evading that code would be committing an unlawful act.²⁵

This proposal has been strongly criticized by numerous trade associations, by the computer electronics industry, and by educators and librarians as well.²⁶ The interoperable software industry is particularly concerned about the provision precisely because of the possibility that the amendment will be used to prohibit activity found to be lawful fair use under *Sega* and *Atari*. These critics note that the proposed amend-

22. *Id.* at 1523-24. See also *Compaq Computer Corp. v. Procom Technology, Inc.*, 908 F. Supp. 1409 (S.D. Tex. 1995) (holding no fair use of competitor's hardware parameter values by the defendant-distributor where distributor copied values simply to avoid having to create its own values, and not to facilitate study of the functional aspects of the hardware system).

One court, however, has held that a software developer may charge a licensing fee to a firm that makes a copy of its software in order to service customers using that software. Rejecting the defendant's fair use argument, the court in *Triad Sys. Corp. v. Southeastern Express Co.*, 64 F.3d 1330 (9th Cir. 1995), declined to find fair use and follow *Lasercomb Am., Inc. v. Reynolds*, 911 F.2d 970 (4th Cir. 1990), because the plaintiff did not attempt to prohibit the defendant from developing its own competitive service software. See *Triad Sys.*, 64 F.3d at 1336-37. For a more detailed discussion of the *Lasercomb* decision, see *infra* note 37 and accompanying text.

23. See *Bateman v. Mnemonics*, 79 F.3d 1532, 1540 (11th Cir. 1996) ("[W]here disassembly is the only way to gain access to the ideas and functional elements embodied in a copyrighted computer program, and where there is a legitimate reason for seeking such access, disassembly is a fair use of the copyrighted work as a matter of law." (quoting *Sega Enters. Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1527-28 (9th Cir. [1992]))

24. H.R. 2441 and S. 1284, 104th Cong. 1st Sess. (1995). This provision grew out of the Working Group on Intellectual Property Rights' "White Paper" of September 1995. See INTELLECTUAL PROPERTY AND THE NATIONAL INFORMATION INFRASTRUCTURE, REPORT OF WORKING GROUP ON INTELLECTUAL PROPERTY RIGHTS, at 230-34 (1995).

25. H.R. 2441 and S. 1284, 104th Cong. 1st Sess. § 1201 (1995).

26. These include the American Committee for Interoperable Systems and the Computer and Communications Industry Association.

ment would establish a harsher standard for anticopy circumvention devices than for the devices actually used to do the copying. In its decision in *Sony Corp. of America v. Universal Studios, Inc.*,²⁷ the Supreme Court made clear that a copying device does not contribute to copyright infringement if it has substantial non-infringing uses. By contrast, § 1201 would prohibit the use of devices that had substantial non-infringing uses if the primary purpose or effect of the device was to promote copyright infringement. The "effects" test is particularly troubling because of its potential to implicate software developers who build products genuinely intended for lawful uses but which are subsequently adopted for unlawful acts. In response to this opposition, lawmakers are taking a critical look at § 1201, and it is unclear whether, or in what form, this provision will emerge from the legislative process.

Finally, while outside the scope of U.S. legal precedent, it might also be noted that in 1991 the European Community (now the European Union) adopted Council Directive No. 91/250 ("Software Directive") which allows some forms of reverse engineering.²⁸ In particular, the Software Directive allows intermediate copying where those acts "are indispensable to obtain the information necessary to achieve the interoperability of an independently created computer program with other programs."²⁹ Importantly, the Software Directive also stipulates that this right to decompilation may not be negated between parties by contract.³⁰ Many of the innovation-related policy considerations discussed in the *Atari* and *Sega* decisions appear to have motivated the European Community to adopt this Directive.³¹

B. Copyright Cases Involving Antitrust Claims

It has long been recognized that antitrust problems can arise in the case of copyright acquisition, licensing, and enforcement, just as they

27. 464 U.S. 417 (1984).

28. See Council Directive No. 91/250, 1991 O.J. (L 122) 43 [hereinafter Software Directive].

29. *Id.* at art. 6(1). The Software Directive subjects the right to decompilation to the following conditions:

- (a) these acts are performed by the licensee or by another person having a right to use a copy of a program, or on their behalf by a person authorized to do so;
- (b) the information necessary to achieve interoperability has not previously been readily available to the persons referred to in subparagraph (a); and
- (c) these acts are confined to the parts of the original program which are necessary to achieve interoperability.

30. See *id.* at art. 9(1).

31. See *id.* at 43.

may with other types of intellectual property. As the Supreme Court noted, "the copyright laws confer no rights on copyright owners to fix prices among themselves or otherwise to violate the antitrust laws."³² This basic proposition was recently confirmed by the First Circuit, which stated that, "although creation and protection of original works of authorship may be a national pastime, the Sherman Act does not explicitly exempt such activity from antitrust scrutiny and the courts should be wary of creating implied exemptions."³³ While affirming the applicability of antitrust law to copyright, the cases make clear that the antitrust analysis must, nonetheless, be sensitive to the underlying policies and concerns of copyright law.³⁴

The number of cases explicitly considering antitrust issues in the context of copyright are relatively few and are largely concentrated in the areas of blanket licensing of copyrighted music and motion pictures, alleged tying of copyrighted software to hardware or services, and mergers. Copyright issues implicitly arise in the antitrust analysis of virtually all of those cases, however, since copyrights typically form the basis of the disputed market power.

C. Misuse Defense Distinguished from an Affirmative Antitrust Claim/Counterclaim

Before turning to a discussion of antitrust law as applied to reverse engineering of software, it is important to distinguish the various procedural contexts in which antitrust issues may be raised. Patent law has long recognized misuse as an equitable defense to infringement in cases where the patentee has attempted to extend the reach of his patent beyond its proper scope.³⁵ While the Supreme Court has yet to clearly establish the availability of a misuse defense in copyright cases, and

32. *Broadcast Music, Inc. v. Columbia Broadcasting Sys., Inc.*, 441 U.S. 1, 19 (1979).

33. *Data General Corp. v. Grumman Sys. Support Corp.*, 36 F.3d 1147, 1185 (1st Cir. 1994). The opinion went on to cite *Square D Co. v. Niagara Frontier Tariff Bureau, Inc.*, 476 U.S. 409, 421 (1986) ("[E]xemptions from the antitrust laws are strictly construed and strongly disfavored."). *Data General*, 36 F.3d at 1185.

34. *See id.*; *see also* *National Cable Television Advertising Ass'n v. Broadcast Music, Inc.*, 772 F. Supp. 614 (D.D.C. 1991).

35. *See Morton Salt Co. v. G.S. Suppiger*, 314 U.S. 488 (1942).

several commentators oppose such a development,³⁶ several recent cases suggest that the doctrine may be taking root in U.S. jurisprudence.

The leading case in this nascent line is *Lasercomb America, Inc. v. Reynolds*,³⁷ in which the Fourth Circuit held that it was misuse for the plaintiff to have included in its software license a clause prohibiting its licensee from participating in the *development* of any competitive software for a period of ninety-nine years. The court found substantial similarities between the underlying policies of the patent and copyright laws³⁸ and reasoned on that basis that the misuse defense should also be available in copyright cases.³⁹

36. The objections center principally on the differences in the nature and scope of the protection afforded by copyright as opposed to patent law. It is argued that whereas patent protection is narrow but deep, allowing the patentee to preclude all use of the subject invention, copyright protection does not preclude use of underlying ideas and procedures, and is therefore broad and thin. The copyright grant thus conveys much less power to the copyright holder to materially affect competition. Because there is less danger of anticompetitive impact, some argue courts should be less willing to apply the misuse doctrine developed under patent law to copyrights. See Wharton, *supra* note 6. Other objections to the misuse defense have focused more specifically on its applicability to software cases. See, e.g., Marshall Leaffer, *Engineering Competitive Policy and Copyright Misuse*, 19 U. DAYTON L. REV. 1087 (1994). In the software area, critics point to the fact that software is often protected by both copyright and trade secret law and that recognizing a copyright misuse defense in such cases would inevitably lead to forced disclosure of the trade secret-protected portion of the code.

37. 911 F.2d 970 (4th Cir. 1990).

38. See *id.* at 975. The court in *Lasercomb* followed the Supreme Court holding in *Mazer v. Stein*, 347 U.S. 201, 219 (1953):

The economic philosophy behind the clause empowering Congress to grant patents and copyrights is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare through the talents of authors and inventors in "Science and useful Arts." Sacrificial days devoted to such creative activities deserve rewards commensurate with the services rendered.

The *Lasercomb* court wisely noted:

The philosophy behind copyright, parallel to that discussed above for patent, is that the public benefits from the efforts of authors to introduce new ideas and knowledge into the public domain. To encourage such efforts, society grants authors exclusive rights in their work for a limited time.

Id. at 975.

39. See *Lasercomb*, 911 F.2d at 976. In *Atari Games Corp. v. Nintendo of Am., Inc.*, 975 F.2d 832 (Fed. Cir. 1992), the Federal Circuit, applying Ninth Circuit law, held that, "under the appropriate factual setting, copyright misuse may be a viable defense against a claim of copyright infringement." *Id.* at 845. The court went on to note that, "the United States Supreme Court has given at least tacit approval of the defense." *Id.* at 846 (citing *United States v. Loew's, Inc.*, 371 U.S. 38 (1962)). In *Data General Corp. v. Grumann Sys. Corp.*, 36 F.3d 1147 (1st Cir. 1994), the First Circuit, although citing authority in support of the misuse defense, stopped short of adopting it because the court found the underlying antitrust claims meritless. *Id.* at 1170-71. The court noted that, while the *Lasercomb* court held that the misuse defense did not require proof of an antitrust violation, the defendant in

If successfully asserted, a misuse defense can preclude the enforcement of a copyright against an infringer until the misuse is stopped and its effects have dissipated. It must be distinguished from an affirmative antitrust claim/counterclaim, which would, if successful, result in a finding of antitrust liability and an award of antitrust remedies — an injunction and treble damages. While there is much substantive overlap in both misuse and antitrust analysis of the competitive impact of the contested practice, the misuse defense does not require proof of all the elements necessary to establish an antitrust violation.⁴⁰ The *Lasercomb* court succinctly stated: "The question [in a misuse defense] is not whether the copyright is being used in a manner violative of antitrust law . . . but whether the copyright is being used in a manner violative of the public policy embodied in the grant of a copyright."⁴¹

An anticompetitive use of a copyright may thus be asserted either by means of a misuse defense, an antitrust claim/counterclaim, or both. The proof required will depend on the specific way in which the matter is asserted. We focus below on analysis of antitrust law in the context of an antitrust claim or counterclaim. In most instances, however, proof of an antitrust violation will also establish misuse.⁴²

IV. ANTITRUST ANALYSIS

A large number of antitrust issues could potentially arise from situations involving the reverse engineering of computer software. This Article, however, will address only those circumstances that the authors believe are most likely to arise and cause significant antitrust problems, using the three hypotheticals outlined in the Introduction as useful points of orientation. This part will analyze how the antitrust prohibitions against certain acts of monopolization, attempts to monopolize, refusals to deal, and tying arrangements might be relevant to these general situations.⁴³ The antitrust analysis will be performed on a relatively general level, as even small changes in the underlying facts can have dramatic effects on the antitrust outcome.

this instance failed to assert its defense in any terms other than the Sherman Act violation. *Id.* at 1169-70.

40. Some of the more troublesome proofs required in an antitrust analysis, include market power, competitive injury, and antitrust standing.

41. *Lasercomb*, 911 F.2d at 978.

42. Whether and under what circumstances a copyright holder's efforts to limit decompilation will give rise to misuse will turn largely on the equities of each case. As a general proposition, there appears to be no reason why such actions could not give rise to misuse. See Leaffer, *supra* note 36, at 1102.

43. Other potential antitrust issues, including conspiracy to monopolize, conspiracy to restrain trade, and vertical restraints are omitted because they are less likely to arise.

A. Monopolization

The offense of monopolization under § 2 of the Sherman Act⁴⁴ requires that plaintiff: (1) define a "relevant market;" (2) show that defendant possesses "monopoly power" within this market; and (3) demonstrate that this monopoly power was acquired or maintained by anticompetitive "willful" acts, "as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident."⁴⁵ These three requirements, which are among the most difficult to define in antitrust, are discussed in turn.

1. Definition of the Relevant Market

The relevant market consists of any product(s) or groups of products that effectively compete with the product in question. These are the goods or services that, as a matter of commercial reality, might be able to prevent or significantly constrain any supracompetitive pricing by a hypothetical monopolist of the product(s) in question.⁴⁶ The relevant market must be defined in terms of two dimensions: the product(s) involved (the product market) and the geographical area(s) affected (the geographic market).⁴⁷

This analysis may be especially complex in cases involving the reverse engineering of computer software because two or more relevant products will often be involved. Consider, for example, the situations presented in hypotheticals two and three. In hypothetical two, involving a spreadsheet and an interoperable checkbook program, it is likely that separate product markets would be defined for both the spreadsheet and the complimentary checkbook program. In hypothetical three, as many as four separate markets may need to be defined: the computer hardware, the operating system software, the diagnostic software, and the computer service markets.

44. 15 U.S.C. § 2 (1994) provides: "Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony . . ."

45. *United States v. Grinnell Corp.*, 384 U.S. 563, 570-71 (1966). The intent requirement for the offense of monopolization is not generally an issue, "for no monopolist monopolizes unconscious of what he is doing." *United States v. Aluminum Co. of Am.*, 148 F.2d 416, 432 (2d Cir. 1945).

46. See *Grinnell*, 384 U.S. at 571 (holding that the relevant market includes those products to which "customers may turn . . . if there is a slight increase in the price of the main product.").

47. See *Brown Shoe Co. v. United States*, 370 U.S. 294, 324 (1962).

a. Relevant Product Market

The Supreme Court set forth the general principles under which product markets are to be defined in *United States v. E.I. DuPont de Nemours & Co.*:⁴⁸

The "market" which one must study to determine when a producer has monopoly power will vary with the part of commerce under consideration. The tests are constant. That market is composed of products that have reasonable interchangeability for the purposes for which they are produced — price, use and qualities considered.⁴⁹

Products are considered to be in the same market if they are reasonably interchangeable in use and if their prices are reasonably comparable. These two concepts are often related, for even if two products theoretically could substitute for one another they would not do so as a practical matter if the price of the potential substitute was too high. To take account of this, courts consider the cross-elasticity of demand for the two products as indicated by "the responsiveness of the sales of one product to price changes of the other."⁵⁰ The Court in *DuPont* reasoned that, "[i]f a slight decrease [or increase] in the price of [a product] . . . causes a considerable number of customers of [other products to switch to that product] . . . it would be an indication that a high cross-elasticity of demand exists between them; that the products compete in the same market."⁵¹

A similar approach is contained in the U.S. Department of Justice's Merger Guidelines.⁵² To define a product market, the 1992 Merger Guidelines begin by examining each product produced or sold by both merging firms. They then ask whether a "small but significant and nontransitory" price increase (the Guidelines suggest five percent for one year) by a hypothetical monopolist would cause buyers to switch to other products and thus make the increase unprofitable. If the answer is yes, then the market is expanded to include the additional products.⁵³

48. 351 U.S. 377 (1956).

49. *Id.* at 404.

50. *Id.* at 400.

51. *Id.* The DuPont test may yield an overly-broad market because pre-existing market power will lead a firm to raise price until the product in question competes with other products. For the origin of the "cellophane fallacy," see Donald F. Turner, *Antitrust Policy and the Cellophane Case*, 70 HARV. L. REV. 281, 308-13 (1956).

52. U.S. Dept. of Justice and U.S. Federal Trade Comm'n, Merger Guidelines, 4 Trade Reg. Rep. (CCH) ¶ 13,104, at 20,569 (1992) [hereinafter 1992 Merger Guidelines].

53. See *id.* § 1.11.

Both use and price comparisons are often matters of degree. It is difficult to predict, for example, how similar two computer programs would have to be before they would be considered to be within the same relevant market for antitrust purposes.⁵⁴ They need not be identical, but how different could they be and still be considered "reasonably interchangeable?" Similarly, suppose there are two programs that accomplish virtually the same tasks but one is a "deluxe" version that does more and sells for a higher price. How much higher must that price be before the products are considered to be in different relevant markets? What percentage of consumers would have to switch to the deluxe version if the less expensive product's price rose ten percent (as a result of product monopolization) for the two products to be considered "reasonably interchangeable" in terms of use and price? This is an extremely complex and intensely fact-dependent area of law.⁵⁵

Consequently, the definition of product markets for copyright purposes can become particularly difficult in cases where a court has before it issues involving fair use,⁵⁶ misuse,⁵⁷ and affirmative antitrust claims. The theories of market definition under each of these bodies of

54. Product market analysis in software cases is made more difficult by underlying technological factors such as operating system and hardware compatibility. Consider the situation in which two spreadsheet products perform nearly identical functions, and cost the same, but one is designed to run only on an Intel "IBM-compatible" microprocessor whereas the other runs only on a Sun Workstation. Serious arguments can be made that the two products, although identically priced and functionally similar, do not compete with each other for purposes of antitrust analysis. From the perspective of buyers locked into a particular item of hardware, the products would not be substitutes. From the perspective of a prospective purchaser trying to decide between an Intel "IBM-compatible" microprocessor and a Sun Workstation, however, the two programs might well be substitutes for one another. For example, in the recent case of *United States v. Microsoft Corp.*, the Justice Department's Complaint defined the relevant product market as operating systems for "x86" microprocessors and implicitly rejected a broader market definition that would include operating systems designed to run on other hardware platforms. See Proposed Final Judgment and Competitive Impact Statement, *United States v. Microsoft Corp.*, 59 Fed. Reg. 42,845, 42,846-47 (1994).

55. For additional considerations, see A.B.A. ANTITRUST SECTION, ANTITRUST LAW DEVELOPMENTS 196-208 (3d ed. 1992).

56. As is noted *supra* part III(A)(1)(d), one of the statutory considerations in assessing a fair use exception is, "the effect of the use upon the potential market for or value of the copyrighted work." 17 U.S.C. § 107 (1994) (emphasis added).

57. The misuse defense usually focuses on the question of whether the copyright in issue has been used to violate the antitrust laws or the public policy embodied in the copyright grant. This, in turn, frequently begs the question of whether it has been used to secure market power outside the market or markets to which the copyright grant pertains.

law are far from consistent and many courts fail to maintain analytical clarity among them.⁵⁸

b. Technology and Innovation Markets

Increasing attention has been given in recent years to assessing market power and the impact of anticompetitive practices within what are frequently referred to as "technology" and/or "innovation" markets. In contrast to the traditional product market, which focuses on market competition for the finished goods or services, technology and innovation market concepts have particular relevance to copyrighted computer software and software licensing practices.

A technology market can be defined as the intellectual property that is licensed, transferred, or acquired (or otherwise in issue) and "technologies or goods that are close enough substitutes significantly to constrain the exercise of market power with respect to the intellectual property that is licensed."⁵⁹ For example, assume a software developer β obtains a copyright for a program that simplifies and enhances the display of graphical images used and manipulated in desktop publishing software. β does not have a complete desktop publishing software package, but merely licenses its program to other developers who incorporate it into their software. Other companies offer competing technologies to display graphical images, but β 's program is far superior, and customers of desktop publishing software strongly prefer the β technology. In such a context, the competitive effects of β 's practices may be significant in the technology market comprised of suppliers of alternative display technologies, as well as in the market for desktop publishing software. As with most antitrust analysis, the choice of market definition may have a dispositive effect on the results reached. For example, it may be possible to find the requisite market power and anticompetitive effects in a technology market but not in the markets defined by the finished products themselves, i.e., the desktop publishing software market.

In contrast to a technology market, where an invention or work has been or imminently will be commercialized, an innovation market is an analytical tool used to focus on market power and competitive effects in

58. For a more detailed treatment of this issue, see Daniel M. Wall & Charles S. Crompton III, *The Antitrust and Intellectual Property Law Issues: Exploiting Computer Software Copyrights in Multiple "Markets,"* 8 ANTITRUST 19 (1994).

59. Antitrust Guidelines for the Licensing of Intellectual Property, 4 Trade Reg. Rep. (CCH) ¶ 13,132, § 3.2.2 at 20,737 (1988) [hereinafter IP Guidelines]. The use of technology markets in antitrust analysis is well-recognized in the intellectual property guidelines contained in Antitrust Enforcement Guidelines for International Operations, 4 Trade Reg. Rep. (CCH) ¶ 13,109.10, § 3.6. at 20,605 (1988).

fields where firms compete in research and development directed to new and improved products or processes.⁶⁰

A licensing arrangement may have competitive effects on innovation that cannot be adequately addressed through the analysis of goods or technology markets. For example, the arrangement may affect the development of goods that do not yet exist. Alternatively, the arrangement may affect the development of new or improved goods or processes in geographic markets where there is no actual or likely potential competition in the relevant goods.⁶¹

The U.S. Government sought to prevent two proposed acquisitions of note based, at least in part, on anticompetitive effects in innovation markets.⁶² In *United States v. General Motors Corp.*, the suit was filed to block GM's sale of its Allison transmission division to its largest competitor. The DOJ defined three separate markets in which the transaction would lessen competition, two of which focused on transmission end products while the third dealt with "worldwide technological innovation in the design and production of automatic transmissions."⁶³ Similarly, the FTC recently incorporated innovation market analysis into its review of Silicon Graphics, Inc.'s ("SGI") acquisition of two of the world's three largest developers of entertainment graphics software. SGI

60. See IP Guidelines, *supra* note 59, at 20,738.

61. *Id.* (citations omitted).

62. See, e.g., Complaint, *United States v. General Motors Corp.*, Civ. No. 93-530, 6 Trade Reg. Rep. (CCH) ¶ 45,093 (D. Del. filed Nov. 16, 1993); Complaint, *United States v. Flow Int'l Corp.*, Civ. No. 94-71320, 6 Trade Reg. Rep. (CCH) ¶ 45,094 (E.D. Mich. filed Apr. 4, 1994). See also Proposed Consent Order and Complaint, *United States v. Sensormatic Electronics Corp.*, 5 Trade Reg. Rep. (CCH) ¶ 23,742 (demonstrating that the FTC obtained modification of proposed acquisition to address reduced incentives for research and development).

63. Complaint, *United States v. General Motors Corp.*, Civ. No. 93-530, 6 Trade Reg. Rep. (CCH) ¶ 45,093 (D. Del. filed Nov. 16, 1993). An example of an instance where an innovation market is relevant to antitrust analysis is one in which there are only two software developers with sufficient technical staff and expertise to continue improving a piece of software. For example, with regard to Microsoft's proposed acquisition of Intuit, the DOJ filed suit to block the merger partly because of concern for the resulting concentration of technical expertise. Both Microsoft and Intuit had personal finance software products. While Microsoft had agreed to license its personal finance software product (Money) to a competitor (Novell), it did not agree to transfer any "human" resources. Thus, the DOJ stated: "The Microsoft Money team itself, including all product managers, developers, programmers and sales and marketing personnel, apparently will remain with Microsoft. In contrast, Microsoft has described the Intuit people as the most important resource it will acquire if the transaction closes." Complaint, *United States v. Microsoft Corp.*, Civ. No. 94-1564, ¶ 28 (D.D.C. filed April 27, 1995).

manufactures computer workstations used to run the entertainment graphics software. In its complaint filed with a consent agreement, the FTC specifically alleged that one of the anticompetitive effects of the merger would be to "reduce innovation competition among producers of entertainment graphics software and among producers of entertainment graphics workstations."⁶⁴

Despite the recent attention paid to both technology and innovation markets, there are enormous practical difficulties in the application of these concepts to real cases, as the IP Guidelines recognize. Moreover, the concepts have yet to be applied rigorously and directly in any actual federal antitrust decision, making it difficult to assess what role they are likely to play with respect to reverse engineering of computer software.⁶⁵

One difference that could arise from the use of a technology or innovation market, as opposed to an end-use product market, concerns the time frame within which competitive effects will be assessed. For example, the 1992 U.S. Merger Guidelines ask whether a merger might give a firm the power to impose at least a "small but significant and nontransitory" increase in price,⁶⁶ and whether potential competing suppliers might be able to enter within two years to prevent this increase.⁶⁷ The Guidelines' two-year benchmark starts at the date of the merger.⁶⁸ Since a merger detrimentally affecting competition in a technology or innovation market could focus or extend the search for anticompetitive effects significantly into the future, the use of a technology or innovation market would have the practical effect of significantly extending the two-year benchmark.

c. Relevant Geographic Market

The relevant geographic market is defined as the area in which, as a matter of commercial practicality, potential customers of the relevant product will purchase it. As the Supreme Court observed:

64. Proposed Consent Order and Complaint, *In re Silicon Graphics, Inc.*, 5 Trade Reg. Rep. (CCH) ¶ 23,838 (filed June 9, 1995).

65. While it is not unusual for antitrust cases to mention and take account of the effects of anticompetitive acts on innovation, these cases usually do so within the context of markets traditionally defined as goods or services markets. See, e.g., *McCullough v. Kammerer Corp.*, 166 F.2d 759 (9th Cir. 1948); see generally *Symposium: A Critical Appraisal of the "Innovation Market" Approach*, 64 ANTITRUST L.J. 1 (1995).

66. 1992 Merger Guidelines, *supra* note 32, § 1.0.

67. See *id.* § 3.2. For market-definition purposes, the Guidelines use a one year timeframe. See *id.* § 1.32.

68. See *id.*

The criteria to be used in determining the appropriate geographic market are essentially similar to those used to determine the relevant product market. . . . The geographic market selected must, therefore, both "correspond to the commercial realities" of the industry and be economically significant. Thus, although the geographic market in some instances may encompass [the entire world or] the entire Nation, under other circumstances it may be as small as a single metropolitan area.⁶⁹

As is the case with relevant product market, the relevant geographic market often changes along with price changes. For example, if a product is priced at \$100, potential customers in city *X* might purchase only from vendors in that city. If the product is monopolized and its price rises to \$120, however, some potential customers in city *X* might instead go to city *Y* where the price remains \$100. At \$120, the geographic market includes both city *X* and city *Y*. While in some cases the determination of appropriate geographic market may be complex, absent significant transportation or other distributional cost variances the geographic market in most software cases will either be national or international in scope.

2. Monopoly Power

The Supreme Court has defined monopoly power as "the power to control prices or exclude competition."⁷⁰ Proof of either element is a sufficient predicate for a violation of § 2. The power to control prices is often characterized as a short-term phenomenon: Can the firm at issue profitably raise price? The power to exclude competition is considered a long-term phenomenon, indicative that the monopolist continues to enjoy its monopoly position.⁷¹

Monopoly power can seldom be proven directly, largely because direct evidence that the firm in question is excessively pricing or actually excluding competitors is rarely available.⁷² The courts therefore rely upon other factors to determine whether monopoly power is present.

Market share is the first indicator, and Judge Learned Hand's classic formulation is still widely followed. Hand indicated that a ninety percent

69. *Brown Shoe Co. v. United States*, 370 U.S. 294, 336-37 (1962) (citations omitted).

70. *United States v. E.I. DuPont de Nemours & Co.*, 351 U.S. 377, 391 (1956).

71. For additional complexities and a further discussion of the meaning of monopoly power, see Thomas G. Krattenmaker et al., *Monopoly Power and Market Power in Antitrust Law*, 76 GEO. L.J. 241 (1987).

72. See A.B.A., ANTITRUST LAW DEVELOPMENTS, *supra* note 55, at 212.

market share usually "is enough to constitute a monopoly; it is doubtful whether sixty or sixty-four percent would be enough; and certainly thirty-three percent is not."⁷³ Thus, there is no magic number for the required market share. The average market share of firms found by courts to be monopolists is between seventy-five and eighty-five percent,⁷⁴ with seventy percent market share often enough to demonstrate monopoly power. However, firms with a fifty to sixty percent market share have only been found to possess monopoly power under rare circumstances.⁷⁵

Market share is only the starting point for determining monopoly power. While a firm with only a forty percent market share will almost certainly not be found to be a monopolist, neither will a firm with an eighty percent market share if, for example, entry into the relevant market by competitors can be accomplished quickly and easily. When firms outside the market can enter freely and compete successfully with the incumbent firms in two years or less,⁷⁶ a firm will not be found to have the monopoly power to "control prices or exclude competition."⁷⁷ While ease of entry is the most important factor, others include: "technological superiority resulting in cost advantages, economies of scale, the relative size of competitors, competitors' performance, pricing trends and practices, homogeneity of products, potential competition, and the stability of market shares over time."⁷⁸

Whether a court will determine that a particular firm has monopoly power in a particular market depends upon many factors, and few general conclusions can be drawn. However, two topics of particular interest to antitrust suits involving the reverse engineering of computer software should be noted.

The first issue is whether the owner of copyrighted software will be rebuttably presumed to have monopoly power. The IP Guidelines state: "The Agencies will not presume that a patent, copyright, or trade secret necessarily confers market power upon its owner."⁷⁹ However, in *Jefferson Parish Hospital District No. 2 v. Hyde*,⁸⁰ the Supreme Court stated that when a product is patented, "it is fair to presume that the inability to buy the product elsewhere gives the seller market power."⁸¹ Justice O'Connor disagreed, and noted in a concurring opinion that "a

73. *United States v. Aluminum Co. of Am.*, 148 F.2d 416, 424 (2d Cir. 1945).

74. See Robert H. Lande, *Are Antitrust "Treble" Damages Really Single Damages?*, 54 OHIO ST. L.J. 115, 148-51 (1993).

75. See *id.*

76. Cf. 1992 Merger Guidelines, *supra* note 52, § 3.

77. A.B.A., ANTITRUST LAW DEVELOPMENTS, *supra* note 55, at 215-18.

78. *Id.* at 215.

79. IP Guidelines, *supra* note 59, § 2.2.

80. 466 U.S. 2 (1984).

81. *Id.* at 16.

patent holder has no market power in any relevant sense if there are close substitutes for the patented product.⁸² Because of changes in the composition of the Court, it is unclear whether the Court today would make a rebuttable presumption that the owner of copyrighted software has monopoly power, especially given evidence of the existence of similar products.⁸³ Even if such a presumption were made, moreover, the defendant has the opportunity to rebut it.

The analysis of market power derived from copyright protection, as opposed to other types of intellectual property rights, becomes more complex in the case of software. In general, one would expect the argument in favor of a presumption to be weaker in the case of copyrights because of the less extensive exclusionary rights afforded in comparison with patent protection. In theory, as long as the underlying ideas and functions cannot be protected under copyright law, it would seem that competitive entry barriers should be lower than in the case of patents. However, in the case of software, the reality is often more complex. The complexity derives from the very significant distinctions between software and other traditional types of creative expression protected by copyright. Unlike most other types of expression, software in object-code form normally does not provide transparency of the underlying ideas and functions embodied in the work. To the extent that unprotectable subject matter remains undisclosed and is accessible only by decompilation, if decompilation (i.e., reverse engineering) can be precluded by means of copyright enforcement, the exclusionary effects of the copyright — and hence its market power — grow considerably. By enforcing a copyright to prevent decompilation and understanding of unprotected subject matter, the copyright holder gains exclusionary powers that more nearly approach those of a patent holder.

A second complexity that might be of special concern in reverse engineering antitrust actions concerns the proper time at which the court defines the relevant market and assesses whether monopoly power exists. *Eastman Kodak Co. v. Image Technical Services, Inc.*⁸⁴ required the Court to define a market involving copying machines and other products.⁸⁵ After customers purchased a Kodak machine, they were effectively locked into using that machine for a considerable period of

82. *Id.* at 37 n.7 (O'Connor, J. concurring).

83. In *Data General Corp. v. Grumman Systems Support Corp.*, 36 F.3d 1147 (1st Cir. 1994), which included antitrust claims involving copyrighted software, the First Circuit found that the defendant possessed monopoly power, but cited traditional factors such as market share (over 90%), barriers to entry, market imperfections, and supracompetitive prices rather than the defendant's possession of copyright. See *id.* at 1182 n.60.

84. 504 U.S. 451 (1992).

85. See Robert H. Lande, *Chicago Takes It on the Chin: Imperfect Information Could Play Crucial Role in Post-Kodak World*, 62 ANTITRUST L.J. 193 (1993).

time because of the high cost of switching to another manufacturer. A key question was whether Kodak had monopoly power over these locked-in customers even though the overall copier market was competitive.

The *Kodak* Court held that, in view of imperfect information considerations, it was appropriate to view the situation *after* consumers were locked into Kodak's products, and that in the spare parts and service aftermarkets Kodak had the potential for exploitative monopoly power.⁸⁶

The holding in *Kodak* has major implications for future antitrust actions involving bans on the reverse engineering of computer software. When consumers' information in a market for software is highly imperfect, and when consumers become effectively locked into a particular program or hardware platform, three things follow: (1) the relevant market should be assessed from these locked-in customers' perspective; (2) the software vendor's potential monopoly power should be measured at that point;⁸⁷ and (3) an aftertie (such as a tie between an operating system and hardware service, or between a computer and its diagnostic software) could give rise to an antitrust violation. In cases like that posed in hypothetical three, the *Kodak* holding will make it easier to establish market power, an important prerequisite to a finding of an antitrust violation.⁸⁸

86. Before 1985, potential purchasers of Kodak machines allegedly understood that after purchasing their machines they could go to an independent service organization ("ISO") for parts and service. In 1985 or 1986, Kodak changed its policy and any customer wishing to purchase Kodak's patented spare parts had to purchase a Kodak service contract as well. Kodak thus instituted an "aftertie" between parts and service, effectively eliminating the ISOs. Due to the "lock-in" factor (the cost that would be incurred if a customer with a Kodak machine decided to switch to a new machine), customers could be exploited by the aftertie. Imperfect information permitted the lock-in, and the Court defined the market from the consumers' perspective after the lock-in was in place. The Court said that this was an unexpected change that customers of the machines could not reasonably have anticipated. Competition involving machines, before the machine's initial purchase, could not have protected these consumers effectively since Kodak's switch was expected by neither Kodak's customers nor its competitors. *See id.* at 194-95.

A similar result was reached in *Data General*, where the court found the relevant antitrust market to consist of the "aftermarket for service of Data General computers." *Data General*, 36 F.3d at 1181 n.59. In this narrowly-defined market, Data General had a market share that exceeded 90%. *See id.* at 1182 n.60.

87. If the lock-in is complete and the switching costs are large, the software producer might have a 100% market share and be found to possess monopoly power.

88. *See infra* part IV(B).

3. Conduct

The Supreme Court in *United States v. Grinnell Corp.*⁸⁹ held that a monopoly is illegal only if the antitrust defendant engaged in "willful" acts directed at establishing or maintaining the monopoly "as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident."⁹⁰ This hazy formulation has been clarified somewhat by subsequent case law which makes it clear that the required conduct must be more than "willful." Terms such as "predatory," "anticompetitive," or "unreasonably exclusionary," are generally used by courts to describe the type of conduct required for a violation of § 2.⁹¹ Even these stronger terms, however, do not clarify how "bad" conduct must be to qualify. As the Court recently noted:

The question whether [the antitrust defendant's] conduct may properly be characterized as exclusionary cannot be answered by simply considering its effect on [the plaintiff]. In addition, it is relevant to consider its impact on consumers and whether it has impaired competition in an unnecessarily restrictive way. If a firm has been "attempting to exclude rivals on some basis other than efficiency," it is fair to characterize its behavior as predatory.⁹²

Numerous articles and books have been written on the questions of which conduct should be deemed to violate the prohibition against illegal monopolization, and of how to draw the line between pro-competitive or benign and anticompetitive⁹³ behavior.⁹⁴ No dispositive generalizations as to when a court will decide that conduct is bad enough to be declared "predatory," "unreasonably exclusionary," or "anticompetitive," are possible, other than to note that the offense of monopolization rarely has been proven.⁹⁵

89. 384 U.S. 563 (1966).

90. *Id.* at 570-71.

91. See A.B.A., ANTI-TRUST LAW DEVELOPMENTS, *supra* note 55, at 221.

92. Aspen Skiing Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585, 605 (1985) (citations omitted).

93. Anticompetitive behavior can be classified into two general types — that which reduces rivals' revenue (through such practices as boycott) and that which raises their costs. See Thomas G. Krattenmaker & Steven C. Saloj, *Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power over Price*, 96 YALE L.J. 209 (1986); see also Krattenmaker et al., *supra* note 71, at 249.

94. For representative citations, see Krattenmaker et al., *supra* note 71; see also James D. Hurwitz & William E. Kovacic, *Judicial Analysis of Predation: The Emerging Trends*, 35 VAND. L. REV. 63, 66-70 (1982).

95. See Lande, *supra* note 74, at 147.

One influential formulation deserving mention was first proposed by then-Professor Robert Bork⁹⁶ and has since been endorsed by many courts and commentators.⁹⁷ Bork proposed that conduct be deemed predatory if the conduct *only* made economic sense if it were to result in a monopoly and monopoly profits. If the conduct would be profitable even if it did not lead to a monopoly, it should be presumed benign or procompetitive. The test therefore targets conduct that would be economically irrational *but for* its adverse effect on competition.⁹⁸

This Article does not discuss all of the types of conduct that have been evaluated by courts under § 2 of the Sherman Act.⁹⁹ It instead focuses upon a few areas — the essential facilities doctrine (illegal refusals to deal), sham litigation and business torts, and monopoly leveraging — that will probably be most relevant to monopolization suits involving the reverse engineering of computer software.

a. The Essential Facilities Doctrine (Illegal Refusals to Deal)

The essential facilities doctrine originated in two early antitrust cases. *United States v. Terminal Railroad Ass'n*.¹⁰⁰ concerned the sole railroad bridge crossing the Mississippi river along a several-hundred mile segment. The Supreme Court held that it was illegal for the group of railroads that jointly owned this "essential facility" not to allow a competing railroad to use it. However, the Court explained in *United States v. Colgate & Co.*,¹⁰¹ that "[i]n the absence of any purpose to create or maintain a monopoly, the [Sherman] act does not restrict the long-recognized right of a trader or manufacturer engaged in an entirely private business, freely to exercise his own independent discretion as to

96. See ROBERT BORK, *THE ANTITRUST PARADOX* 144 (1978).

97. See Hurwitz & Kovacic, *supra* note 94, at 66-70.

98. See Bork, *supra* note 96, at 144. Hurwitz and Kovacic describe Bork's methodology:

Professor Bork has defined predation as a "firm's deliberate aggression against one or more rivals through the employment of business practices that would not be considered profit maximizing" except for two expectations: Either the conduct will drive competitors from the market, which would give the predator a sufficient market share to command monopoly profits, or the competitors will, through fear or a renewed spirit of cooperation, "abandon competitive behavior the predator finds inconvenient or threatening."

Hurwitz & Kovacic, *supra* note 94, at 68 (footnotes omitted).

99. A single type of conduct — alleged predatory pricing — has been the focus of numerous law review articles. For citations, see generally Hurwitz & Kovacic, *supra* note 94; Krattenmaker et al., *supra* note 71; Daniel J. Gifford, *Predatory Pricing Analysis in the Supreme Court*, 39 ANTITRUST BULL. 431 (1994).

100. 224 U.S. 383 (1912).

101. 250 U.S. 300 (1919) (interpreting the statutory construction of the Sherman Act).

parties with whom he will deal."¹⁰² Although the essential facilities doctrine has been applied many times, the leading modern applications have involved telecommunications cases. *MCI Communications Corp. v. AT&T*¹⁰³ involved charges by MCI that AT&T effectively refused to allow MCI's long distance service to interconnect with AT&T's local service lines. MCI argued that it was essential to have access to AT&T's local customer lines and that the only reason AT&T refused to allow this interconnection at a reasonable price was to protect its monopoly on long-distance service. The court held:

A monopolist's refusal to deal under these circumstances is governed by the so-called essential facilities doctrine. Such a refusal may be unlawful because a monopolist's control of an essential facility (sometimes called a "bottleneck") can extend monopoly power from one stage of production to another, and from one market into another. Thus, the antitrust laws have imposed on firms controlling an essential facility the obligation to make the facility available on non-discriminatory terms.¹⁰⁴

The court held that four elements were required under the doctrine: "(1) control of the essential facility by a monopolist; (2) a competitor's inability practically or reasonably to duplicate the essential facility; (3) the denial of the use of the facility to a competitor; and (4) the feasibility of providing the facility."¹⁰⁵ Although the contours of this doctrine are unsettled, it seems clear that a monopolist's duty to cooperate with a rival is stronger when the monopolist has had a long history of cooperating with this rival and did not have a valid business justification for its decision to terminate cooperation.¹⁰⁶

The business justification defense is therefore the principal defense against the invocation of the essential facilities doctrine. The other main defense is that the defendant does not compete in the same market as the plaintiff. Both of these defenses are consistent with Bork's definition of predation. A monopolist's decision to deny access to an essential facility will make economic sense if it results in a monopoly and monopoly profits, but it will also make economic sense if: (1) the monopolist has

102. *Id.* at 307.

103. 708 F.2d 1081 (7th Cir.), cert. denied, 464 U.S. 891 (1983).

104. *Id.* at 1132 (citations omitted).

105. *Id.* at 1132-33.

106. See *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 604-05, 608 (1985). *Aspen* may not apply when markets are rapidly evolving. In these circumstances, the past patterns of dealing between competitors may not necessarily support an inference that a present refusal to deal lacks business justification.

a legitimate business justification for the refusal; or (2) the monopolist does not compete in the same market as the excluded firm. Each of these two defenses is considered below.

(i) Legitimate Business Justifications

There are perhaps an infinite number of legitimate business reasons why a monopolist would not want to cooperate with its rivals.¹⁰⁷ Three cases illustrate this point.

*In re E.I. DuPont de Nemours & Co.*¹⁰⁸ involved a defendant that refused to license its low cost technology to rivals. Reasoning that a duty to license might chill incentives to innovate, and finding it justifiable for a firm to choose to fully exploit its own low cost technology, the FTC and the Ninth Circuit refused to find a § 2 Sherman Act violation.¹⁰⁹

*Berkey Photo, Inc. v. Eastman Kodak Co.*¹¹⁰ raised the question of whether a monopolist had a duty to predisclose to its rival its intention to introduce a new product into the marketplace, or to provide its rivals with technical information about new products so they could make compatible products.¹¹¹ The Second Circuit held that Kodak had no such duty to predisclose, reasoning that after a firm undertakes the risks and expenses of innovation it is entitled to all of the success in the marketplace that this innovation brings, and that a duty to predisclose might chill incentives to innovate.¹¹²

Finally, a series of cases involving IBM explored the issue of whether a monopolist could integrate or modify a computer system's components in a way that rendered competitors' interactive peripheral devices inoperable. Several courts held that, as long as there was some plausible respect in which the design at issue was superior or less expensive, a monopolist was free to change its computer so as to disadvantage producers of peripheral devices.¹¹³ An anticompetitive intent on the monopolist's part was deemed irrelevant,¹¹⁴ as was the

107. In the patent context, the law is clear that a patentee has the right to suppress its invention and prevent all others from using it. See *United States v. Studiengesellschaft Kohle*, 670 F.2d 1122, 1127 (D.C. Cir. 1981) (citing *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 212 U.S. 405 (1908)). This issue is addressed in greater detail *infra* part IV(A)(3)(a)(iii).

108. 96 F.T.C. 653 (1980).

109. See *id.* at 748.

110. 603 F.2d 263 (2d Cir. 1979).

111. See *id.* at 281.

112. See *id.* at 282.

113. See, e.g., *Transamerica Computer Co., Inc. v. IBM Corp.*, 698 F.2d 1377, 1382-83 (9th Cir.), cert. denied, 464 U.S. 955 (1983).

114. See *In re IBM Peripheral EDP Devices Antitrust Litigation*, 481 F. Supp. 965, 1005 (N.D. Cal. 1979), *aff'd*, 698 F.2d 1377 (9th Cir.), cert. denied, 464 U.S. 955 (1983).

overall reasonableness of the monopolist's conduct.¹¹⁵ The opinions make it clear that ambiguous situations were to be decided in favor of the antitrust defendant because of the desire to encourage innovation. An antitrust violation would be found only if the monopolist introduced a deliberate incompatibility which in no respect enhanced the product's performance or reduced its cost.¹¹⁶

(ii) Monopolist Does Not Compete in Affected Market

If an essential facility does not directly compete with the excluded firm, the monopolist may arbitrarily exclude that firm from the essential facility. *Official Airline Guides, Inc. v. FTC*¹¹⁷ involved a suit by a commuter airline against the publisher of the only comprehensive listing of airline flights, before the advent of computerized airline reservations services. Even though it was relatively easy to include commuter airlines in the directory, and the Guide's refusal to list them was arbitrary,¹¹⁸ the Second Circuit held that a monopolist has no duty to deal with firms in related markets even though this refusal placed those firms at a significant competitive disadvantage.¹¹⁹ The court quoted *United States v. Colgate & Co.*¹²⁰ for the proposition that a firm may refuse to deal with anyone "[i]n the absence of any purpose to create or maintain a monopoly."¹²¹ The court also refused to extend the holding of *Otter Tail Power Co. v. United States*¹²² that "a monopolist may not abuse its monopoly power in one market to gain an improper advantage or to destroy threatened competition in an adjacent market in which it also operates,"¹²³ to adjacent markets in which the monopolist does not yet

115. See *California Computer Prods., Inc. v. IBM Corp.*, 613 F.2d 727, 744 (9th Cir. 1979).

116. See *Transamerica Computer*, 698 F.2d at 1383. The various situations described involved product changes for which there was at least some claim of functional enhancement and therefore may be contrasted with the deliberate lockout device developed by Nintendo. See *Atari Games Corp. v. Nintendo of Am.*, *supra* note 15 and accompanying text. Where all of the other elements of a strong essential facilities case are present, courts are much more likely to demand a business justification for a device designed to prevent all reverse engineering than they are for a new product that is difficult to reverse engineer, or for which it is difficult to develop compatible products.

117. 630 F.2d 920 (2d Cir. 1980), *cert. denied*, 450 U.S. 917 (1981).

118. See *id.* at 924.

119. See *id.* at 927.

120. 250 U.S. 300 (1919).

121. *Id.* at 307.

122. 410 U.S. 366 (1973).

123. *Official Airline Guides*, 630 F.2d at 925.

operate.¹²⁴ Other courts also agree that a monopolist therefore cannot be found to be monopolizing a market in which it does not compete.¹²⁵

(iii) Reverse Engineering Situations

It is difficult to predict how the essential facilities doctrine would be applied to cases involving the reverse engineering of computer software. While few in number, certain types of software programs — particularly those that have become official or de facto standards and those providing basic services (such as operating systems) or interfaces — have the potential to satisfy the *MCI Communications*¹²⁶ test: (1) they may certainly involve an essential facility controlled by a monopolist of a relevant market; (2) the competitor may be unable to practically or reasonably duplicate the essential facility; (3) the facility may be denied to a competitor; and (4) it may be feasible to provide the facility to the competitor.¹²⁷ Some have argued that certain software markets are particularly susceptible to the development of monopolistic essential facilities, given the powerful momentum created by network externalities combined with the exclusionary powers of intellectual property rights usually present.¹²⁸

A more difficult question is whether there are legitimate business justifications for the monopolist's refusal to allow reverse engineering

124. *See id.* at 927.

125. *See, e.g., Beard v. Parkview Hospital*, 912 F.2d 138, 144 (6th Cir. 1990); *E.I. DuPont de Nemours & Co. v. FTC*, 729 F.2d 128, 138 (2d Cir. 1984); *Carleton v. Vermont Dairy Herd Imp. Ass'n*, 782 F. Supp. 926, 935 (D. Vt. 1991).

126. *See MCI Communications Corp. v. AT&T*, 708 F.2d 1081, 1132-33 (7th Cir.), *cert. denied*, 464 U.S. 891 (1983).

127. There are many reasons why the owner of an "essential facility" software program might not wish to deal with others. While it is true that the creator of an operating system has an incentive to promote the widespread adoption of its product by encouraging others to write useful applications to run on it, once that operating system is generally adopted industry-wide the creator will have a strong incentive to develop applications or other complementary products itself. Accordingly, the original creator may take steps to disadvantage other application developers, or it may wish to prevent the development of functional equivalents of the operating system.

128. *See Comments of the American Committee for Interoperable Systems on Draft Antitrust Guidelines for the Licensing and Acquisition of Intellectual Property* (submission to the Department of Justice) (1994).

The essential facilities doctrine should apply to intellectual property just as it applies to railroad terminals, ski lift tickets, and basketball stadiums. In fact, the potential harm to consumer welfare is even greater in the case of a denial of access to intellectual property essential facilities because it tends to be systemic, not localized — it is the difference between harm to consumers nationally and to patrons of the Chicago Stadium or of a particular ski resort.

Id. at 4-5 (citations omitted).

of its software. Of course, many of the business justifications addressed by existing case law apply equally to software products and we will not dwell on them here. Others, however, are somewhat unique to the software field. One such justification commonly proffered by software manufacturers is that the copyright itself justifies the otherwise anticompetitive behavior. This raises two questions. First, does the scope of copyright protection proscribe the specific acts of reverse engineering in question? Second, even if copyright protection does not technically prohibit the acts, are there policy justifications which derive from copyright protection to allow the otherwise anticompetitive behavior?

As to the first question, our review of the current state of copyright law indicates that reverse engineering is not a per se copyright infringement. When the act of reverse engineering constitutes infringement not otherwise protected, the copyright owner is free to ban it. However, when the use is protected under the fair use doctrine, such as in the *Atari* and *Sega* cases, the analysis is more complex. As an initial matter, the analysis must address the question of whether an antitrust violation can ever be found in the refusal of a monopolist to allow a particular use such as reverse engineering when the underlying intellectual property law seems to give the copyright holder almost complete discretion over licensing matters.¹²⁹ If the copyright holder can altogether refuse to license the program, how may a lesser restraint on its use form the basis of liability?

Unfortunately, the essential facilities doctrine has seldom been applied in cases involving copyrighted subject matter. In one of the few cases to confront the question directly, the First Circuit concluded:

129. See, e.g., *SCM Corp. v. Xerox Corp.*, 645 F.2d 1195 (2d Cir. 1981), cert. denied, 455 U.S. 1016 (1982); see also *United States v. Studiengesellschaft Kohle*, supra note 107, at 1127. In 1988, Congress codified this absolute discretion into the patent law by enacting § 271(d)(4), providing that a patentee could not be denied relief for infringement because it "refused to license or use any rights to the patent." 35 U.S.C. § 271(d)(4) (1994). The *SCM* case, which involved SCM's challenge to Xerox's refusal to license basic patents it had acquired covering the process for plain paper xerography, raises an interesting question of whether the scope of discretion should be sensitive to the developmental stage of the technology in question. The *SCM* court, which upheld Xerox's right to deny licenses, accorded significant weight to the fact that Xerox had acquired the intellectual property rights and adopted a policy of not giving licenses while the technology was still in its infant stages. See *SCM*, 645 F.2d at 1206-09. It reasoned that the threat of antitrust liability for refusing to license while technology was still nascent would unduly undermine the objectives of the patent system. In contrast, the court did seem to recognize that antitrust violations might arise where the technology "already has been commercialized successfully." *Id.* at 1205.

[I]t may be inappropriate to adopt an empirical assumption that simply ignores harm to the competitive process caused by a monopolist's unilateral refusal to license a copyright. . . .

. . . . [W]e hold that while exclusionary conduct can include a monopolist's unilateral refusal to license a copyright, an author's desire to exclude others from use of its copyrighted work is a presumptively valid business justification for any immediate harm to consumers.¹³⁰

In a footnote, the court continued:

Wary of undermining the Sherman Act, however, we do not hold that an antitrust plaintiff can never rebut this presumption, for there may be rare cases in which imposing antitrust liability is unlikely to frustrate the objectives of the Copyright Act.¹³¹

Neither was this basic licensing discretion dispositive in the other cases that directly applied the essential facilities doctrine.¹³² While greatly increasing the antitrust plaintiff's burden, these decisions suggest that the presence of the intellectual property licensing discretion does not represent an insurmountable barrier to full antitrust scrutiny.

Policy arguments beyond the technical confines of the copyright law offered to support denial of access would likely focus on some of the peculiarities of software markets, such as the importance of protecting large up-front investments in development, the short product lifecycles, and the ease of copying software. Yet, these are also factors that have been well-recognized in both the specific terms of the Copyright Act and its amendments, and in the case law interpreting the statutory terms such

130. *Data General Corp. v. Grumman Sys. Support Corp.*, 36 F.3d 1147, 1185, 1187 (1st Cir. 1994).

131. *Id.* at 1187 n.64.

132. In the lower court, an essential facilities counterclaim in *Data General* was dismissed on summary judgment based on the finding that the defendant's diagnostic software for analyzing its computers was not an essential facility since independent service providers could develop their own diagnostic programs, and the defendant made its software available to purchasers of its computers. See *Data General Corp. v. Grumman Sys. Support Corp.*, 761 F. Supp. 185 (D. Mass. 1991). The court found that while *Data General's* knowledge of its computer systems gave it significant advantages in the development of diagnostic software, this was insufficient to invoke the essential facilities doctrine. See *id.* at 192. See also *Corsearch, Inc. v. Thomson & Thomson, Inc.*, 792 F. Supp. 305, 332 (S.D.N.Y. 1992) (holding that the copyrighted database was not an essential facility because the plaintiff could develop a competitive database in less than one year).

as fair use. Even though these broader policy considerations do not preclude a finding of fair use, or even misuse, some have argued that they should be given greater weight when considering antitrust liability because of the severity of antitrust liability (treble damages) as compared to fair use or misuse liability (loss of enforceability).¹³³ Although similar arguments have been made with respect to the interaction of patent and antitrust law, no such accommodation has been made, in part based on the recognition that establishing all of the required elements of an independent antitrust violation is sufficiently rigorous to deter the use of the antitrust laws in a fashion that discourages innovation.

Beyond the special considerations attendant to protection of intellectual property rights, more generic versions of these policy arguments have implicitly been made and answered in favor of the antitrust plaintiff in analogous circumstances. If the only goal was simply to permit the defendant to protect and maximize the return on its investment, cases like *Terminal Railroad* and *MCI Communications* would have been decided the other way and the essential facilities doctrine would not exist. In every successful essential facilities case, the defendant's property rights are somewhat abridged.

The line of cases holding that the monopolist must compete in the same market as the excluded firm has obvious applications to potential antitrust cases involving bans on the reverse engineering of computer software. If the company instituting the ban (e.g., the producer of an operating system) does not compete in the same market as the firm that wants to engage in reverse engineering (e.g., the market for word processing), even a monopolist otherwise considered to possess an "essential facility" can refuse to cooperate with anyone it chooses. This is true even if the monopolist is profitably cooperating with other firms in that market.¹³⁴

To further elaborate on the application of the essential facilities doctrine we return to hypothetical one, in which a clearly dominant company refused a potential new entrant access to its software except on terms that precluded reverse engineering of that product for any purpose. If the information regarding the licensed product (Calcpro) gained by reverse engineering were essential to compete in the spreadsheet market,¹³⁵ and the licensor's (MicroBig) broad prohibition precluded the

133. See Leslie Wharton, *Misuse and Copyright: A Legal Mismatch*, 8 *COMPUTER L.* 1, 5 (1991).

134. See *Official Airline Guides, Inc. v. FTC*, 630 F.2d 920, 927 (2d Cir. 1980).

135. It will generally be more difficult to establish the essential nature of the facility (software) in the case of a competitive substitute than in the case of an interoperable or complementary product. As in *Data General Corp. v. Grumman Sys. Support Corp.*, 36 F.3d 1147 (1st Cir. 1994), most courts approach these claims with a high degree of skepticism.

potential new entrant (Phoenix) from undertaking otherwise legal copying, MicroBig's behavior may be deemed unreasonably restrictive. This then raises the possibility of antitrust liability under an essential facilities theory.

Such behavior is roughly analogous to an attempt by the author of a leading history textbook on the civil war to ban aspiring historians wishing to write their own book on the subject from reading his renowned text and using factual material contained therein to assist them in their endeavor. The young historians know that it is essential, for both professional and commercial success, to be familiar with other works in the field, and to be able to show distinguishable advances over the leading text. This cannot be done without a detailed understanding of the standard. Upholding MicroBig's broad ban on reverse engineering would have the similar effect of denying Phoenix the ability to fully understand MicroBig's dominant software and make use of that knowledge in its efforts to build a better spreadsheet.¹³⁶ As such it could constitute a serious impediment to innovation and competition. Allowing such firms to ban the reverse engineering of their software would give overly broad protection to the first innovator in a field, enabling it to freeze out competing innovators in both the product's market and aftermarkets. This violates the copyright law's overriding goals of ensuring the public dissemination of information and encouraging innovation, and would be contrary to the antitrust laws' goal of preventing restraints on competition and innovation.

Hypothetical two presented a situation in which a copyright holder precluded access to its software not by license terms, but by erection of a technological roadblock — the embedding of software code to frustrate efforts to reverse engineer those elements of the code essential to designing an interoperable product.¹³⁷ The lawfulness of such a scheme

136. Some have argued that allowing reverse engineering of software by decompilation is equivalent to forcing the author of a book not only to allow his text to be read, but also his notes, drafts, ideas, and other materials he prepared in the course of creating the finished product. See, e.g., Testimony of R. Duff Thompson, Senior Vice President and General Counsel of the WordPerfect Corporation, before the Collaborators Council of the Agency for Cultural Affairs, at 8-9 (Dec. 13, 1993). While the debate on this point can be quite technical and somewhat metaphysical, it seems this position overstates the case. Reverse engineering seeks only to comprehend what is part of and constitutes the finished program in issue; it does not invade any of the developer's work product generated during the developmental process except what is actually reflected in the marketed program. Drafts and other material that helped produce the product remain secret. In this sense, it is more analogous to the simple copying of pages from a published book than the type of intrusion suggested by Mr. Thompson.

137. It has been argued that as a result of the "weakened" protection against reverse engineering flowing from *Sega Enterprises Ltd. v. Accolade Inc.*, 977 F.2d 1510 (9th Cir. 1992), and *Atari Games Corp. v. Nintendo of America, Inc.*, 975 F.2d 832 (Fed. Cir. 1992),

may well turn on whether there was any plausible justification based on enhanced functionality, reduced cost, or other pro-competitive objectives for the added code. If it was a device designed purely to disadvantage competitors and lacked any pro-competitive redeeming merit, it may well result in antitrust liability.¹³⁸ However, it should again be noted that the law in this area gives wide latitude to defendants and turns on highly-technical expert and other evidence. For these reasons, it is unlikely that many close cases will be won by antitrust plaintiffs.

Hypothetical two also premised that the holder of the essential facility, MicroBig, was dominant in the spreadsheet market and was only *planning* to enter the checkbook market. MicroBig was therefore not an actual competitor in the market in which the reverse engineer (Phoenix) sought to develop its product. Due to the absence of actual competition in the market affected by MicroBig's denial of access, *Official Airline Guides, Inc.*¹³⁹ ("OAG") and its progeny may pose an obstacle to the successful use of an essential facilities theory. This hypothetical may be distinguished from the *OAG* line of cases, however, by the fact that MicroBig had begun efforts to enter the complementary product market, and thus while there was no actual competition such competition was "imminent."¹⁴⁰ If an imminent or potential monopolization theory were used, there would have to be clear evidence that the defendant was likely to achieve market power in the affected market through the denial of access.

that software developers will be more inclined to seek protection through technological means.

138. Similar cases supporting a finding of antitrust liability include *Digital Equip. Corp. v. System Industries, Inc.*, 1990-1 CCH Trade Cases ¶ 68,901 (D. Mass. 1990), and *California Computer Prods. v. IBM Corp.*, 613 F.2d 727 (9th Cir. 1979). See *supra* part IV(A)(3)(a)(i) for a discussion of the IBM peripherals cases.

139. *Official Airline Guides, Inc. v. FTC*, 630 F.2d 920 (2d Cir. 1980).

140. Professors Areeda and Hovenkamp suggest that the theory may be applied in the case of both actual and "potential" monopolization. See PHILLIP AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW* 620-21 (Supp. 1994). Moreover, the Antitrust Division's recent investigation of Microsoft's Microsoft Network ("MSN") strongly suggests it considers the theory viable in the closely-related area of attempted monopolization. At the time of the DOJ's investigation, Microsoft was planning to enter the market for on-line services by bundling MSN with its new operating system, Win95, in a market that Microsoft dominates. The DOJ stated:

Nor is it necessarily 'fatal' to an attempted monopolization claim that Microsoft currently lacks any subscribers to its online service; a new entrant, depending on the facts, plainly could pose a dangerous probability of monopolizing a market.

See Memorandum of the United States in Opposition to Microsoft Corporation's Petition to Set Aside Civil Investigative Demand No. 13187, *Microsoft Corp. v. Anne Bingaman*, Misc. Action No. M8-85 (S.D.N.Y. July 13, 1995) (citations omitted).

In the third hypothetical, the manufacturer of a computer and related operating system and diagnostic software (Zeta) refused to allow a licensee (Alpha) to reverse engineer the software for purposes of enabling Alpha to develop its own competitive products and aftermarket service. In *Data General Corp. v. Grumman Systems Support Corp.*,¹⁴¹ Grumman was sued by Data General for infringement of its copyrighted diagnostic software. Grumman asserted antitrust counterclaims, one of which was based on an essential facilities theory. The court concluded that the antitrust laws generally impose no obligation on innovators to disclose or predisclose information about their systems to facilitate competition, and denied Grumman's claim on summary judgment.¹⁴²

There are, however, several significant distinctions between the facts in *Data General* and those of the third hypothetical. First, Data General's claim of infringement was based on the use of its diagnostic program in the course of service work done by Grumman for third party owners of Data General computers. Second, the essential facility alleged by Grumman was Data General's expertise in understanding its own computers, and the advantages this expertise conferred upon Data General in the design of its own diagnostic software. Grumman argued that it should either be allowed use of the Data General software in its service work or be given detailed schematics of Data General's computers. By contrast, the claimed infringing use in this hypothetical was for the purposes of reverse engineering so that Alpha could develop aftermarket software and service *on its own*; Alpha did not seek any proprietary information (i.e., schematics) from Zeta. In similar fashion, the *Data General* court recognized that allowing reverse engineering was quite distinct from forcing disclosure, noting that "the impetus for competitors to reverse engineer and produce competing solutions would be reduced" by the forced disclosure of proprietary information under antitrust law.¹⁴³

Alternately, should the outcomes discussed above be dependent on whether the antitrust plaintiff signed a license agreement? In other words, would the existence of a contractual foundation for the restraint have a bearing on its lawfulness? As a matter of general antitrust law, a plaintiff's contractual agreement acquiescing to an otherwise unlawful

141. 761 F. Supp. 185, 192 (D. Mass. 1991).

142. On appeal it appears that Grumman chose not to focus on its essential facilities theory and instead relied on an exclusionary withdrawal of assistance theory based on *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585 (1985). As a result, the First Circuit opinion does not deal with Grumman's essential facilities arguments. See *Data General Corp. v. Grumman Sys. Support Corp.*, 36 F.3d 1147, 1187 (1st Cir. 1994).

143. *Data General Corp. v. Grumman Sys. Support Corp.*, 761 F. Supp. at 192.

act by the defendant does not provide the defendant with a safe haven.¹⁴⁴ There is, however, substantial debate regarding the significance of a contractual basis for such a prohibition under intellectual property law. This debate centers on the question of whether intellectual property law does in fact, or should, preempt contract law in instances where parties have agreed to a prohibition of reverse engineering. In *Vault Corp. v. Quaid Software Ltd.*,¹⁴⁵ the Fifth Circuit held that a Louisiana statute allowing a shrink-wrap license prohibition against reverse engineering was preempted by federal copyright law. While the Fifth Circuit did not focus explicitly on § 301 of the Copyright Act,¹⁴⁶ it nonetheless correctly concluded that the Louisiana statute directly intruded on several key elements of federal copyright law.¹⁴⁷

Beyond the language and legislative history of § 301, others have used recent Supreme Court decisions in *Bonito Boats*,¹⁴⁸ *Sony*,¹⁴⁹ and *Feist*,¹⁵⁰ to argue that neither copyright nor contract law may be used to abridge a "right" to reverse engineer.¹⁵¹ Proponents of this position argue that there is a constitutional right to reverse engineer based on the First

144. Courts have been particularly uniform in rejecting an *in pari delicto* defense where there has been some element of coercion or unilateral imposition of terms by the defendant. See, e.g., *Goldlawr v. Shubert*, 268 F. Supp. 965 (E.D. Pa. 1967).

145. 847 F.2d 255 (5th Cir. 1988). See generally Christopher Celentino et al., *Vault Corp. v. Quaid Software Ltd.: Invalidating Shrink-Wrap Licenses?*, 2 HARV. J.L. & TECH. 151 (1987).

146. See 17 U.S.C. § 301 (1994) (codifying Congress' intent to make federal law the exclusive source of protection for rights that are "in the nature of copyright").

147. It has been argued, moreover, that the *Vault* outcome should not be particularly sensitive to the extent to which the licensee is "informed" about the bargain he has struck. See David A. Rice, *Public Goods, Private Contract and Public Policy: Federal Preemption of Software License Prohibitions Against Reverse Engineering*, 53 U. PITT. L. REV. 543, 615-616 (1992) ("Even making *scienter* a condition for liability may not sufficiently differentiate what is otherwise a state claim for appropriation of copyrightable subject matter.").

148. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141 (1989) (finding that state law prohibiting the use or known sale of an unpatented boat design conflicts with federal policy to promote free competition in ideas not deserving patent protection, and thus is preempted by federal patent law).

149. *Sony Corp. of Am. v. Universal Studios, Inc.*, 464 U.S. 417 (1984) (holding that manufacturers of home video recorders not liable for contributory infringement of copyrights because the videotape recorder is capable of uses that do not infringe upon established copyrights).

150. *Feist Publications, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340 (1991) (stating that phonebook publisher not entitled to copyright protection because factual information was not copyrightable, and because the information was not organized in any original fashion warranting copyright).

151. See, e.g., comments of Pamela Samuelson, contained in Lexis Counsel Connect; Discuss Section; National and International Topical Forums; Intellectual Property; Copyright Law; Shrinkwraps & Copyright; Shrinkwraps Copyright (comments of Dec. 15, 1994 and Jan. 2, 1995).

Amendment and Copyright Clause, manifest in the fair use exception to copyright protection. The *Feist* Court noted:

It may seem unfair that much of the fruit of the [copyright holder's] labor may be used by others without compensation. As Justice Brennan has correctly observed, however, this is not "some unforeseen byproduct of a statutory scheme." It is, rather, "the essence of copyright," and a constitutional requirement. The primary objective of copyright is not to reward the labor of authors, but "[t]o promote the Progress of Science and useful Arts."¹⁵²

b. Sham Litigation and Business Torts

Firms generally are permitted under the antitrust laws to use the government and courts to help them achieve anticompetitive ends,¹⁵³ but in extreme cases sham litigation may violate the antitrust laws. *Professional Real Estate Investors, Inc. v. Columbia Pictures Industries, Inc.*¹⁵⁴ ("PRE") involved a copyright infringement lawsuit with an antitrust counterclaim that the copyright action was frivolous and therefore a violation of the Sherman Act. The copyright suit was dismissed, but the Supreme Court held that an allegedly frivolous lawsuit rose to the level of an antitrust violation only if: (1) the claim was so "objectively baseless" that no reasonable prospective litigant would have predicted victory; and (2) the party bringing the baseless lawsuit subjectively had as its motive the intent of using the lawsuit as a way to detrimentally affect its competitor.¹⁵⁵ The Supreme Court also made clear in *PRE* that the issue of subjective intent was not to be considered unless the first prong was satisfied.¹⁵⁶

Business torts may also at times rise to the level of monopolizing conduct. False statements, disparagement, and other business torts can

152. *Feist*, 499 U.S. at 349 (emphasis added) (citations omitted).

153. See, e.g., *United Mine Workers v. Pennington*, 381 U.S. 657 (1965); *Eastern R.R. President's Conference v. Noerr Motor Freight, Inc.*, 365 U.S. 127 (1961).

154. 113 S. Ct. 1920 (1993).

155. See *id.* at 1928.

156. See *id.* Some sense of the burden presented by the first prong is inherent in the Court's language: "Even in the absence of supporting authority, [the defendant] would have been entitled to press a novel claim as long as a similarly situated reasonable litigant could have perceived some likelihood of success." *Id.* Prior to *PRE*, one court held that the mere threat to file a frivolous lawsuit could alone establish a § 2 violation. See *CVD, Inc. v. Raytheon*, 769 F.2d 842, 851 (1st Cir. 1985).

violate § 2.¹⁵⁷ The torts must, however, be severe enough to affect not just a target company but also to detrimentally affect competition in a market in a manner that leads to or preserves a monopoly.

One certainly can posit extreme circumstances under which sham litigation or business torts could satisfy § 2's conduct requirement. It should be cautioned, however, that the sham litigation or business tort must be so significant that it materially helps defendant achieve or maintain monopoly power. Few actions are likely to satisfy these exacting tests.

In hypothetical three, a dominant company (Zeta) sought to prevent reverse engineering by use of threats of and actual infringement litigation against a company (Alpha) wishing to reverse engineer to compete in the service business. Assuming Zeta ultimately loses its infringement suit because Alpha's reverse engineering is found to be fair use, what are the prospects of Alpha prevailing in an antitrust counterclaim under a sham litigation theory? Based on the relatively underdeveloped state of the copyright law regarding reverse engineering at present, it may be difficult to satisfy the "objectively baseless" prong of the *PRE* test. Thus, a successful antitrust counterclaim is improbable.

c. Monopoly Leveraging

Antitrust law prohibits a monopolist from using its market power in a market it dominates to monopolize or attempt to monopolize a second market.¹⁵⁸ This "leveraging" of monopoly power can be accomplished by a variety of mechanisms such as traditional tying arrangements, preferential or discriminatory access to information or facilities, and various distributional restraints, including intellectual property licensing practices. The state of U.S. antitrust law is much less clear as to whether such leveraging is unlawful where monopoly power is used to gain merely an advantage in the second market, but falls short of attempted or actual monopolization.¹⁵⁹ On balance, it would seem that the recent trend is *against* the finding of a violation when monopoly leveraging

157. See, e.g., *National Ass'n. of Pharmaceutical Mfrs. v. Ayerst Labs*, 850 F.2d 904, 916 (2d Cir. 1988); *International Travel Arrangers v. Western Airlines*, 623 F.2d 1255 (8th Cir.), cert. denied, 449 U.S. 1063 (1980); *Browlee v. Applied Biosystems, Inc.*, 1989-1 Trade Cas. (CCH) ¶ 68,425, at 60,337 (N.D. Cal. 1989).

158. See *United States v. Griffith*, 334 U.S. 100 (1948).

159. The uncertainty on this issue arises out of a "gap" in statutory coverage between § 1 and § 2 of the Sherman Act. Whereas § 1 addresses concerted (multilateral) restraints of trade, § 2 addresses unilateral conduct only when it threatens or achieves monopolization — leaving unilateral restraints of trade facially excluded from the statutory scheme of protection.

gains only an advantage in a second market.¹⁶⁰ Lest we prematurely announce the death of leveraging, it should be noted that the theory figured prominently in the DOJ's suit against Microsoft seeking to stop its proposed merger with Intuit. The DOJ Complaint stated: "Microsoft's control of that market [personal finance software] will give it a cornerstone asset that could be used with its existing dominant position in operating systems for personal computers to seize control of the markets of the future, including PC-based home banking."¹⁶¹ The DOJ also relied heavily on a leveraging theory to justify its recent investigation of Microsoft's imminent entry into the online services business.¹⁶²

The monopoly leveraging theory has direct implications for the analysis of potential antitrust problems associated with reverse engineering. Both hypotheticals two and three raise leveraging issues. In hypothetical two, a dominant company seeks to use a reverse engineering restraint to limit competition in a separate product market it plans to enter, while in hypothetical three the dominant firm seeks to preserve and enhance an existing market position in the separate market. Our analysis suggests that a plaintiff is more likely to succeed with a leveraging theory in hypothetical three, where the defendant already has or will imminently have market power in the separate market, than in hypothetical two where the defendant is only a new entrant.

In cases where actual market share in the separate product market is low it may be fruitful to pay particularly close attention to the concepts of innovation and technology markets, because the antitrust defendant may have a much more prominent and competitively significant position when viewed from these (rather than end-product) perspectives. Consider, for example, the situation in hypothetical two, where the defendant has no share at all of the separate product market for check-book programs. While a leveraging theory may fail if only end-product markets are considered, an altogether different result might obtain if it

160. See, e.g., *Alaska Airlines v. United Airlines*, 948 F.2d 536, 547 (9th Cir. 1991); *Fineman v. Armstrong World Indus.*, 980 F.2d 171 (3d Cir. 1992); see also *Spectrum Sports Inc. v. McQuillan*, 506 U.S. 447, 457 (1993) (confirming, in a non-leveraging case, that "§ 2 makes the conduct of a single firm unlawful only when it actually monopolizes or dangerously threatens to do so").

161. *Justice Department Files Antitrust Suit to Challenge Microsoft's Purchase of Intuit*, Department of Justice Antitrust Division Press Release, Apr. 27, 1995, available in 1995 WL 249007, at *1 [hereinafter *Justice Department*]. Although the Government's suit was brought under § 7 of the Clayton Act, rather than § 2 of the Sherman Act, there has been substantial convergence of the substantive standards of the two laws in recent cases. See, e.g., *McCaw Personal Communications v. Pacific Telesis Group*, 645 F. Supp. 1166, 1173 (N.D. Cal. 1986).

162. See *Justice Department*, *supra* note 161, at *2.

was determined that the defendant had market power relative to checkbook innovation or technology markets.

B. Attempts to Monopolize

This offense, closely related to the offense of monopolization, has three requirements: (1) predatory or anticompetitive conduct; (2) a specific intent to control prices or destroy competition; and (3) a "dangerous probability of success."¹⁶³

The conduct element is identical to that required under the offense of monopolization.¹⁶⁴ The intent requirement provides that a general desire to increase market share will not suffice, but that the defendant must have a "specific intent to destroy competition or build monopoly."¹⁶⁵ The requisite specific intent can be proven either directly, by documents describing the defendant's intent, or indirectly through inferences drawn from anticompetitive conduct.¹⁶⁶

The dangerous probability requirement is more lenient than the monopoly power requirement discussed earlier. The same factors are examined under both monopolization and attempted monopolization analyses, but attempt requires only a "dangerous probability" that monopoly power will be achieved. The market share requirement accordingly is slightly lower, although there are again no magic thresholds. Whereas monopolization cases usually require a sixty to seventy percent defendant market share,¹⁶⁷ attempted monopolization cases usually require only a fifty percent share, and sometimes less.¹⁶⁸ Every other factor relevant to whether a firm has monopoly power, particularly ease of entry, is also relevant to whether there is a dangerous probability of the firm obtaining monopoly power. Because both the offenses and the evidence required to substantiate them are similar, antitrust suits alleging monopolization usually also charge attempted monopolization, and vice-versa. Some suits that prove monopolization lack the requisite specific intent for attempted monopolization, while others that prove attempted monopolization lack the requisite monopoly

163. *Swift & Co. v. United States*, 196 U.S. 375 (1905); see also *Spectrum Sports Inc. v. McQuillan*, 506 U.S. 447, 455-57 (1993).

164. See *Transamerica Computer Co. v. IBM Corp.*, 698 F.2d 1377, 1382 (9th Cir. 1983).

165. *Times-Picayune Publishing Co. v. United States*, 345 U.S. 594, 626 (1953).

166. See, e.g., *Volvo N. Am. Corp. v. Men's Int'l Professional Tennis Council*, 857 F.2d 55, 74 (2d Cir. 1988); *Great Escape, Inc. v. Union City Body Co.*, 791 F.2d 532, 541 (7th Cir. 1986); *Shoppin' Bag of Pueblo, Inc. v. Dillon Cos.*, 783 F.2d 159, 163 (10th Cir. 1986); see also A.B.A., ANTITRUST LAW DEVELOPMENTS, *supra* note 55, at 260-61.

167. See *supra* part IV(A)(2).

168. See A.B.A., ANTITRUST LAW DEVELOPMENTS, *supra* note 55, at 213-14.

power for monopolization. Most of the difficult cases that fail, however, fail because the plaintiffs cannot demonstrate the requisite anticompetitive conduct, thus dooming efforts to prove both offenses.

C. Tying Arrangements

A tying arrangement is typically defined as "an agreement by a party to sell [or lease] one product [or service] but only on the condition that the buyer also purchases [or leases] a different (or tied) product [or service], or at least agrees that he will not purchase [or lease] that product [or service] from any other supplier."¹⁶⁹ Tying arrangements are illegal if several conditions are met: (1) the existence of two separate products or services; (2) the firm tying the products has sufficient market power in the tying product to make "forcing" possible; and (3) the arrangement forecloses a "substantial volume of commerce" or produces a substantial potential of an adverse effect on competition in the market for the tied product.¹⁷⁰ In addition, even though tying arrangements are per se illegal, the offense is in reality governed by a standard close to a rule of reason standard because courts generally permit an efficiency or business justification defense.¹⁷¹

The first requirement — that the tied items be considered different products — invokes all of the market definition issues discussed above,¹⁷² as well as whether there is separate demand for the items.¹⁷³ The second "forcing" requirement is similar to the monopoly power requirement discussed in part IV(A)(2).¹⁷⁴ The opinion in *Jefferson Parish* suggested that at least a thirty percent defendant market share is required.¹⁷⁵ This requirement is nuanced, however, by the *Kodak* holding that under certain circumstances market share and market power

169. *Northern Pac. Ry. v. United States*, 356 U.S. 1, 5-6 (1958); see also *United States v. Loew's, Inc.*, 371 U.S. 38 (1962) (holding explicitly that both services and products are covered by this body of antitrust law); *United Shoe Mach. Corp. v. United States*, 258 U.S. 451 (1922) (including leases as well as sales).

170. See *Jefferson Parish Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 15-16 (1984).

171. See *United States v. Jerrold Elec. Corp.*, 187 F. Supp. 545 (E.D. Pa. 1960), *aff'd*, 365 U.S. 567 (1961).

172. See *supra* part IV(A)(1).

173. See *Jefferson Parish*, 466 U.S. at 19-21. For example, while diagnostic software and repair services are physically distinct entities, both items may still be considered part of a single antitrust market. See also *supra* part IV(A)(2) (discussing the monopoly power requirement).

174. The Court noted, "we have condemned tying arrangements when the seller has some special ability — usually called 'market power' — to force a purchaser to do something that he would not do in a competitive market." *Jefferson Parish*, 466 U.S. at 13-14.

175. See *id.* at 17, 26-29.

should be measured in an aftermarket situation from the perspective of locked-in customers,¹⁷⁶ and by the controversy discussed in part III (A)(2) over whether the existence of a copyright leads to a presumption that the copyright owner has monopoly power. Regardless, the firm must have the power to force consumers to purchase a product they otherwise would not want. The third requirement is that a substantial volume of commerce must be foreclosed to other potential sellers of the tied product, or that there is a substantial potential of anticompetitive effects in the tied market. Although it is difficult to determine precisely how much this requirement adds to the second, the Seventh Circuit has held that an antitrust plaintiff must show "a substantial danger that the tying seller will acquire market power in the tied product market."¹⁷⁷ In this respect, the requirement is similar to the showing required under monopoly leveraging.

Either of the two basic types of tying arrangements — an agreement by a party to sell one product but only on the condition that the buyer also purchase a different product, or an agreement that he will not purchase that product from any other supplier (sometimes called a "tie-out" or "negative tie") — could be present in reverse engineering situations. Consider hypothetical two, in which MicroBig refused to disclose required information (via reverse engineering) to allow other companies to build compatible checkbook programs. It is possible to conceptualize this situation as a type of technological tying, in which buyers of MicroBig's spreadsheet program who want a compatible checkbook program are essentially forced to buy the MicroBig program. The likelihood of a tying theory succeeding in this situation would depend on a number of factors, including whether buyers of MicroBig's spreadsheet would be considered a distinct antitrust aftermarket because they have been locked-in, and whether the checkbook program would be considered a separate product from the spreadsheet. Regarding the latter point, software products are often composed of numerous code modules, and it is often difficult to draw clear lines between distinct programs whose codes interact extensively. For example, MicroBig could simply include the checkbook functionality as a module within its spreadsheet program using a common interface. It would no doubt argue that such an integration was more convenient to end-users and therefore pro-competitive. From an antitrust view, however, should this be deemed any less a tie than if the programs were marketed as distinct, but technologically tied, pieces of code? These are very difficult questions

176. See *supra* part IV(A)(2).

177. *Carl Sandburg Village Condominium Ass'n v. First Condominium Dev. Co.*, 758 F.2d 203, 210 (7th Cir. 1985).

to answer, and highlight the difficulty of applying these theories to complex software cases.¹⁷⁸

In hypothetical three, we also confront a situation where tying issues are likely to emerge. By refusing to allow reverse engineering of its operating system and diagnostic software, it might be argued that Zeta is forcing buyers of its computers and software to also obtain service from Zeta. Similar issues were raised in the *Data General* case, where the First Circuit found that diagnostic software was distinct from support services, but there was no evidence that customers were actually "coerced" into buying a product they did not otherwise want.¹⁷⁹ The specific practice in issue was Data General's policy of making its diagnostic software available only to customers who maintained their own computers. On the issue of coercion, the court found that there was no evidence that customers who chose the self-maintenance option (rather than using an independent service provider) were in any way coerced to do so.¹⁸⁰

In our third hypothetical, the element of coercion would be significant. In order to sustain a tying theory, there would have to be evidence of coercion either by express contractual terms (i.e., the licensing terms for the operating system and diagnostic software require the buyer to use Zeta's support services) or by clear circumstantial evidence. In this case, assuming Zeta is modestly educated on antitrust law, proof of coercion is likely to be based on technological necessity: service cannot be provided to the Zeta computers without either access (i.e., a license to use) or knowledge gained by reverse engineering of the operating system and diagnostic software. Thus, by denying access to other potential service providers Zeta effectively precludes them from offering service and forces customers to buy service only from Zeta. If this is the theory employed, then there would still have to be evidence that customers plainly wanted Alpha's service and that it was Zeta's denial of access which was preventing them from using Alpha. Our hypothetical also raises the interesting question of whether Zeta's litigation and liability threats might also be deemed to constitute at least part of the required coercion.

As this discussion suggests, success under this theory would require a number of formidable proofs, such as establishing that competing service providers could not, as a practical matter, develop their own

178. Disappointingly few of these issues arose in *Data General*. See *supra* part IV (A)(3)(a)(iii). The court examined a tying allegation, but found neither distinct products, nor tying, nor anticompetitive forcing. See *Data General Corp. v. Grumman Sys. Support Corp.*, 36 F.3d 1147, 1178-81 (1st Cir. 1994).

179. See *id.*

180. See *id.*

diagnostic software and render maintenance services without reverse engineering the antitrust defendant's product. It is unlikely that there will be many cases where all of these circumstances are present and can be proven. Nevertheless, in those cases where all of the necessary elements are present, the goals of competition and maximum innovation are best served by successful antitrust litigation.

V. CONCLUSION

Recent software copyright decisions suggest a trend toward rejecting a *per se* infringement standard for software decompilation and the creation of at least a narrow category of activity protected under the fair use exemption. This trend, in turn, raises the possibility that certain efforts to enforce or use copyright protection to restrain such fair use will give rise to antitrust liability. Unfortunately, there is little case law interpreting and applying both the underlying copyright law pertaining to reverse engineering and antitrust claims arising out of such disputes. In exploring these relatively uncharted waters, we have found no overriding legal or policy bases to shield this area from reasoned antitrust scrutiny. For reasons discussed throughout this Article, there may be relatively few instances where efforts to restrain reverse engineering actually give rise to antitrust liability. Nevertheless, in situations involving essential facilities, tying, and similar practices, the vigorous application of antitrust principles complements intellectual property law and helps foster the common goals of both bodies of law — the encouragement of innovation, industry, and competition.

