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**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF UTAH**

THE SCO GROUP, INC.,
a Delaware corporation,

Plaintiff/Counterclaim-Defendant,

vs.

NOVELL, INC.,
a Delaware corporation,

Defendant/Counterclaim-Plaintiff.

**EXPERT REPORT AND
DECLARATION OF GARY PISANO**

Civil No.: 2:04CV00139

Judge Dale A. Kimball
Magistrate Brooke C. Wells

DECLARATION AND EXPERT REPORT OF GARY PISANO

IN THE UNITED STATES DISTRICT COURT 1

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I. ASSIGNMENT

1. I have been retained to estimate the market demand for and number of SCOsource Intellectual Property Licenses for Linux (also known as a “right to use” or “RTU” license) that the SCO Group would have sold had that business not been damaged by Novell’s alleged slander of title, breach of contract, and unfair competition.

2. I calculated the number of lost license sales by estimating the potential market for the SCOsource product and SCO’s penetration of this market had SCO’s ownership rights of Unix System V copyrights not been challenged by Novell. To arrive at my estimate, I analyzed the industry conditions facing SCO during the relevant time period, and applied my expertise in technology strategy, innovation, and industry analysis to the computer software and server¹ industries and to the relevant intellectual property and licensing issues in this case.

3. In analyzing competitive forces and market conditions, I rely on my professional training in economics and business. There is a substantial body of work in my field on the economic and business theory and analysis of high-technology industries, as well as the

¹ In my opinion, “servers” are distinct from “workstations” and “desktops.” See “Server Operating Environment and Software Platforms: 1999 Worldwide Markets and Trends,” by J. Bozeman, IDC, May 1999, (“A **server** operating system that supports server functionality, including the provision of application, database and Web services to end users. These operating environments are multi-user, multi-tasking, multi-platform (microprocessor), and multivendor... A **client** operating environment (COE) is an operating system that supports application, database, and Web-browsing functionality on a desktop system..”) (*emphasis added*);

See also “Servers Worldwide Vendor Segmentation: 2000,” by J. Hewitt, Gartner, June 8, 2001, p. 195 (“A server is a computer system that has been configured with one or more of the following features: a multi-user operating system or network operating system; large memory capacity, usually 32MB minimum; highly expandable disk; generally a minimum of eight expansion slots; input/output (I/O) channels; used to do back-end processing for a significant portion of the time it is online on the network. Therefore, all supercomputers, mainframes, midrange and entry-level systems are counted as servers. PCs that are not marketed as servers but are used as servers will not be counted.”).

competitive strategies employed within such contexts.² This literature is widely accepted in the management and economics fields and is taught in economics departments and business schools across the United States. It is regularly relied upon by businesses, business consultants, and federal agencies.³ For the purposes of this report, I assumed liability. In my professional opinion, the relevant damage period extends from the date of first slander, May 28, 2003, to the end of trial in approximately 2007. Thus, I examine the market for SCOsource licenses during this period assuming that SCO rightfully owns the UNIX copyrights and as if Novell had never challenged SCO's ownership rights.

4. In the course of my analysis, I reviewed substantial information, which documents and materials are identified in Exhibit B of this report. I reserve the right to supplement this report should additional information come to light or be produced in this matter.

II. QUALIFICATIONS

5. I hold a B.A. degree in economics (with distinction) from Yale University and a PhD in business administration from the University of California, Berkeley.

6. I am the Harry E. Figgie, Jr. Professor of Business Administration at Harvard Business School. I currently serve as the co-chair of the Technology and Operations Management unit. I have taught MBA, doctoral-level, and executive-level courses in Technology and Operations Management, Operations Strategy, the Management of Innovation, and Competition and Strategy since joining the Harvard faculty in 1988.

² "Competitive Strategy: Techniques for Analyzing Industries and Competitors" by Michael Porter, 1980; *see also* "Co-opetition" by Adam Brandenburger and Barry Nalebuff, 1996 (Complementors play a critical role in industries like computers and software and thus are relevant for my analysis of SCO's competitive position).

³ *See e.g.*, "Anticipating the 21st Century: Competition Policy in The New High-Tech, Global Marketplace, A Report of the Federal Trade Commission Staff," May 1996; *see also* "American Bar Association, Handbook on the Antitrust Aspects of Standards Setting," 2004.

7. During that time, my research and teaching have focused on technology and operations strategy, process and product development, vertical integration, outsourcing, and technology licensing. I have consulted for a number of corporations in a range of high-technology industries, advising senior managers on issues of technology strategy, operations strategy, product and process development, and competitive strategy.

8. I have published six books and authored many book chapters within the strategy, operations, and technology areas. In addition, I have published numerous articles in leading professional journals, including The Harvard Business Review, Management Science, Decision Sciences, Strategic Management Journal, Administrative Science Quarterly and others. I have developed, authored, and published over 100 papers, presentations, case studies, and other course materials related to the technology, operations, strategy, innovation, product development, and technology licensing areas. My *curriculum vitae*, which includes a list of my publications, is attached as Exhibit A.

9. I have received numerous awards and distinctions for excellence in research and publishing, and served as an editor of the technology management journal, Research Policy.

10. In the last four years, I have only filed one other expert report, in the SCO v. IBM litigation. To this date, I have not testified at trial in that matter, although I have given deposition testimony.

11. My billing rate in this case is \$600 per hour.

III. SUMMARY OF CONCLUSIONS

12. After applying the principles and methodologies from my field of study to the facts of this case, I reached the following conclusions:

- (a) The potential license market for this analysis includes Linux 2.4 and Linux 2.6 distributions and includes approximately 7.4 million Server Operating

Environment shipments. These are the Linux versions that SCO contends infringe its UNIX copyrights. For reasons I detail later in this report, I believe this is a conservative estimate of the size of the Linux Market.

- (b) SCO would have sold its SCOsource license to between 19% and 45% of the Linux Market, but for Novell's statements regarding copyright ownership.
- (c) Based on my knowledge of the industry and my research and analysis in this case, I am not aware of any causes for SCO's loss of those SCOsource license sales other than Novell's conduct during the relevant time period.
- (d) Given the lapse of four years since Novell's initial statement, and the changes in SCO and the market during that time, a court decision now vindicating SCO's ownership of the UNIX copyrights would not enable SCO simply to recover the SCOsource sales in the future that it has lost due to Novell's slander.

IV. BACKGROUND

13. SCO's damages in this case were caused by Novell's multiple statements contending that Novell, and not SCO, owned the UNIX copyrights. In order to analyze the impact of Novell's statements on SCO, it is important to understand the industry context for the events at issue. This section contains a brief description of the evolution of UNIX, SCO's use of UNIX, the rise of Linux and SCO's response to that development in the marketplace. Finally, I address the series of Novell's statements disputing SCO's ownership of the UNIX copyrights, and their timing in relation to the SCOsource program.

A. The Evolution of UNIX

14. UNIX is an operating system, like Windows, DOS, or (later) Linux. The origins of UNIX can be traced back to AT&T. In 1969, AT&T began development of UNICS, later

renamed UNIX. AT&T initially licensed UNIX to end users, such as universities and researchers, where its use spread rapidly in the 1970s. UNIX became popular because it could run on any hardware platform; it also enabled software programs to run more easily across many hardware platforms.⁴ These features allowed customers to use UNIX on hardware from many different vendors, and gave greater flexibility in choosing software applications to run on the hardware and operating system.⁵ UNIX was considered an “open,” “cross platform” operating system (where “open did not mean that the source code was freely available, as in “open source,” but rather that UNIX provided greater flexibility, in contrast to “closed” systems that effectively locked-in users).

15. Prior to 1983, AT&T licensed UNIX primarily to universities and researchers, along with the source code, for teaching purposes as well as internal use, but in the latter case, such use was limited to specific Central Processing Units (“CPUs”). At this time, customers did not have the right to re-distribute UNIX. Instead, to run UNIX on more than one machine or CPU, a customer was required to obtain additional licenses.

16. Starting in 1983, AT&T sought to capture the commercial value of UNIX by licensing UNIX to large computer system vendors such as Sun, HP, SGI, and IBM. These licensees typically specialized and bundled their modifications and enhancements of UNIX with their own proprietary hardware. AT&T’s approach included a separate licensing agreement

⁴ “Unity in UNIX,” *The Banker*, 1 November 1995 (“UNIX was the first, and for a long time the only operating system not tied to specific hardware architecture.”).

⁵ “The Art of UNIX Programming - Chapter 2 - History: Origins and History of UNIX, 1969-1995” by Eric Steven Raymond, 2003, <http://www.faqs.org/docs/artu/ch02s01.html> (“In 1973 Thompson and Ritchie finally succeeded in rewriting UNIX in their new language. This was quite an audacious move; at the time, system programming was done in assembler in order to extract maximum performance from the hardware, and the very concept of a portable operating system was barely a gleam in anyone’s eye.”).

See also “Computer Wars: How The West Can Win In the Post-IBM World” by Charles Ferguson and Charles Morris, p. 103 (“UNIX was written in C, and could be compiled for, or ported to, any processor...By the early 1980s, almost a quarter of DEC VAXs were running under UNIX rather than VMS. Almost all university VAXs used UNIX rather than VMS...”).

(required in addition to their traditional customer licensing agreement) that allowed the licensee to become a “distributor” of UNIX. Put differently, licensees could distribute their own modified and enhanced versions of UNIX to customers in binary form, but could not distribute the source code outside the license framework.

17. Licensees had to pay a significant upfront fee for this right to distribute UNIX.⁶ Additionally, licensees were required to pay for each binary copy they distributed; these payments were in the form of a royalty.

18. AT&T formed a separate entity, UNIX System Laboratories (USL), retaining majority ownership until 1993, when it sold its interest to Novell.

B. SCO’s Relationship with UNIX

19. SCO’s predecessor in interest, the Santa Cruz Operation, Inc.(“Santa Cruz”), was incorporated in 1979 as a UNIX system porting and consulting company.⁷ The company shipped its first product, SCO XENIX System V, a packaged version of the UNIX operating system, in 1983. In 1985, the company introduced its first operating system for the 32-bit Intel microprocessor environment, SCO XENIX 286, and followed with SCO XENIX 386 in 1987.⁸ By early 1989, nearly 3,000 applications ran on SCO’s UNIX.⁹

20. In September of 1995, Santa Cruz purchased the “UNIX System source technology business”, “including core intellectual property” from Novell Inc., which Novell had

⁶ “The Success of Open Source,” by Steven Weber, 2004, p. 39 (noting that licensing fees for UNIX “skyrocketed” to \$100,000 in 1988, and as high as \$250,000 a few years later).

⁷ SCO Company History. <http://www.sco.com/company/history.html>.

⁸ “10-K Annual Report, The Santa Cruz Operation, Inc. For the fiscal year ended, September 30, 1996,” p. 3 and n.3.

⁹ “UNIX is Everything OS/2 Wants to Be and More” by Martin Marshall, InfoWorld, March 6, 1989 (“There are already 2,000 applications running on Sun systems and nearly 3,000 applications on SCO Xenix/Merged UNIX.”)

acquired from AT&T's UNIX System Laboratories.¹⁰ Santa Cruz also acquired Novell's UnixWare operating system business.¹¹ On October 16, 1996, the parties executed Amendment No. 2 to the Asset Purchase Agreement; among other things, Amendment No. 2 expressly stated that SCO had acquired all "copyrights and trademarks owned by Novell as of the date of the [APA] required for SCO to exercise its rights with respect to the acquisition of UNIX and UnixWare technologies."¹² SCO contends that it owns the copyrights associated with UNIX System V and UnixWare source code as a result of this transaction with Novell. For purposes of my analysis, I have assumed this to be true.

21. On or about May 4, 2001, Santa Cruz sold its Server Software and Professional Services Divisions to Caldera Systems, Inc. This transaction transferred the UNIX and UnixWare rights to Caldera Systems. In August 2002, Caldera changed its name to The SCO Group Inc.

22. An important element of SCO's strategy was to focus on developing an extending the UNIX operating systems for use on the Intel Architecture. Historically, most "flavors" of UNIX, the different UNIX operating systems offered by companies with System V distribution agreements, ran on proprietary RISC (Reduced Instruction Set Chip) microprocessors. Because these chips are designed to integrate the processor with the specific hardware and the specific UNIX operating system from a single manufacturer, a given manufacturer's "flavor" of UNIX could only be used on that manufacturer's hardware. Because SCO's UNIX products were designed to run on Intel Architecture-based computers, and because multiple hardware vendors

¹⁰ In the 1995 acquisition, SCO allegedly did not buy the royalty cash streams associated with System V distribution agreements (contracts with companies like Sun, HP, IBM, SGI, etc.). My understanding is that the Asset Purchase Agreement outlines a process where SCO collects those royalties and transfers 95% of them to Novell. SCO retains 5% of royalty amounts in exchange for managing the collection, accounting and transfer of those royalties.

¹¹ "Milestones in The History of the SCO Group," <http://www.caldera.com/company/history.html>, May 9, 2006.

¹² Amendment No. 2 at ¶A.

provided server systems based on the Intel Architecture, SCO's products offered customers the ability to choose their hardware vendor separately from choosing their operating system.¹³

23. With the acquisition of Novell's UnixWare in 1995, SCO extended its role as the pre-eminent provider of the UNIX operating system for Intel Architecture-based servers.¹⁴ By 1999, SCO held 80% share of the UNIX on Intel market.¹⁵ As depicted in the following table, worldwide shipments of servers based on Intel Architecture approximately tripled from 1995-1999.¹⁶

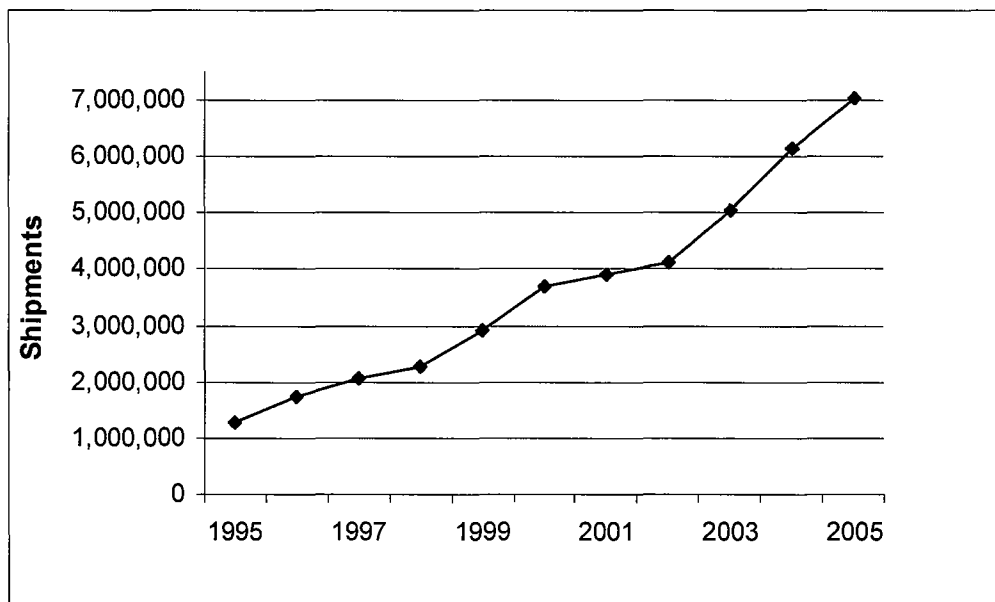
¹³ "Taking a Byte Out of Storage," Lehman Brothers Global Equity Research, February 22, 2002, p. 62 ("The problem with standardizing on a single hardware vendor is that it entails a long term commitment with high switching costs.").

¹⁴ "SCO Enjoys Revival Of Fortunes," Computer Business Review, January 3, 1995 ("SCO has become a major force in determining UNIX's future."); *see also* "Readies UNIX Upgrade," InformationWeek, March 24, 1997, p. 1 ("Today, SCO is not only the largest provider of UNIX systems on Intel, but it's also a UNIX powerhouse."); *id.*, p. 1 ("SCO has become a major force in determining UNIX's future.").

¹⁵ "NT vs. Unix vs. Unix - Unix standard unlikely, vendors seek Intel-based market share" by Gates, Lana, Software Magazine, October 1997, ("The Santa Cruz Operation (SCO) is leading the pack with 80% of the Unix server market on Intel, and 35% of the overall Unix server market, but it's under attack from Sun, Hewlett-Packard, and IBM, which each hold between 12% and 16% of the market with proprietary RISC chips."); UnixWare 7 - Winning ticket? - Santa Cruz Operation's operating system for Intel-based servers - Product Announcement, by Bournellis, Cynthia, Electronic News, March 16, 1998, ("A devoted Intel partner since its inception, the Santa Cruz Operation (SCO) holds 80 percent of the Unix server market on Intel.")

¹⁶ "A very large, tectonic shift has been occurring in the server market where companies are shifting servers formerly based on relatively expensive, proprietary hardware and UNIX to Intel-based Servers which are extremely low-cost to purchase." Deutsche Bank, Global Equity Research, The SCO Group, Inc., "A call (option) to arms", October 14, 2003.

Figure 1: Hardware Server Shipments, Intel architecture, Worldwide, (1995-2005)



Source: Gartner¹⁷

C. The Effect of Linux on the Market for UNIX

24. In the late 1990's, IBM was losing market share in the mainframe market, losing share in the UNIX on RISC market, and was the third place provider for servers running Windows on Intel.¹⁸ Looking to reverse this slide, IBM chose to embrace Linux, which, at the time, was a popular operating system for web serving but not viewed as capable of handling the mission-critical applications required for an enterprise-ready operating system. IBM committed resources, including engineering resources and software code, to make Linux enterprise-capable. IBM claims they committed over \$1 billion to the Linux effort.¹⁹ The features and functionality of Linux improved. As a free UNIX clone, offering similar functionality and features as UNIX

¹⁷ "Market Trends for 1996 Server Industry," Gartner, October 13, 1997; "Server Computing Worldwide Market Segmentation: 1998," Gartner, May 10, 1999; "Servers Quarterly Statistics Worldwide – Database," Gartner, February 21, 2006.

¹⁸ IDC Worldwide Quarterly Server Tracker, February 21, 2006

¹⁹ "IBM to spend \$1 billion on Linux in 2001", by Wilcox, Joe, CNet News, December 12, 2000, <http://news.com.com/2100-1001-249750.html>

did without the price of UNIX, Linux quickly captured the UNIX on Intel opportunity that SCO was positioned to leverage.

25. In 2003, SCO discovered that portions of its protected intellectual property had been included in Linux by IBM, and possibly by others as well. This issue regarding the presence of SCO's intellectual property in Linux became the basis for litigation currently pending between SCO and IBM.²⁰ SCO further learned that Linux infringed its UNIX copyrights.²¹

26. On January 22, 2003, faced with a dramatic decline in its server operating business due to Linux, SCO announced the creation of a new division, SCOSource, chartered with expanding the licensing of its copyrighted UNIX code outside of SCO's operating system, including for use on Linux. SCO also announced the retention of Boies, Schiller & Flexner, LLP, to assist in research and advise the company on its intellectual property. SCOSource introduced the SCOSource license to enable customers to use Linux without infringing on SCO's copyrighted code.²² The SCOSource licenses primarily took two forms: (1) a UnixWare source code license to developers; and (2) a right to use license (RTU License) for commercial end-users of Linux.²³ Both licenses contained a covenant not to sue, stating that the licensee would not be exposed to liability for the use of SCO's intellectual property in Linux. These licenses enabled customers to use Linux without infringing on SCO's copyrighted code.

²⁰ I submitted an expert report in that case opining on IBM's actions and its effects on SCO.

²¹ SCO's discovery about its copyrights was a process; the first copyright infringement (the libraries) was found in early 2003; additionally copyright infringements were discovered throughout 2003.

²² April 18, 2007 Interview of Darl McBride.

²³ Initially, a third type of license allowed access only to SCO's UNIX System Shared Libraries for use with Linux; this product evolved into (and was subsumed by) the general RTU license. See Jan. 22, 2003 SCO Press Release. SCON0055153.

27. On March 7, 2003, SCO filed a legal action against IBM claiming misappropriation of trade secrets, tortious interference, unfair competition and breach of contract. SCO alleged that IBM tried “to improperly destroy the economic value of UNIX, particularly UNIX on Intel, to benefit IBM’s new Linux services business.”²⁴ SCO claimed that IBM was required by contract to keep SCO’s UNIX software code confidential, and prohibited from unauthorized distribution or transfer, including to Linux.

28. During the early months of the SCOSource program, SCO signed expansive licensing agreements with Sun Microsystems and with Microsoft. The Sun agreement was executed on February 25, 2003.²⁵ The Microsoft agreement was announced by SCO on May 19, 2003.²⁶ Through a series of amendments and licenses, these two agreements ultimately represented over \$25 million in revenue to the SCOSource division in 2003.²⁷

29. On May 12, 2003, SCO sent a mailing to “Fortune 1000” Linux users stating that “Linux infringes on our UNIX intellectual property and other rights.”²⁸ SCO also reminded Linux users that “Linux distributors do not warrant the legal integrity of the Linux code provided to customers. Therefore legal liability that may arise from the Linux development process may also rest with the end user.”²⁹ These letters were the precursor to SCO’s expansion of its SCOSource licensing program.³⁰

²⁴ March 7, 2003 SCO Press Release. SCON0055173.

²⁵ Sun/SCO Software License Agreement, SCO1287208-1287221.

²⁶ May 19, 2003 SCO Press Release. SCON0079463 (Exhibit 8 to Jan. 24, 2007 Blake Stowell Deposition in SCO v. Novell).

²⁷ Over the course of several quarters, Sun paid a total of approximately \$10 million, and Microsoft paid \$16.75 million.

²⁸ SCON0024112-113.

²⁹ *Id.*

³⁰ April 18, 2007 Interview of Darl McBride.

D. Novell's Statements Regarding the UNIX Copyrights

30. On May 28, 2003 SCO released its earnings for the second fiscal quarter, and announced several positive developments:

During the quarter ended April 30, 2003, the first two licensing agreements related to our SCOSource initiative, our division for licensing and protecting the Company's UNIX® intellectual property, provided the Company with \$8.8 million in cash and added \$6.1 million to gross margin. There are over 6,000 source code licensees of our UNIX operating system, and *we believe the SCOSource initiative will continue to gain momentum as we pursue enforcement of the Company's intellectual property rights,*" said Darl McBride, president and CEO.

McBride continued, "These positive quarterly financial results, including net income for the first time in the Company's history, have strengthened our balance sheet and financial position. Our increased cash balance and working capital has positioned the Company for its launch of SCOx, our web services strategy, and will provide us with other opportunities to drive growth in future quarters."

"We expect that revenue for our third quarter, ending July 31, 2003, will be in the range of \$19 million to \$21 million. These projections anticipate revenue contributions of approximately two-thirds from our operating system platforms and one-third from our SCOSource initiative," said McBride.³¹

31. On the same day of SCO's announcement, Novell issued a public letter claiming that Novell, not SCO, owned the copyrights to the UNIX code SCO claims is in Linux. Specifically, Novell stated:

Importantly, and contrary to SCO's assertions, *SCO is not the owner of the UNIX copyrights.* Not only would a quick check of the U.S. Copyright Office records reveal this fact, but a review of the asset transfer agreement between Novell and SCO confirms it. To Novell's knowledge, the 1995 agreement governing SCO's purchase of UNIX from Novell *does not convey to SCO the associated copyrights.* We believe it unlikely that SCO can demonstrate that it has any ownership interest whatsoever in these copyrights.³²

³¹ May 28, 2003 SCO Press Release (emphasis added). SCON0055196.

³² May 28, 2003 letter from Jack Messman to Darl McBride (emphasis added). SCON0024115-17.

32. This was the first public indication that there was any question regarding SCO's ownership of the UNIX copyrights. This date, May 28, 2003, marks the beginning of the damages period from Novell's statements regarding the ownership of the UNIX copyrights.

33. In the week that followed Novell's statement, SCO directed Novell's attention to Amendment No. 2, a contractual document between Santa Cruz and Novell regarding ownership of the UNIX copyrights. In response to this document, Novell issued a press release agreeing that Amendment No. 2 "appears to support SCO's claim that ownership of certain copyrights for UNIX did transfer to SCO in 1996."³³ In a letter to SCO that same day, Novell continued to characterize SCO's responsive claims against Novell as "absurd and unfounded."³⁴

34. Despite its qualified public admission regarding Amendment No. 2, within weeks Novell reasserted its claim to copyright ownership. On June 26, 2003, Novell notified SCO that:

Upon closer scrutiny...Amendment No. 2 raises as many questions about copyright transfers as it answers. Indeed, what is most certainly *not* the case is that "any question of whether UNIX copyrights were transferred to SCO as part of the Asset Purchase Agreement was clarified in Amendment No. 2" (as SCO stated in its June 6 press release).³⁵

This letter precluded SCO from assuring prospective SCOsource customers that Novell no longer asserted ownership over SCO's copyrights.³⁶

35. On July 21, 2003, SCO announced that it had received U.S. copyright registrations for UNIX System V source code.³⁷ SCO also indicated that it would offer licenses

³³ June 6, 2003 Novell Press Release. SCON0024123.

³⁴ June 6, 2003 letter from Joseph LaSala, Jr. to Darl McBride. SCON0024122. This letter, along with other letters Novell sent to SCO between May 28, 2003 and December 22, 2003, were publicly disclosed by Novell on December 22, 2003.

³⁵ June 26, 2003 letter from Joseph LaSala, Jr. to Darl McBride. SCON0024148. (Emphasis in original.)

³⁶ April 18, 2007 interviews of Darl McBride and Chris Sontag.

³⁷ July 21, 2003 SCO Press Release. (Exh. 12 to Jan. 24, 2007 Blake Stowell Deposition in SCO v. Novell.)

to support run-time, binary use of Linux for all commercial users of Linux based on kernel version 2.4.x and later.³⁸

36. Novell responded to the announcement of SCO's copyright registration by reiterating its claim of copyright ownership, stating "SCO's claim to ownership of any copyrights in UNIX technologies must be rejected, and ownership of such rights instead remains with Novell."³⁹

37. On August 5, 2003, SCOSource formally announced the availability of the SCO Intellectual Property License for Linux, and that SCO would be meeting with commercial Linux users to present the details of this "right to use" ("RTU") license. The run-time license permits the use of SCO's intellectual property in binary form as contained in Linux.⁴⁰ Within weeks of this announcement, a Fortune 100 company, Computer Associates, requested from SCO and purchased a SCO RTU license.⁴¹

38. On October 2, 2003, Novell filed for (and ultimately received) eight UNIX copyright registrations.⁴² In this process, Novell declared under oath to the United States Copyright Office that, "it retains all or substantially all of the ownership of the copyrights in UNIX..."⁴³

39. On November 4, 2003, Novell announced its agreement to acquire SuSE Linux, and emphasized that this acquisition "affirm[s] Novell's commitment to promoting the open

³⁸ *Id.*

³⁹ August 4, 2003 letter from Joseph LaSala, Jr. SCON0024152.

⁴⁰ August 5, 2003 SCO Press Release. SCON0055211 (Exh. 13 to Jan. 24, 2007 Blake Stowell Deposition in SCO v. Novell).

⁴¹ SCON0048531-38.

⁴² *See* NOV000043025-43049.

⁴³ NOV000043028, NOV000043031, NOV000043034, NOV000043037, NOV000043039, NOV000043042, NOV000043045, and NOV000043048 (each with the same quoted statement).

source model and developer community”, and “will be an important step in Novell’s efforts to accelerate enterprise adoption of Linux.”⁴⁴ At the same time, Novell announced that IBM was investing \$50 million in Novell to help facilitate this purchase.⁴⁵

40. SCO sent a second mailing to commercial Linux users on December 19, 2003 stating that “use of the Linux operating system in a commercial setting violates our rights under the United States Copyright Act.”⁴⁶ SCO indicated that “No one may use our copyrighted code except as authorized by us...Once you have reviewed our position, we will be happy to further discuss your options and work with you to remedy this problem.”⁴⁷

41. On December 22, 2003, Novell publicly reasserted its claim that SCO does not own the UNIX copyrights, publicizing that Novell had also applied for and received UNIX copyright registrations, and disclosing its correspondence with SCO on the issue purportedly to show that “SCO has been well aware that Novell continues to assert ownership of the UNIX copyrights.”⁴⁸

42. On January 13, 2004, in conjunction with closing its acquisition of Linux vendor SuSE, Novell further asserted its copyright ownership claims by announcing that Novell would be offering a new indemnification program for qualifying Novell Linux enterprise customers. According to Novell, this new indemnification would provide “a measure of protection against

⁴⁴ Nov. 4, 2003 Novell Press Release. SCOR0000509-11.

⁴⁵ *Id.*

⁴⁶ SCO1690946-48.

⁴⁷ *Id.*

⁴⁸ Dec. 22, 2003 Novell Press Release at http://www.novell.com/news/press/novell_statement_on_unix_copyright_registrations.

potential copyright infringement claims.”⁴⁹ Novell also reiterated that its copyright registrations confirmed that it retained ownership of UNIX copyrights.⁵⁰

43. Novell’s statements attacking SCO’s copyright ownership continued into the following year. On March 16, 2004, Novell’s Vice Chairman Chris Stone emphasized Novell’s position to an audience of potential SCOsource customers when he addressed SCO in his keynote speech at the Open Source Business Conference, saying “You didn’t invent Linux. Or intellectual property law. We still own UNIX.”⁵¹ This comment was also widely reported in the IT press.

44. Novell continues to assert today that it owns the UNIX copyrights.

45. For Novell, the entity that had sold the UNIX copyrights to SCO, to publicly reject SCO’s ownership claims was a virtual guarantee that customers would be reluctant to purchase a license from SCO, particularly as the SCOsource licenses granted a right-to-use the very IP now being claimed by Novell. There is a substantial body of economic literature on intellectual property and markets for know-how that explains the impact of Novell’s actions on the SCOsource business.⁵² In broad terms, a firm possessing intellectual property can capture economic rents through two basic business models: it can embed the intellectual property into some end product which it sells directly to users (a product revenue model) or it can license the intellectual property to other producers who, in turn, will embed it in end products of their own

⁴⁹ Jan. 13, 2004 Novell Press Release. NOV000030412-15.

⁵⁰ *Id.*

⁵¹ Deposition Exhibit No. 1010, Feb. 6, 2006 Christopher Stone Deposition in SCO v. Novell.

⁵² “The Market for Know-How and the Efficient International Transfer of Technology”, by Teece, David J, *Annals of the American Academy of Political and Social Science*, Vol. 458, November 1981, *See also* “Profiting from technological innovation: Implications for integration, collaboration, licensing, and public policy,” by Teece, David J. *Research Policy*, Volume 15, Number 6, December 1986, p. 285-305; “Profiting from Innovation and the Intellectual Property Revolution,” by Pisano, Gary, *Research Policy*, Volume 35, Number 8, October 2006, 1122-1130.

(a licensing royalty model). With SCOsource, SCO was pursuing a licensing royalty model. Economic theory of licensing and intellectual property is very clear on the point that the licensing royalty model will only be viable if the licensor has well-defined and well-protected intellectual property. Without such protection, the innovator faces a serious disclosure risk. Disclosure risk refers to the risk that, once disclosed to would-be licensees and actual licensees, the unprotected intellectual property will be copied and disseminated to non-licensees. The potential for uncontrolled distribution, in turn, attenuates the incentive of would-be licensees to pay for a license (since they can presumably acquire the IP for free).

46. In this case, it was impossible, ex-post, for SCO to restrict access to their technology as users already had access to it in the form of Linux. Because would-be licensees of SCO's intellectual property already had access to that property via Linux, their willingness to pay for a license is a function of their belief that SCO owned the rights and would enforce those rights. Because SCO had already alerted potential customers through letters and other public statements about its intention to enforce its intellectual property rights, the market was aware of SCO's willingness to enforce its rights. Novell's statements interfered with the potential customers' willingness to pay by creating doubt regarding SCO's ownership rights and thus, its ability to enforce those rights.

47. The following sections describe my calculations of the effect Novell's statements had on SCO's market for licensing their UNIX intellectual property on Linux. Throughout my analysis, I used highly conservative assumptions in order to present the lowest bound of the damages likely suffered by SCO.

V. THE POTENTIAL MARKET FOR SCO'S SCOSOURCE LICENSE

48. In this section of my report, I estimate the number of SCOSource licenses that SCO would have sold but for the actions by Novell at issue in this litigation. I calculate this number based on the total number of Server Operating Environments that SCO contends infringe its intellectual property, the demand among those users for protection from their infringement, and the impact of Novell's statements on that demand. I also evaluate, absent Novell's statements, SCO's ability to compete for these customers with other indemnification providers, and whether these competitors would have been significant competition in the but for world.

A. Estimated Number of Potential Customers

49. I conservatively estimate the total potential market for the SCOSource Right to Use license during the damages period at 7.4 million servers. This estimate is based on a calculation limited to North American servers using versions of Linux with code that SCO claims infringes its UNIX copyrights from 2001 to 2007.

50. I considered data regarding the number of Linux shipments starting in 2001 because the first release of Linux that SCO claims contained its intellectual property occurred in January 2001.⁵³ Accordingly, that install base (consumers with Linux 2.4 shipments beginning in 2001) would be potential SCOSource customers at the onset of the damage period in 2003. Moreover, I have included in my estimate only the Linux server operating environment, although the infringing versions of Linux can be run in both client and server operating environments. A server operating environment is multi-user, multi-tasking, and multi-platform, designed primarily for commercial businesses with the need to manage shared data and applications for multiple

⁵³ SCO's Intellectual Property License for Linux "applies to commercial uses of a Linux operating system that contains a 2.4 or later version of the kernel." See SCO Intellectual Property License for Linux, <http://www.sco.com/SCOSource/description.html>. Linux 2.4 was released in January 2001; the subsequent kernel release, Linux 2.6, became available in December 2003.

users.⁵⁴ A client operating environment generally is an operating system for a desktop, supporting applications, database, and Web-browsing functionality.⁵⁵ My understanding is that SCO primarily targeted commercial users of Linux for SCOsource licenses, *i.e.* those using the server operating environment.⁵⁶ Accordingly, I focused exclusively on shipments of Linux server operating environments from 2001 through 2007 in calculating the size of the potential market for SCOsource licenses.

51. To estimate the total number of Linux SOE shipments (shipments of Linux for use in a server operating environment, or SOE), I reviewed IDC Server Operating Environment reports covering the years 1998 to 2007. IDC is an industry-leading provider of market intelligence and advisory services for the technology sector and has the most comprehensive practice for operating systems in general, and Linux specifically. They are generally relied upon by IT professionals and business executives to make decisions regarding technology purchases and business strategy, and I believe their estimates of market sizes and market and technology trends are reliable. In each report, IDC can revise its estimates for earlier years, reflecting improved data and analysis or changing taxonomies of earlier data over time. As such, my standard methodology when using data from IDC reports is to use the data for any given year from the most recent report covering that respective year.⁵⁷

52. Linux server operating environment deployments fall into one of two categories: revenue-generating shipments (*i.e.*, customers who purchased their Linux operating system

⁵⁴ See "Server Operating Environment and Software Platforms: 1999 Worldwide Markets and Trends," by J. Bozeman, IDC, May 1999.

⁵⁵ *Id.*

⁵⁶ SCO first targeted large companies like Fortune 1000, later opening up licensing to small and medium businesses and international companies.

⁵⁷ One exception to my standard methodology is when calculating growth rates across data from different reports. In such circumstances, such as in my report for SCO v IBM, it is more appropriate to take growth rate data from a single report.

through a distributor such as Red Hat or a hardware vendor, such as HP), and non-paid deployments (*i.e.*, customers who obtained a free version of Linux, possibly through a direct download from the web). Both types of deployments include infringing code and therefore are potential customers for a SCOSource RTU license.⁵⁸

53. IDC reported SOE revenue shipments for each year from 1998 to 2007, but non-paid shipment data was not available for all years. However, since 2000, IDC has estimated the number of non-paid versus revenue-generating (paid) SOE shipments.⁵⁹ IDC reported SOE revenue shipments for each year from 2001 to 2007, and non-paid shipment for the years 2002-2007. The table below shows IDC's reported and projected Linux SOE shipments (both revenue and non-paid) from 2001 through 2007.⁶⁰

Table 1. Linux SOE Shipments Worldwide, 2001 – 2007 (in 000's)⁶¹

	2001	2002	2003	2004	2005	2006	2007	Total
Revenue	1,123	1,009	1,010	712	863	1,091	1,260	7,068
Non-paid	734	900	900	1,132	1,270	1,440	1,547	7,923
Total	1,857	1,909	1,910	1,844	2,133	2,531	2,807	14,991

Source: IDC

⁵⁸ IDC reports anecdotal information from Linux vendors that customers buy one shipment but deploy that shipment up to ten times “Worldwide Linux Operating Environments 2005-2009 Forecast and Analysis: Product Transitions Continue”, IDC # 34390, p. 28. In such cases, the paid shipment user and the non-paid shipment user are the same. Those entities should have the same demand for mitigating IP infringement risk for all its Linux shipments.

⁵⁹ For example, a 2001 IDC study described a survey conducted by IDC that indicated that non-paid shipments were approximately 40% of the total number of Linux shipments for the year 2000. See IDC report #24492, *Linux from Two Perspectives: The Relationship Between Software and Hardware Shipments*, p. 14 (“Based on data obtained through the September 2000 Linux study, IDC found that, on average, 40% of the copies of Linux the survey respondents had obtained had come from a direct download operation.”), (“Free copies that saw deployment as an SOE accounted for 40% of the total SOE new license shipments during CY2000.”).

⁶⁰ IDC did not report non-paid shipments for 2001. To calculate a non-paid shipment estimate for 2001, I employed an IDC study describing a survey conducted by IDC that indicated non-paid shipments were 39.5% of the total number of Linux shipments for the year 2000. This ratio is more conservative than ratios for 2002-2007, so I employed the ratio from year 2000 to arrive at an estimate for 2001 non-paid shipments (1,123 paid shipments divided by 60.5% to arrive at total paid and non-paid time 39.5% to arrive at 734,000 non-paid shipments. (See IDC report #24492, *Linux from Two Perspectives: The Relationship Between Software and Hardware Shipments*, p. 14 (“Based on data obtained through the September 2000 Linux study, IDC found that, on average, 40% of the copies of Linux the survey respondents had obtained had come from a direct download operation.”), (“Free copies that saw deployment as an SOE accounted for 40% of the total SOE new license shipments during CY2000.”).

⁶¹ Source: IDC Report #s 27969, 30159, 32452, US05WP001972, 34599, 34390, 205385. 2001-2006 are IDC estimates while 2007 numbers are IDC forecasts.

Accordingly, between 2001 and 2007, an estimated 15.0 million Linux server operating environments shipped worldwide.

54. To more accurately define the size of the SCOsource license market, I made several adjustments to the 15.0 million figure derived above from IDC's data. First, I adjusted the 2001 data to account for shipments that may have been shipments of earlier versions of Linux, which, for these purposes, SCO did not target with its RTU license. For this adjustment, I estimated the percentage of shipments for 2001 reasonably attributable to Linux 2.2 and subtracted them from the potential market.⁶² Second, it was necessary to subtract any Linux SOE shipments that could be attributed to SCO, since SCO Linux customers were already indemnified by SCO. This number is not significant, particularly as SCO stopped selling Linux in May 2003.⁶³ I calculated a ceiling for potential SCO Linux shipments based on the smallest individual vendor numbers reported by IDC with the result of no more than 28,000 shipments, and likely many fewer.⁶⁴ I confirmed with SCO that the actual number of their shipments probably was much lower than 28,000, but definitely was not more than that amount.⁶⁵ Taking a conservative approach, I subtracted the full 28,000 from the total number of shipments representing potential license.

⁶² Linux 2.4 was the first version for which SCO's Linux Right-To-Use license was available. Red Hat Linux 7.1, the first version to include the 2.4 kernel, was globally available April 24th, 2001. (Red Hat press release, April 16th, 2001, "Red Hat Announces Red Hat Linux 7.1 with 2.4 kernel"). Red Hat is the largest Linux OS vendor. SuSE, the second largest vendor, started selling their Linux kernel 2.4 compatible edition on February 12, 2001. (<http://lwn.net/2001/0201/a/suse-7.1.php3>). Thus, to create a conservative estimate I attributed four months' worth (33.3%) of 2001 shipments to kernel 2.2 and subtracted these from the 2001 shipments. By April 28th, 2001 the Linux kernel had already advanced to release 2.4.4 (<http://www.kernel.org/pub/linux/kernel/v2.4/>).

⁶³ This understanding is based on an interview with Darl McBride, CEO of SCO, and review of SCO's Linux shipment data.

⁶⁴ I estimated a theoretical ceiling for SCO Linux shipments by calculating the number of shipments for smallest Linux vendor whose shipments are tracked by IDC, Red Flag Software Company. SCO's shipments must be at that level or lower, else IDC would be tracking SCO's Linux shipments. Therefore I subtracted the number of Red Flag shipments for 2001, 2002, and 5/12ths of the shipments for 2003, as SCO stopped selling Linux in May 2003.

⁶⁵ April 18, 2007 Interview of Darl McBride. In fact, it was approximately 10,000. *Id.*

55. Finally, I further reduced the total Linux market to include only shipments for North America.⁶⁶ SCO made SCOsource available internationally on a country-by-country basis.⁶⁷ Linux use data is available by region, and North America is the only region with full availability. While I fully expect that SCO would have generated SCOsource revenue outside North America, limiting the data set to North America is the most conservative estimate possible. The table below details the results of these adjustments.

Table 2. Linux SOE North American Shipments (Less 2001 Adjustment and SCO Linux Adjustment) (millions)

	2001	2002	2003	2004	2005	2006	2007	Total
Revenue	373	506	537	381	441	554	639	3,432
Non-paid	248	457	480	606	650	731	785	3,956
Total	621	962	1,018	987	1,091	1,284	1,424	7,388

56. Based on the above analysis, I estimate that from 2001 to 2007, the total size of the North American market for the SCO RTU license is approximately 7.4 million units.

B. Demand for Linux IP Indemnification

57. In my opinion, but for Novell's actions, SCO would have been able to sell SCOsource Right to Use licenses to between 19% and 45% of the 7.4 million Linux deployments described above. This opinion is substantiated by market research and my understanding of the industry.

58. Indemnification is an important issue for technology users in general, and the users of enterprise servers in particular. In the case of indemnification, a critical issue affecting demand is a customer's risk tolerance. Enterprise server owners are highly risk averse with respect to the potential costs and consequences of intellectual property litigation.

⁶⁶ To calculate the North American share of total shipments, I averaged the North American share of server hardware shipments from 2002-2005 (from IDC Server Tracker), and the North American share of Linux operating environment revenue. I then applied a linear trend line to the average for these four years, and used the slope of this line to project the North American share forward for 2006-2007, and backward for 2001.

⁶⁷ "SCO Announces Worldwide Availability of SCO Intellectual Property License," January 15, 2004 SCO Press Release. SCON0055254.

59. Enterprise servers run mission critical software and are expected to be highly reliable, available and serviceable (an industry metric known as RAS). Commercial users place substantial emphasis on minimizing the amount of risk associated with running a server, its operating system and mission critical applications. There are two types of risk facing a user of an operating system: operational risks and intellectual property risks. Operational risks have to do with the operating system becoming unavailable to the user. Intellectual property risks have to do with a user's potential liability if the operating system contains unlicensed intellectual property. A user of an operating system that contains unlicensed code, for example, faces multiple potential legal risks, including: the risk of time- and resource-consuming litigation; the risk of disruption of service due to the need to replace infringing code; and the risk of damages being assessed. Intellectual property risks may include operational risks as well, since intellectual property infringement may result in a functional system becoming legally unavailable to a user (because code needs to be replaced, or an injunction prohibits use, etc.).⁶⁸

60. In order to minimize intellectual property risk, commercial users prefer to be indemnified for their information technology. Accordingly, prior to 2001 and the introduction of Open Source software (and Linux specifically) to the enterprise server market, it was standard practice for operating system vendors to include indemnification to their users. Users of enterprise servers paid licensing fees for operating systems and software vendors provided indemnification that ensured any intellectual property liability would be borne by the vendor, not

⁶⁸ See *Research in Motion and Vonage* as two recent examples where IP infringement risks potentially became or might become operational risks.

the end-user. OpenServer, UnixWare, Windows, AIX, and Solaris all require license fees and all provide indemnification to their users.⁶⁹

61. With IBM's support of Linux in 2000 and the launch of Linux 2.4 in January 2001, enterprise server customers increasingly adopted Linux. However, Linux was not distributed with indemnification provisions or other protection from intellectual property risks. This would not have been viewed as a significant risk until 2003, when SCO announced its finding that Linux infringed SCO's copyrights. SCO's concerns and public position on its UNIX rights alerted Linux users to their intellectual property risks. These risks naturally stimulated a demand for some type of protection, either through indemnification or a license. For instance, Novell's CEO at the time has testified that the question of copyrighted UNIX code in Linux "was a perceived problem" in the market, and that "the market was spooked with regard to that – the allegations that were being made by SCO..."⁷⁰

62. The effect of SCO's claims on the demand for protection was noted in the contemporary media: "Intellectual-property protection of open-source software has moved to the forefront in the computing industry as the result of matters such as the SCO Group's ongoing attack on Linux."⁷¹ This trend remained strong into 2005, as did the demand for indemnification. "Software companies increasingly are dangling the offer of intellectual-property liability indemnification in front of customers concerned about protecting themselves against the threat of

⁶⁹ "Indemnification Becomes Open Source's Nightmare and Microsoft's Blessing", by DiDio, Laura, November 2004, ("Corporations that use proprietary software, such as Microsoft Volume Licenses, Apple Macintosh and the various flavors of UNIX (e.g., Sun Microsystems Solaris), get indemnification protection.") and ("Indemnification is a big-ticket item and is included as a standard component in proprietary software licensing contracts.")

⁷⁰ April 14, 2006 Deposition of Jack Messman in SCO v. IBM at 240, 79.

⁷¹ CNET News, "This week in Linux news," November 19, 2004.

lawsuits. Some may wonder whether the hubbub over software indemnification is just much ado about nothing, but chief information officers know better.”⁷²

63. Further, the market was aware of SCO’s intent to protect its intellectual property and to offer solutions to enable commercial users to use the infringing code in Linux. When SCO initially introduced SCOSource in January 2003, there was heavy media coverage.⁷³ The Microsoft and Sun deals were signed in the first five months of SCOSource activity, and other good opportunities were in the SCOSource sales pipeline. Jeff Hunsaker testified that, “[I]n 2003...That’s when we introduced SCOSource. We had some good opportunities in building a pipeline. And then the Novell issue came and, wham, it dropped almost in half...”⁷⁴

64. Novell’s assertions that it owned the UNIX copyrights severely impacted customers’ demand for SCOSource licenses. As the public confidence in SCO’s ownership decreased, so did the demand for SCO’s licenses. One of the barriers to a well-functioning market for IP licensing is an inability to enforce the IP rights being sold.⁷⁵ When SCO attempted to sell the SCOSource license it found that the “Novell copyright dispute was continually thrown back in our face.”⁷⁶ The dispute with Novell “caused customers to back away from any interest

⁷² CNET News, "Perspective: How to fight against patent terrorism," January 6, 2005.

⁷³ This story was covered by the New York Times, Cnet, Forbes, the Wall Street Journal, and many others.

⁷⁴ March 30, 2007 Deposition of Jeff Hunsaker (“Hunsaker Dep.”) in SCO v. Novell at 161.

⁷⁵ “The Market for Know-How and the Efficient International Transfer of Technology”, by Teece, David J, *Annals of the American Academy of Political and Social Science*, Vol. 458, November 1981, See also “Profiting from technological innovation: Implications for integration, collaboration, licensing, and public policy,” by Teece, David J. *Research Policy*, Volume 15, Number 6, December 1986, p. 285-305; “Profiting from Innovation and the Intellectual Property Revolution,” by Pisano, Gary, *Research Policy*, Volume 35, Number 8, October 2006, 1122-1130; Arora, A. and A. Gambardella, 2001, Markets for Technology. MIT Press.

⁷⁶ SCO v. IBM, Ex. 319 (Tibbitts Dep.) at 112-113.

in the IP agreements.”⁷⁷ Describing the impact of Novell's assertions on SCO's sales attempts,

Jeff Hunsaker testified that:

Well, it's caused tremendous consternation with all of our customers, and it's caused a lot of concern. It's clearly had an impact on our day-to-day dealings with our customers such that, you know, many of them have questioned us now. "Well, there was never a question that you all owned the copyrights in UNIX and UnixWare. You've been selling it to us for many years. Now all of the sudden Novell comes out and states that they still retain the copyrights. So which is it?" ***So it's had a huge impact. Not on a few of our customers; pretty much, I would say, across the board.*** I mean, it has made an impact and caused a lot of uncertainty, fear, doubt, and has cast a pretty grim shadow over some of the -- over our business.⁷⁸

65. Just as the media had provided widespread coverage of SCOSource initiatives, Novell's statements received extensive media attention, continuing into 2004⁷⁹ The National Retail Federation, for example, issued a 2004 public statement claiming that Novell's actions raised "serious questions regarding whether the SCO Group ever gained legal ownership to Unix System V."⁸⁰ The resulting confusion implicated every attempted SCOSource sale.⁸¹ "It's as if someone came to Novell and said, 'By the way, you don't own NetWare anymore. We own the copyrights for NetWare.'"⁸²

66. By the time Chris Stone addressed the Open Source Business Conference in March 2004, the issue of the UNIX IP ownership was pervasive, as he testified: "[T]his was a big issue and it was discussed and there were questions in the audience and it was on everyone's

⁷⁷ SCO v. IBM, Ex. 324 (Hughes Dep.) at 182-183. *See also* SCO v. IBM, Ex. 308 (Langer Dep.) at 127 (Novell's "public pronouncements questioning SCO's ownership of UNIX's IP negatively impact[ed]" ability sell licenses).

⁷⁸ Hunsaker Dep. at 15 (emphasis added).

⁷⁹ *Id.* at 16-17 ("the press just has jumped all over those statements...")

⁸⁰ "Retail trade group calls SCO's claims baseless," May 5, 2004, http://news.com.com/2100-7344_3-5206729.html, as accessed on April 10, 2007.

⁸¹ *Id.* (resulting confusion created "a very formidable challenge for every one of our customers.")

⁸² *Id.*

mind. I couldn't go anywhere without someone asked [*sic*] this question."⁸³ This statement was widely reported and repeated by the media.⁸⁴

67. Industry press and analyst reports noted the futility of purchasing SCO's RTU license given the uncertainty regarding SCO's copyright ownership. For example, after Novell's statements claiming copyright ownership, potential customers shifted to a "maybe later" mode," delaying purchasing a license until there is a resolution of the copyright ownership issue.⁸⁵

The magic question is..., when should you start seriously looking for shelter [from SCO legal action]? My answer? Probably on the day that a judge announces that he agrees with SCO's interpretation of what it acquired from Novell.⁸⁶

68. My conclusion that market demand was impacted by Novell's statements is further supported by the fact that many of SCO's potential customers specifically referred to the dispute with Novell as a reason for not pursuing a license with SCO. Regal Entertainment, for example, specifically highlighted Novell's statements as a reason they declined to pursue further license negotiations with SCO.⁸⁷ The repeated reasoning was "How can SCO sue enterprises using Linux for the misappropriation of its intellectual property if it hasn't established beyond a shadow of a doubt that it owns the intellectual property in question?"⁸⁸

69. Above, I estimated the total size of the Linux server operating environment in North America. SCO contends that all 7.4 million servers identified in that analysis were

⁸³ Feb. 6, 2007 Deposition of Chris Stone in SCO v. Novell at 66.

⁸⁴ See, e.g. "Novell Exec: Don't Fear Open Source, Embrace It," Matthew Hicks, eWeek.com, March 16, 2004; "Novell plugs open source, dings SCO", Stephen Shankland, March 16, 2004, CNET News.com.

⁸⁵ Tech Update, David Berlind, "Is Red Hat the canary in SCO's coal mine?," February 18, 2004. ("For the most part, the buzz is that most Linux using enterprises are in a wait and see mode. That may change in the event that a judge sides with SCO on what it purchased from Novell.")

⁸⁶ David Berlind, Tech Update, "The SCO legal train: Know your options," February 18, 2004. http://techupdate.zdnet.com/techupdate/stories/main/SCO_legal_train.html, as accessed on March 9, 2007.

⁸⁷ Nov. 5, 2004 Deposition of Philip Langer in SCO v. IBM at 140-141. SCON0067408-9

⁸⁸ David Berlind, Tech Update, "The SCO legal train: Know your options," February 18, 2004. http://techupdate.zdnet.com/techupdate/stories/main/SCO_legal_train.html, as accessed on March 9, 2007.

running infringing versions of Linux. Thus, all 7.4 million servers in North America were candidates for the SCOsource license. To identify the "but for" penetration of that market by SCOsource, I considered a number of industry studies examining Linux users' preferences for intellectual property protection. Since all of these studies were conducted after Novell's statements, they reflect demand already diminished by Novell's claims to ownership of the UNIX copyrights, and thus represent a minimum measure of the demand that could have been realized in the absence of slander. Users willing to obtain indemnification were those most concerned with the risks of IP litigation. This set of users would thus have been the most likely purchasers of SCOsource Right to Use licenses. The level of interest in indemnification post-Novell's statement represents a lower-bound on the interest since Novell's statements. Novell's statements cast SCO's ownership rights into question and would have reduced demand for indemnification. There is no plausible economic rationale for Novell's statements to have increased demand for indemnification. Thus, I use the level of demand post-action as an absolute minimum on the likely demand prior to Novell's statements.

70. Several industry analyst reports attempted to gauge the level of demand for Linux IP protection. In May 2004, a Forrester study estimated that 22% of respondents were interested in buying Linux from a vendor who had a Linux indemnification program, with an additional 36% that were "unsure".⁸⁹ While the 22% represents a lower bound of demand, in my opinion, some fraction of the 36% that identified themselves as "unsure" would have been buyers of SCO's RTU license in the absence of uncertainty regarding SCO's ownership of the IP.

71. Six months later, a November 2004 Yankee Group Report showed that 19% of respondents were highly concerned about Linux indemnification (8% considered Linux IP

⁸⁹ "Linux IP Litigation: Users Largely Unconcerned About SCO Suit, Indifferent to Indemnifications," by Fichera, Richard, Forrester Research, Inc., May 14, 2004. This data is from a survey of 36 North American companies.

indemnification a “top priority,” while an additional 11% were “very concerned” about Linux indemnification).⁹⁰ An additional 26% indicated that they were “somewhat concerned” about Linux indemnification.⁹¹ Again, it is worth stressing that these responses reflect post-slander opinions clouded by uncertainty of SCO’s intellectual property rights. Had the slander not occurred and damaged perceptions about SCO’s ownership of UNIX copyrights, it is very possible that these 26% of respondents who listed themselves as still “somewhat concerned” (despite the slander) would have been buyers of the SCOSource license. Including all 26% as SCOSource customers (in addition to the 8% who considered IP protection a top priority and 11% who identified themselves as very concerned) suggests an upper bound of the range for demand at 45% of users.

72. Finally, in a March 2005 Yankee Group study of Linux users, approximately 20% of respondents said they planned to purchase third-party indemnification to protect their Linux assets.^{92, 93} This study did not identify any groups of users other than those who were planning to purchase protection.

73. Again, because all these reports gauged demand after Novell had called SCO’s ownership of the UNIX copyrights into question, I believe that the lower range numbers are lower than they would have been if SCO’s ownership of the UNIX copyrights had not been

⁹⁰ “Indemnification Becomes Open Source’s Nightmare and Microsoft’s Blessing”, by DiDio, Laura, The Yankee Group, November 2004, p. 3. (Joint Yankee Group / Sunbelt Software, Inc. survey of 1,000 organizations.).

⁹¹ *Id.*

⁹² “2005 North American Linux and Windows TCO Comparison, Part 1” by Didio, Laura, The Yankee Group, April 2005.

⁹³ Because two of the three reports on the market demand for indemnification specifically mention that the survey respondents were large companies (5,000+ employees for one and \$1 billion in revenue for the other), I considered whether the size of a company was likely to affect its demand for indemnification. A Gartner report (“User Survey Report: Open Source and Linux Software Support Service, North America, 2006”, July 24, 2006, p. 22) asked customers the importance of open source contract components and broke the results down by company size. All size groupings responded in a very tight range, with smaller companies (defined as having 1-99 employees) placing only slightly less importance on indemnification.

clouded and many of those on the fringe or undecided would be more interested and included as part of the demand.⁹⁴

74. Considering all of the above evidence of market demand, I estimate that between 19% and 45% of the Linux market would purchase a SCOsource license in the absence of uncertainty regarding SCO's ownership of UNIX copyrights. Applying the minimum 19% rate to the Linux Market calculated earlier translates into 1.478 million lost SCOsource RTU licenses. In the following table, I illustrate the lost SCOsource licenses under different assumptions over the estimated penetration range of 19% to 45%:

Table 3 North American Linux SOE Shipments Available to SCO, and Potential SCOsource Licenses, 2001 – 2007 (000s)

	2001	2002	2003	2004	2005	2006	2007	Total
N. America SOE Shipments	621	962	1,018	987	1,091	1,284	1,424	7,388
SCOsource Licenses at 19% share	118	183	193	188	207	244	271	1,404
SCOsource Licenses at 40% share	248	385	407	395	436	514	570	2,955
SCOsource License at 45% share	279	433	458	444	491	578	641	3,325

75. Because the slander must have dampened expressed interest in indemnification and because the ownership issue hindered SCO's ability to proceed with enforcement actions, it is my opinion that absent Novell's statements, SCO probably would have experienced demand at above the 19% threshold.

C. SCOsource Adoption Rate

76. But for Novell's statements attacking SCO's ownership of the UNIX copyrights, I believe that SCO would have sold between 1,404,000 and 3,325,000 server licenses by 2007, as reflected in Table 3 above.

77. As explained above, the relevant Linux SOE shipments span from 2001 to 2007. Servers that SCO contends required a SCOsource license in order not to infringe SCO's rights

⁹⁴ Potential customers probably believed that if Novell were found to be the owner, they had no need to worry about the copyrighted code in question as Novell had publicly indicated that believed Linux should remain free and assured that they would not sue end-users.

can be separated into two classes, depending on whether or not a SCOsource license was available when they acquired their Linux SOE. I grouped potential servers by calendar year, evaluating the group of servers from 2004 to 2007 (after SCOsource), and those acquired during 2001 to 2003 (the install base at the time of the SCOsource launch).

78. With respect to the first group, those that shipped from 2004 to 2007, I concluded that, but for Novell's actions, the SCOsource sale would occur in the same year as the SOE shipment. Corporate IT purchasers normally acquire licenses for operating systems, enterprise servers, and other software at the time of purchase and installation. Accordingly, I believe that these IT purchasers would have acquired SCOsource licenses at the time they purchased their Linux SOE. In other words, SCO would earn the sale of a SCOsource license at the time of the SOE shipment.

79. For the install base in place when SCO launched the SCOsource program, there would be a different buying pattern since the SCOsource license was not necessarily available at the time of their purchase.⁹⁵ I believe that this group would complete their purchases of SCOsource licenses by 2007. While I can't determine the exact timing of when each of these users would have acquired the protection of a SCOsource license, I believe that users with high levels of concern about mitigating the risks associated with IP infringement would have acquired a license in the four years between the announcement of the program and the end of 2007.

D. Alternative Vendors Would Not Have Been a Viable Option Absent Novell's Slander

80. Following Novell's attacks on SCO's UNIX copyright ownership rights, other vendors began offering alternative forms of Linux indemnification to their customers. The

⁹⁵ I recognize that 2003 will contain some purchasers for whom the SCOsource license was available at the time of their SOE purchase; however, this fact does not impact my conclusion as these purchasers would simply follow the buying pattern described for the 2004-2007 group of customers.

longer that the dispute between Novell and SCO endured, the more programs were initiated that compete (to some extent) with SCOsource RTU licenses. Each vendor offers different coverage, with varying prerequisites that customers must meet in order to be eligible for the indemnification.

81. In my opinion, these alternative programs would not detract from SCO's realization of 19% - 45% of the Linux Market in the "but for" world. Absent Novell's statements, SCO would have been the provider of choice for the customers calculated above, while the other indemnification vendors who entered the market would not have been viable options for two primary reasons: (1) the broader the protection offered by these programs, the greater their potential liability once SCO's ownership rights are clear, and the less likely they are to enter the market; (2) the narrower the protection offered by the alternative programs, the less they offer a complete substitute for a SCOsource license, and the less likely they are to compete with SCO. This section addresses both of these issues.

82. First, if SCO's ownership of the UNIX copyrights were settled, then the risk of offering a program indemnifying purchasers from liability to SCO increases significantly. A provider of indemnification, like any provider of insurance, essentially is taking a bet on an uncertain liability. The indemnifier profits if the risky event in question does not occur. The indemnifier's risks increase with the likelihood of the risky event in question. In this case, the "risky event" is SCO being able to enforce its intellectual property rights. Economic reasoning suggests that a provider of insurance (here, an indemnification) will not offer such insurance in the absence of uncertainty. If the event in question has no probability of occurring, there will be no demand for the indemnification. In contrast, if the event in question is certain to occur, there will be no supply of indemnification. If SCO's property rights were certain, then potential

indemnifiers would not have found it profitable to offer indemnification. They would be, in essence, taking on a certain liability. By making SCO's property rights uncertain, Novell's actions decreased the perceived risks for a vendor of offering indemnification for its customers. As a result, the number of companies that began offering indemnification increased. In the "but for" world, where SCO's ownership is certain and risks of being found liable for infringement are higher, these vendors would not have been likely to enter the market.

83. At the time SCO announced the SCOsource division and began offering licenses for its IP in Linux, there were no providers of such protection for intellectual property in Linux. As the dispute with Novell escalated, so did the number of alternative indemnification providers. The following table captures the chronology of the alternative indemnification programs.

Vendor	Plan/Program	Initiation Date	Scope of Coverage	Cost
SCO	SCOsource Intellectual Property License for Linux	August 5, 2003	Right to Use; Covenant not to sue	\$699 introductory list price
HP	Linux indemnification	September 23, 2003	SCO only	No specific incremental cost, but costs associated with meeting eligibility requirements, no less than \$1431.
Novell (SuSE)	Novell Linux Indemnification Program	January 14, 2004	All IP; limited to 125% of license cost	No specific incremental cost, but costs associated with meeting eligibility requirements, including \$50,000 per year expenditures
Red Hat	Open Source Assurance Program (End User Program)	January 19, 2004	All IP, but only replacement, not indemnification	No additional cost beyond Red Hat subscription costs
Oracle	Linux Services Agreement	October 26, 2006	All IP, but allows Oracle to	No specific incremental cost beyond Oracle support costs

Vendor	Plan/Program	Initiation Date	Scope of Coverage	Cost
			terminate	

84. By creating uncertainty regarding SCO's ownership rights, Novell reduced the apparent risk of offering an indemnification program and created a market for indemnification (as an alternative to the SCOSource RTU license). This significantly altered the competitive landscape for SCO in selling its SCOSource licenses. For example, in the case of HP, there were negotiations with SCO regarding providing indemnification to HP's customers under a bulk license. This arrangement would have been beneficial to both companies. However, HP did not conclude this Linux deal with SCO and eventually offered a form of indemnification to its customers without any liability protection from SCO.

85. Second, where an indemnification program offers less than complete coverage (*e.g.*, caps on total damages, replacement risks not compensated, downtime not considered), the program is less likely to compete directly with SCO. In order for an indemnification program to be a true substitute for SCO's RTU license, it would need to indemnify the user against litigation expenses, damages, and costs for replacing infringing code, including labor and downtime. SCO's Right to Use license mitigates all of these risks, and as such, each of the alternative sources of Linux indemnification offers protection that differs significantly from the security of SCO's Right to Use license. I conducted a detailed analysis of each of the indemnification programs available in the market and the scope of their protection. As shown below, each of these programs entails significant limits on the protection offered and do not constitute viable substitutes for SCOSource licenses.

i. HP's Indemnification Program

86. HP placed a number of restrictions on customers to qualify for the program that substantially distinguish the program from SCO's RTU license. The HP restrictions include prohibiting customers from using or modifying the source code (which restricts one of the primary benefits of Open Source software). Additionally, customers must purchase a Linux distribution directly from HP or purchase HP copies of a Linux distribution from an HP authorized reseller. Customers also have to run the Linux operating system solely on HP hardware, thus substantially restricting the value of hardware independence associated with the Intel architecture. Finally, customers are required to purchase standard or premium service contracts for Linux support from HP; the least expensive qualifying contract is \$1,431 per server per year.⁹⁶

87. Other than requiring customers to purchase software support from their hardware vendor, the most significant HP restriction is the lock-in to HP's hardware. One of the biggest values of running UNIX (or Linux) on the Intel platform is hardware independence. Reasonable customers would prefer mitigating the risks associated with intellectual property in Linux while still maintaining the freedom of choice in selecting hardware that previously was inherent in Linux.

ii. Red Hat's Indemnification Program

88. Prior to Novell's December 22, 2003 statements claiming ownership of the UNIX copyrights, Red Hat launched a limited program called Open Source Now to defray legal costs of Linux developers. In January 2004, after Novell's release of all the communications with SCO regarding UNIX copyright ownership, Red Hat launched its Open Source Assurance program.

⁹⁶ Interviews of various HP sales personnel

The program allowed Red Hat, at its discretion, to modify any software found to be infringing, or replace the infringing component with a non-infringing component if there is an IP issue. This program did not indemnify users against lawsuits or damages. As Yankee Group states, “It doesn’t promise to compensate customers for downtime, incompatibilities or legal expenses in the event of an IP dispute.”⁹⁷ Substantially later, in November 2006, Red Hat added a limited indemnification clause to the Open Source Assurance program. However, the program still does not provide any relief to its customers who may experience increased labor costs or downtime in association with finding that part of their Linux code infringes protected intellectual property. As such, although Red Hat’s indemnification coverage has increased as Novell’s statements persisted, even Red Hat’s new indemnity clause does not mitigate many of the risks addressed by SCO’s right-to-use license.

iii. Novell’s IP Indemnification

89. Novell launched its Linux Indemnification Program on January 14, 2004, shortly after Novell completed the acquisition of SuSE and re-publicized its copyright ownership claims. Novell’s indemnity program does not cover any SUSE licenses shipped prior to January 14, 2004. Additionally, Novell has considerable prerequisites to qualifying for participation in the program: customers must meet the \$50,000 annual minimum purchase requirement for licenses, upgrades, and updates within the year preceding a claim against their indemnified Linux product; maintain current upgrade protection for the indemnified product; maintain a current Premium Service Level contract; and register with the indemnification program within 10 days of obtaining the covered product.

⁹⁷ “Indemnification Becomes Open Source’s Nightmare and Microsoft’s Blessing,” by DiDio, Laura, The Yankee Group, November 2004.

90. The most significant difference in Novell's indemnification program is that Novell limits the indemnification to 125% of the fees from licenses, upgrades and updates, and caps damages liability at \$1.5 million.⁹⁸ This amount also does not cover downtime potentially associated with litigation or a finding of infringement. Novell's own documentation lists several industries and the costs associated with an hour of downtime. They range from ATM fees at \$12 - \$17 thousand to brokerage firms at \$5.6 - \$7.3 million.⁹⁹ In other words, some of the most substantial risks from which users of enterprise servers most need protection are not covered by Novell's indemnification program.

iv. Oracle's IP Indemnification

91. On October 25, 2006, Oracle announced that it would start distributing and offering support services for Red Hat's version of Linux. Oracle's service agreement includes indemnification for end-users and has no minimum purchase requirements or damage caps. It does, however, have a termination provision that allows Oracle to terminate indemnification if they are unable to modify the material to be non-infringing or acquire a license for the infringing material in a commercially reasonable manner. In essence, Oracle will take over a customer's legal defense and pay any damages awarded in court, but will not compensate for a customer's losses related to downtime, replacement, etc. Moreover, if Oracle exercises their option to terminate the indemnification, the customer is required to resolve the infringement without Oracle's assistance.

92. Extremely limited coverage and many restrictions minimize the value of the competing indemnification programs; but for the uncertainty Novell created regarding SCO's

⁹⁸ Novell Linux Indemnification Program Flyer, <http://www.novell.com/licensing/indemnity/>, as accessed on April 5, 2007.

⁹⁹ Novell Premium Services, Services Brochure, p. 7.

ownership rights SCO's RTU license would have been the most reasonable choice for the customers seeking IP protection. The absence of any alternative vendor providing coverage that would compare favorably with the assurance of a SCOsource RTU license is evidence of the significant cost of providing full coverage (including downtime associated with changing infringing code or licenses required as a result of ongoing use of infringing code). That cost would be exponentially greater in a world where SCO's ownership of the UNIX copyrights is no longer disputed. Moreover, the risk of less than complete coverage that consumers are willing to bear in the status quo would be less bearable to risk averse consumers if there were no question that SCO, and only SCO, had the right to license copyrighted UNIX code. The result would be near-elimination of competition – either competitors would opt not to enter the indemnification market at all, or their plans would appear grossly inadequate in comparison to the certainty of a SCOsource RTU license.

E. The Future Market for SCOsource Licenses

93. It is important to note that today's market is not the market of the "but for" world. It is my opinion that, at this point, even a court's determination that SCO owns the UNIX copyrights probably would not restore SCO to the position they were in before Novell's statements. As a practical matter, SCO's ability to sell SCOsource licenses in the future is highly uncertain. Nearly four years have passed since Novell's first attack on SCO's copyright ownership, and technology markets change rapidly.

94. Moreover, currently there are public doubts about SCO's viability as a company.¹⁰⁰ Due in part to extensive media coverage, potential customers may also be aware

¹⁰⁰ See, e.g. Declaration of Darl McBride, May 18, 2007, ¶11 (noting public questions about SCO's viability and the fact that these questions were not as prominent in 2003).

that SCO's financial resources today are far more restricted than they were in 2003.¹⁰¹ Concerns about SCO's viability support the public perception that SCO is unable to enforce its IP rights due to lack of resources, funding, etc.¹⁰² As explained above, when potential customers view SCO as unable to enforce its rights, they are substantially less likely to purchase SCOsource licenses.

95. Finally, Microsoft recently has begun making claims that it has intellectual property rights infringed by Linux.¹⁰³ Microsoft now asserts that Linux infringes 235 Microsoft patents, and has not foreclosed the possibility of seeking royalties from users.¹⁰⁴ During 2003-2007, the prospect of SCO's copyrighted code being in Linux appears to have been the primary threat to their IP that concerned Linux users seeking indemnification. Virtually all press or analyst articles discussing software intellectual property indemnification highlighted the importance of SCO's copyright claims to Linux.¹⁰⁵ The presence of Microsoft as an additional IP concern would significantly alter the future market for SCOsource licenses, which do not indemnify against all threats, but only provide the user a right-to-use SCO's IP in Linux.

96. In short, based on my expertise in high technology industries and my research and analysis in this case, I have no reason to believe that a court decision vindicating SCO's ownership rights would allow SCO to recover its losses through SCOsource sales at this time.

¹⁰¹ *Id.* at ¶13 (recognizing that, overall, SCO's finances are much more limited now than in 2003).

¹⁰² *Id.* at ¶¶10-13.

¹⁰³ See "Microsoft Takes on the Free World", Roger Parloff, *Fortune*, May 14, 2007.


¹⁰⁴ *Id.*

¹⁰⁵ IDC #32467, "Microsoft Augments Intellectual Property Indemnification," December 2004. ("In the wake of the SCO-IBM intellectual property (IP) dispute, Microsoft's new IP indemnification policy effectively raises the stakes for protecting software customers caught in the crossfire of vendor disputes."). I examined court cases to see if there were any other intellectual property claims launched against Linux or any of its distributors and did not find any. I also searched trade press and analyst reports for any other intellectual property holders making claims against Linux users.

97. I declare under penalty of perjury that the foregoing is true and correct.

Date Executed: May 25, 2007

City, State: CAMBRIDGE, MA



GARY PISANO

EXHIBIT A

EXPERT QUALIFICATIONS

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EDUCATION

Ph.D., Business Administration, University of California, Berkeley, 1988

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ACADEMIC APPOINTMENTS

Harry E. Figgie, Jr. Professor of Business Administration
July 1999 - present

Professor, Harvard Business School, Technology and Operations Management
July 1997- June 1999

Associate Professor, Harvard Business School, Technology and Operations Management
July 1993 - June 1997

Assistant Professor, Harvard Business School, Technology and Operations Management
July 1988 - June 1993

HONORS AND AWARDS

Strategic Management Journal Best Paper Prize, 2003

Greenhill Award, Harvard Business School, 2001

Baxter Foundation Distinguished Fellow, Harvard Business School, 1993-1994

Bradley Fellow, University of California, Berkeley, 1987-1988

University of California Regents Fellowship, 1986-1987

Comprehensive Ph.D. examination passed with distinction, 1985

RESEARCH INTERESTS

Technology and Operations Strategy

Process and Product Development

Vertical Integration, Outsourcing, and Technology Licensing

Healthcare and Biomedical Innovation

TEACHING ASSIGNMENTS

Technology and Operations Management (MBA), Managing Innovation (MBA), Managing Medicine (MBA), Competition and Strategy (MBA), The Economics and Management of Technological Innovation (Doctoral), Operations Strategy (MBA), Program for Management Development (Executive Education), Leading Product Development (Executive Education) Leadership and Strategy in Pharmaceuticals and Biotech (Chair, Executive Education)

ADMINISTRATIVE ASSIGNMENTS

Unit Head, Technology and Operations Management, July 2004-present
Director, Division of Faculty and Faculty Development, July 2002 – June 2004
Chair, Management Track, Health Policy Ph.D. Program: 2000 – 2002
Faculty Chair, Harvard Business School Global Alumni Conference,
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PROFESSIONAL ACTIVITIES

Editor, *Research Policy* (1998-2003), *Associate Editor* (2003-Present)
Ad hoc reviewer for *Administrative Science Quarterly*, *California Management Review*, *Journal of Law, Economics, and Organization*, *Journal of Operations Management*, *Management Science*, *Strategic Management Journal*, and National Science Foundation.

PERSONAL

Born in Pelham Manor, New York, October 6, 1961
Married with two children

Publications

BOOKS

Pisano, G. P. *Science Business: Promise, Reality, and the Future of Biotech*/ Boston: Harvard Business School Press, forthcoming 2006.

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Pisano, Gary P. and Gino, Francesca. "Behavioral Operations," INFORMS, San Francisco, November, 2005.

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