

### APPENDIX C

The Court should give preclusive effect to the following Findings of Fact (“Findings”) in the United States District Court for the District of Columbia opinion *United States v. Microsoft Corp.*, 84 F. Supp. 2d 9 (D.D.C. 1999).<sup>1</sup> In the few instances in which Novell, Inc. does not seek preclusive effect for an entire Finding, the portion excluded is indicated in black-lined form.

**2. An “operating system” is a software program that controls the allocation and use of computer resources (such as central processing unit time, main memory space, disk space, and input/output channels). The operating system also supports the functions of software programs, called “applications,” that perform specific user-oriented tasks. The operating system supports the functions of applications by exposing interfaces, called “application programming interfaces,” or “APIs.” These are synapses at which the developer of an application can connect to invoke pre-fabricated blocks of code in the operating system. These blocks of code in turn perform crucial tasks, such as displaying text on the computer screen. Because it supports applications while interacting more closely with the PC system’s hardware, the operating system is said to serve as a “platform.”**

**4. An operating system designed to run on an Intel-compatible PC will not function on a non-Intel-compatible PC, nor will an operating system designed for a non-Intel-compatible PC function on an Intel-compatible one. Similarly, an application that relies on APIs specific to one operating system will not, generally speaking, function on another operating system unless it is first adapted, or “ported,” to the APIs of the other operating system.**

**6. In 1981, Microsoft released the first version of its Microsoft Disk Operating System, commonly known as “MS-DOS.” The system had a character-based user interface that required the user to type specific instructions at a command prompt in order to perform tasks such as launching applications and copying files. When the International Business Machines Corporation (“IBM”) selected MS-DOS for pre-installation on its first generation of PCs, Microsoft’s product became the predominant operating system sold for Intel-compatible PCs.**

**7. In 1985, Microsoft began shipping a software package called Windows. The product included a graphical user interface, which enabled users to perform tasks by selecting icons and words on the screen using a mouse. Although originally just a user-interface, or “shell,” sitting on top of MS-DOS, Windows took on more operating-system functionality over time.**

**8. In 1995, Microsoft introduced a software package called Windows 95, which announced itself as the first operating system for Intel-compatible PCs that exhibited the**

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<sup>1</sup> Findings to which the Court granted preclusive effect in its December 3, 2008 Order are in bold typeface.

same sort of integrated features as the Mac OS running PCs manufactured by Apple Computer, Inc. (“Apple”). Windows 95 enjoyed unprecedented popularity with consumers, and in June 1998, Microsoft released its successor, Windows 98.

**9. Microsoft is the leading supplier of operating systems for PCs. The company transacts business in all fifty of the United States and in most countries around the world.**

**10. Microsoft licenses copies of its software programs directly to consumers. The largest part of its MS-DOS and Windows sales, however, consists of licensing the products to manufacturers of PCs (known as “original equipment manufacturers” or “OEMs”), such as the IBM PC Company and the Compaq Computer Corporation (“Compaq”). An OEM typically installs a copy of Windows onto one of its PCs before selling the package to a consumer under a single price.**

17. Although certain Web browsers provided graphical user interfaces as far back as 1993, the first widely-popular graphical browser distributed for profit, called Navigator, was brought to market by the Netscape Communications Corporation (“Netscape”) in December 1994. Microsoft introduced its browser, called Internet Explorer, in July 1995.

18. Currently there are no products, nor are there likely to be any in the near future, that a significant percentage of consumers worldwide could substitute for Intel-compatible PC operating systems without incurring substantial costs. Furthermore, no firm that does not currently market Intel-compatible PC operating systems could start doing so in a way that would, within a reasonably short period of time, present a significant percentage of consumers with a viable alternative to existing Intel-compatible PC operating systems. It follows that, if one firm controlled the licensing of all Intel-compatible PC operating systems worldwide, it could set the price of a license substantially above that which would be charged in a competitive market and leave the price there for a significant period of time without losing so many customers as to make the action unprofitable. Therefore, in determining the level of Microsoft’s market power, the relevant market is the licensing of all Intel-compatible PC operating systems worldwide.

20. Since only Intel-compatible PC operating systems will work with Intel-compatible PCs, a consumer cannot opt for a non-Intel-compatible PC operating system without obtaining a non-Intel-compatible PC. Thus, for consumers who already own an Intel-compatible PC system, the cost of switching to a non-Intel compatible PC operating system includes the price of not only a new operating system, but also a new PC and new peripheral devices. It also includes the effort of learning to use the new system, the cost of acquiring a new set of compatible applications, and the work of replacing files and documents that were associated with the old applications. Very few consumers would incur these costs in response to the trivial increase in the price of an Intel-compatible PC system that would result from even a substantial increase in the price of an Intel-compatible PC operating system. For example, users of Intel-compatible PC operating systems would not switch in large numbers to the Mac OS in response to even a substantial, sustained increase in the price of an Intel-compatible PC operating system.

28. Operating systems are not the only software programs that expose APIs to application developers. Netscape’s Web browser and Sun Microsystems, Inc.’s Java class libraries are examples of non-operating system software that do likewise. Such software is often called “middleware,” because it relies on the interfaces provided by the underlying operating system while simultaneously exposing its own APIs to developers. Currently no middleware product

exposes enough APIs to allow independent software vendors (“ISVs”) profitably to write full-featured personal productivity applications that rely solely on those APIs.

29. Even if middleware deployed enough APIs to support full-featured applications, it would not function on a computer without an operating system to perform tasks such as managing hardware resources and controlling peripheral devices. But to the extent the array of applications relying solely on middleware comes to satisfy all of a user’s needs, the user will not care whether there exists a large number of other applications that are directly compatible with the underlying operating system. Thus, the growth of middleware-based applications could lower the costs to users of choosing a non-Intel-compatible PC operating system like the Mac OS. It remains to be seen, though, whether there will ever be a sustained stream of full-featured applications written solely to middleware APIs. In any event, it would take several years for middleware and the applications it supports to evolve from the status quo to a point at which the cost to the average consumer of choosing a non-Intel compatible PC operating system over an Intel-compatible one falls so low as to constrain the pricing of the latter systems.

**30. Firms that do not currently produce Intel-compatible PC operating systems could do so. What is more, once a firm had written the necessary software code, it could produce millions of copies of its operating system at relatively low cost. The ability to meet a large demand is useless, however, if the demand for the product is small, and signs do not indicate large demand for a new Intel-compatible PC operating system. To the contrary, they indicate that the demand for a new Intel-compatible PC operating system would be severely constrained by an intractable “chicken-and-egg” problem: The overwhelming majority of consumers will only use a PC operating system for which there already exists a large and varied set of high-quality, full-featured applications, and for which it seems relatively certain that new types of applications and new versions of existing applications will continue to be marketed at pace with those written for other operating systems. Unfortunately for firms whose products do not fit that bill, the porting of applications from one operating system to another is a costly process. Consequently, software developers generally write applications first, and often exclusively, for the operating system that is already used by a dominant share of all PC users. Users do not want to invest in an operating system until it is clear that the system will support generations of applications that will meet their needs, and developers do not want to invest in writing or quickly porting applications for an operating system until it is clear that there will be a sizeable and stable market for it. What is more, consumers who already use one Intel-compatible PC operating system are even less likely than first-time buyers to choose a newcomer to the field, for switching to a new system would require these users to scrap the investment they have made in applications, training, and certain hardware.**

31. The chicken-and-egg problem notwithstanding, a firm might reasonably expect to make a profit by introducing an Intel-compatible PC operating system designed to support a type of application that satisfies the special interests of a particular subset of users. For example, Be, Inc. (“Be”) markets an Intel-compatible PC operating system called BeOS that offers superior support for multimedia applications, and the operating system enjoys a certain amount of success with the segment of the consumer population that has a special interest in creating and playing multimedia content with a PC system. Still, while a niche operating system might turn a profit, the chicken-and-egg problem (hereinafter referred to as the “applications barrier to entry”) would make it prohibitively expensive for a new Intel-compatible operating system to attract enough developers and consumers to become a viable alternative to a dominant incumbent in less than a few years.

32. To the extent that developers begin writing attractive applications that rely solely on servers or middleware instead of PC operating systems, the applications barrier to entry could erode. As the Court finds above, however, it remains to be seen whether server- or middleware-based development will flourish at all. Even if such development were already flourishing, it would still be several years before the applications barrier eroded enough to clear the way for the relatively rapid emergence of a viable alternative to incumbent Intel-compatible PC operating systems. It is highly unlikely, then, that a firm not already marketing an Intel-compatible PC operating system could begin marketing one that would, in less than a few years, present a significant percentage of consumers with a viable alternative to incumbents.

**33. Microsoft enjoys so much power in the market for Intel-compatible PC operating systems that if it wished to exercise this power solely in terms of price, it could charge a price for Windows substantially above that which could be charged in a competitive market. Moreover, it could do so for a significant period of time without losing an unacceptable amount of business to competitors. In other words, Microsoft enjoys monopoly power in the relevant market.**

**34. Viewed together, three main facts indicate that Microsoft enjoys monopoly power. First, Microsoft's share of the market for Intel-compatible PC operating systems is extremely large and stable. Second, Microsoft's dominant market share is protected by a high barrier to entry. Third, and largely as a result of that barrier, Microsoft's customers lack a commercially viable alternative to Windows.**

**35. Microsoft possesses a dominant, persistent, and increasing share of the worldwide market for Intel-compatible PC operating systems. Every year for the last decade, Microsoft's share of the market for Intel-compatible PC operating systems has stood above ninety percent. For the last couple of years, the figure has been at least ninety-five percent, and analysts project that the share will climb even higher over the next few years. Even if Apple's Mac OS were included in the relevant market, Microsoft's share would still stand well above eighty percent.**

**36. Microsoft's dominant market share is protected by the same barrier that helps define the market for Intel-compatible PC operating systems. As explained above, the applications barrier would prevent an aspiring entrant into the relevant market from drawing a significant number of customers away from a dominant incumbent even if the incumbent priced its products substantially above competitive levels for a significant period of time. Because Microsoft's market share is so dominant, the barrier has a similar effect within the market: It prevents Intel-compatible PC operating systems other than Windows from attracting significant consumer demand, and it would continue to do so even if Microsoft held its prices substantially above the competitive level.**

**37. Consumer interest in a PC operating system derives primarily from the ability of that system to run applications. The consumer wants an operating system that runs not only types of applications that he knows he will want to use, but also those types in which he might develop an interest later. Also, the consumer knows that if he chooses an operating system with enough demand to support multiple applications in each product category, he will be less likely to find himself straitened later by having to use an application whose features disappoint him. Finally, the average user knows that, generally speaking, applications improve through successive versions. He thus wants an operating system for which successive generations of his favorite applications will be released –**

promptly at that. The fact that a vastly larger number of applications are written for Windows than for other PC operating systems attracts consumers to Windows, because it reassures them that their interests will be met as long as they use Microsoft's product.

38. Software development is characterized by substantial economies of scale. The fixed costs of producing software, including applications, is very high. By contrast, marginal costs are very low. Moreover, the costs of developing software are "sunk" – once expended to develop software, resources so devoted cannot be used for another purpose. The result of economies of scale and sunk costs is that application developers seek to sell as many copies of their applications as possible. An application that is written for one PC operating system will operate on another PC operating system only if it is ported to that system, and porting applications is both time-consuming and expensive. Therefore, application developers tend to write first to the operating system with the most users – Windows. Developers might then port their applications to other operating systems, but only to the extent that the marginal added sales justify the cost of porting. In order to recover that cost, ISVs that do go to the effort of porting frequently set the price of ported applications considerably higher than that of the original versions written for Windows.

39. Consumer demand for Windows enjoys positive network effects. A positive network effect is a phenomenon by which the attractiveness of a product increases with the number of people using it. The fact that there is a multitude of people using Windows makes the product more attractive to consumers. The large installed base attracts corporate customers who want to use an operating system that new employees are already likely to know how to use, and it attracts academic consumers who want to use software that will allow them to share files easily with colleagues at other institutions. The main reason that demand for Windows experiences positive network effects, however, is that the size of Windows' installed base impels ISVs to write applications first and foremost to Windows, thereby ensuring a large body of applications from which consumers can choose. The large body of applications thus reinforces demand for Windows, augmenting Microsoft's dominant position and thereby perpetuating ISV incentives to write applications principally for Windows. This self-reinforcing cycle is often referred to as a "positive feedback loop."

42. Counteracting the collective-action phenomenon is another known as the "first-mover incentive." For an ISV interested in attracting users, there may be an advantage to offering the first and, for a while, only application in its category that runs on a new PC operating system. The user base of the new system may be small, but every user of that system who wants such an application will be compelled to use the ISV's offering. Moreover, if demand for the new operating system suddenly explodes, the first mover will reap large sales before any competitors arrive. An ISV thus might be drawn to a new PC operating system as a "protected harbor." Once first-movers stake claims to the major categories of applications, however, there is a strong chance that the new operating system could stall; it would not support the most familiar applications, nor the variety and number of applications, that attract large numbers of consumers, and there would no longer exist a first-mover incentive to attract additional ISVs to the important application categories. Although the upstart operating system might find itself with enough applications support to hold a fraction of the market, the collective-action phenomenon would still prevent the system from gaining the kind of positive feedback momentum that can turn a fringe entrant into a rival that would put competitive pressure on Windows.

44. Microsoft continually releases “new and improved” versions of its PC operating system. Each time it does, Microsoft must convince ISVs to write applications that take advantage of new APIs, so that existing Windows users will have incentive to buy an upgrade. Since ISVs are usually still earning substantial revenue from applications written for the last version of Windows, Microsoft must convince them to write for the new version. Even if ISVs are slow to take advantage of the new APIs, though, no applications barrier stands in the way of consumers adopting the new system, for Microsoft ensures that successive versions of Windows retain the ability to run applications developed for earlier versions. In fact, since ISVs know that consumers do not feel locked into their old versions of Windows and that new versions have historically attracted substantial consumer demand, ISVs will generally write to new APIs as long as the interfaces enable attractive, innovative features. Microsoft supplements developers’ incentives by extending various “seals of approval” – visible to consumers, investors, and industry analysts – to those ISVs that promptly develop new versions of their applications adapted to the newest version of Windows. In addition, Microsoft works closely with ISVs to help them adapt their applications to the newest version of the operating system – a process that is in any event far easier than porting an application from one vendor’s PC operating system to another’s. In sum, despite the substantial resources Microsoft expends inducing ISVs to develop applications for new versions of Windows, the company does not face any obstacles nearly as imposing as the barrier to entry that vendors and would-be vendors of other PC operating systems must overcome.

55. OEMs believe that the likelihood of a viable alternative to Windows emerging any time in the next few years is too low to constrain Microsoft from raising prices or imposing other burdens on customers and users. The accuracy of this belief is highlighted by the fact that the other vendors of Intel-compatible PC operating systems do not view their own offerings as viable alternatives to Windows. Microsoft knows that OEMs have no choice but to load Windows, both because it has a good understanding of the market in which it operates and because OEMs have told Microsoft as much. Indicative of Microsoft’s assessment of the situation is the fact that, in a 1996 presentation to the firm’s executive committee, the Microsoft executive in charge of OEM licensing reported that piracy continued to be the main competition to the company’s operating system products. Secure in this knowledge, Microsoft did not consider the prices of other Intel-compatible PC operating systems when it set the price of Windows 98.

56. As the Court found above, the growth of server- and middleware-based applications development might eventually weaken the applications barrier to entry. This would not only make it easier for outside firms to enter the market, it could also make it easier for non-Microsoft firms already in the market to present a viable alternative to Windows. But as the Court also found above, it is not clear whether ISVs will ever develop a large, diverse body of full-featured applications that rely solely on APIs exposed by servers and middleware. Furthermore, even assuming that such a movement has already begun in earnest, it will take several years for the applications barrier to erode enough to enable a non-Microsoft, Intel-compatible PC operating system to develop into a viable alternative to Windows.

59. The software industry in general is characterized by dynamic, vigorous competition. In many cases, one of the early entrants into a new software category quickly captures a lion’s share of the sales, while other products in the category are either driven out altogether or relegated to niche positions. What eventually displaces the leader is often not competition from another product within the same software category, but rather a technological advance that renders the boundaries defining the category obsolete. These events, in which categories are redefined and leaders are superseded in the process, are spoken of as “inflection points.”

60. The exponential growth of the Internet represents an inflection point born of complementary technological advances in the computer and telecommunications industries. The rise of the Internet in turn has fueled the growth of server-based computing, middleware, and open-source software development. Working together, these nascent paradigms could oust the PC operating system from its position as the primary platform for applications development and the main interface between users and their computers. Microsoft recognizes that new paradigms could arise to depreciate the value of selling PC operating systems; however, the fact that these new paradigms already exist in embryonic or primitive form does not prevent Microsoft from enjoying monopoly power today. For while consumers might one day turn to network computers, or Linux, or a combination of middleware and some other operating system, as an alternative to Windows, the fact remains that they are not doing so today. Nor are consumers likely to do so in appreciable numbers any time in the next few years. Unless and until that day arrives, no significant percentage of consumers will be able to abandon Windows without incurring substantial costs. Microsoft can therefore set the price of Windows substantially higher than that which would be charged in a competitive market – or impose other burdens on consumers – without losing so much business as to make the action unprofitable. If Microsoft exerted its power solely to raise price, the day when users could turn away from Windows without incurring substantial costs would still be several years distant. Moreover, Microsoft could keep its prices high for a significant period of time and still lower them in time to meet the threat of a new paradigm. Alternatively, Microsoft could delay the arrival of a new paradigm on the scene by expending surplus monopoly power in ways other than the maintenance of high prices.

66. Microsoft expends a significant portion of its monopoly power, which could otherwise be spent maximizing price, on imposing burdensome restrictions on its customers – and in inducing them to behave in ways – that augment and prolong that monopoly power. For example, Microsoft attaches to a Windows license conditions that restrict the ability of OEMs to promote software that Microsoft believes could weaken the applications barrier to entry. Microsoft also charges a lower price to OEMs who agree to ensure that all of their Windows machines are powerful enough to run Windows NT for Workstations. To the extent this provision induces OEMs to concentrate their efforts on the development of relatively powerful, expensive PCs, it makes OEMs less likely to pursue simultaneously the opposite path of developing “thin client” systems, which could threaten demand for Microsoft’s Intel-compatible PC operating-system products.<sup>2</sup>

67. Microsoft’s monopoly power is also evidenced by the fact that, over the course of several years, Microsoft took actions that could only have been advantageous if they operated to reinforce monopoly power. These actions are described below.

68. Middleware technologies have the potential to weaken the applications barrier to entry. Microsoft was apprehensive that the APIs exposed by middleware technologies would attract so much developer interest, and would become so numerous and varied, that there would arise a substantial and growing number of full-featured applications that relied largely, or even wholly, on middleware APIs. The applications relying largely on middleware APIs would potentially be relatively easy to port from one operating system to another. The applications relying

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**Deleted:** In addition, Microsoft charges a lower price to OEMs who agree to ship all but a minute fraction of their machines with an operating system pre-installed. While this helps combat piracy, it also makes it less likely that consumers will detect increases in the price of Windows and renders operating systems not pre-installed by OEMs in large numbers even less attractive to consumers. After all, a consumer

**Deleted:** s interest in a non-Windows operating system might not outweigh the burdens on system memory and performance associated with supporting two operating systems on a single PC. Other such restrictions and incentives are described below.

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<sup>2</sup> The word “Furthermore” is deleted from Finding 66 to avoid a misleading connection to the preceding Finding 64. The details of these particular dealings with OEMs are deleted because they are not germane to Novell’s case.

exclusively on middleware APIs would run, as written, on any operating system hosting the requisite middleware. So the more popular middleware became and the more APIs it exposed, the more the positive feedback loop that sustains the applications barrier to entry would dissipate. Microsoft was concerned with middleware as a category of software; each type of middleware contributed to the threat posed by the entire category. At the same time, Microsoft focused its antipathy on two incarnations of middleware that, working together, had the potential to weaken the applications barrier severely without the assistance of any other middleware. These were Netscape's Web browser and Sun's implementation of the Java technologies.<sup>3</sup>

69. Netscape Navigator possesses three key middleware attributes that endow it with the potential to diminish the applications barrier to entry. First, in contrast to non-Microsoft, Intel-compatible PC operating systems, which few users would want to use on the same PC systems that carry their copies of Windows, a browser can gain widespread use based on its value as a complement to Windows. Second, because Navigator exposes a set (albeit a limited one) of APIs, it can serve as a platform for other software used by consumers. A browser product is particularly well positioned to serve as a platform for network-centric applications that run in association with Web pages. Finally, Navigator has been ported to more than fifteen different operating systems. Thus, if a developer writes an application that relies solely on the APIs exposed by Navigator, that application will, without any porting, run on many different operating systems.

70. Adding to Navigator's potential to weaken the applications barrier to entry is the fact that the Internet has become both a major inducement for consumers to buy PCs for the first time and a major occupier of the time and attention of current PC users. For any firm looking to turn its browser product into an applications platform such to rival Windows, the intense consumer interest in all things Internet-related is a great boon.

71. Microsoft knew in the fall of 1994 that Netscape was developing versions of a Web browser to run on different operating systems. It did not yet know, however, that Netscape would employ Navigator to generate revenue directly, much less that the product would evolve in such a way as to threaten Microsoft. In fact, in late December 1994, Netscape's chairman and chief executive officer ("CEO"), Jim Clark, told a Microsoft executive that the focus of Netscape's business would be applications running on servers and that Netscape did not intend to succeed at Microsoft's expense.

72. As soon as Netscape released Navigator on December 15, 1994, the product began to enjoy dramatic acceptance by the public; shortly after its release, consumers were already using Navigator far more than any other browser product. This alarmed Microsoft, which feared that Navigator's enthusiastic reception could embolden Netscape to develop Navigator into an alternative platform for applications development. In late May 1995, Bill Gates, the chairman and CEO of Microsoft, sent a memorandum entitled "The Internet Tidal Wave" to Microsoft's executives describing Netscape as a "new competitor 'born' on the Internet." He warned his colleagues within Microsoft that Netscape was "pursuing a multi-platform strategy where they move the key API into the client to commoditize the underlying operating system." By the late spring of 1995, the executives responsible for setting Microsoft's corporate strategy were deeply concerned that Netscape was moving its business in a direction that could diminish the applications barrier to entry.

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<sup>3</sup> The deleted portion of Finding 68 avoids a potentially confusing reference to other Findings.



73. The term “Java” refers to four interlocking elements. First, there is a Java programming language with which developers can write applications. Second, there is a set of programs written in Java that expose APIs on which developers writing in Java can rely. These programs are called the “Java class libraries.” The third element is the Java compiler, which translates the code written by the developer into Java “bytecode.” Finally, there are programs called “Java virtual machines,” or “JVMs,” which translate Java bytecode into instructions comprehensible to the underlying operating system. If the Java class libraries and a JVM are present on a PC system, the system is said to carry a “Java runtime environment.”

74. The inventors of Java at Sun Microsystems intended the technology to enable applications written in the Java language to run on a variety of platforms with minimal porting. A program written in Java and relying only on APIs exposed by the Java class libraries will run on any PC system containing a JVM that has itself been ported to the resident operating system. Therefore, Java developers need to port their applications only to the extent that those applications rely directly on the APIs exposed by a particular operating system. The more an application written in Java relies on APIs exposed by the Java class libraries, the less work its developer will need to do to port the application to different operating systems. The easier it is for developers to port their applications to different operating systems, the more applications will be written for operating systems other than Windows. To date, the Java class libraries do not expose enough APIs to support the development of full-featured applications that will run well on multiple operating systems without the need for porting; however, they do allow relatively simple, network-centric applications to be written cross-platform. It is Sun’s ultimate ambition to expand the class libraries to such an extent that many full-featured, end-user-oriented applications will be written cross-platform. The closer Sun gets to this goal of “write once, run anywhere,” the more the applications barrier to entry will erode.

75. Sun announced in May 1995 that it had developed the Java programming language. Mid-level executives at Microsoft began to express concern about Sun’s Java vision in the fall of that year, and by late spring of 1996, senior Microsoft executives were deeply worried about the potential of Sun’s Java technologies to diminish the applications barrier to entry.

76. Sun’s strategy could only succeed if a Java runtime environment that complied with Sun’s standards found its way onto PC systems running Windows. Sun could not count on Microsoft to ship with Windows an implementation of the Java runtime environment that threatened the applications barrier to entry. Fortunately for Sun, Netscape agreed in May 1995 to include a copy of Sun’s Java runtime environment with every copy of Navigator, and Navigator quickly became the principal vehicle by which Sun placed copies of its Java runtime environment on the PC systems of Windows users.

77. The combined efforts of Netscape and Sun threatened to hasten the demise of the applications barrier to entry, opening the way for non-Microsoft operating systems to emerge as acceptable substitutes for Windows. By stimulating the development of network-centric Java applications accessible to users through browser products, the collaboration of Netscape and Sun also heralded the day when vendors of information appliances and network computers could present users with viable alternatives to PCs themselves. Nevertheless, these middleware technologies have a long way to go before they might imperil the applications barrier to entry. Windows 98 exposes nearly ten thousand APIs, whereas the combined APIs of Navigator and the Java class libraries, together representing the greatest hope for proponents of middleware, total less than a thousand. Decision-makers at Microsoft are apprehensive of potential as well as present threats, though, and in 1995 the implications of the symbiosis between Navigator and

Sun's Java implementation were not lost on executives at Microsoft, who viewed Netscape's cooperation with Sun as a further reason to dread the increasing use of Navigator.

78. Although they have been the most prominent, Netscape's Navigator and Sun's Java implementation are not the only manifestations of middleware that Microsoft has perceived as having the potential to weaken the applications barrier to entry. Starting in 1994, Microsoft exhibited considerable concern over the software product Notes, distributed first by Lotus and then by IBM. Microsoft worried about Notes for several reasons: It presented a graphical interface that was common across multiple operating systems; it also exposed a set of APIs to developers; and, like Navigator, it served as a distribution vehicle for Sun's Java runtime environment. Then in 1995, Microsoft reacted with alarm to Intel's Native Signal Processing software, which interacted with the microprocessor independently of the operating system and exposed APIs directly to developers of multimedia content. Finally, in 1997 Microsoft noted the dangers of Apple's and RealNetworks' multimedia playback technologies, which ran on several platforms (including the Mac OS and Windows) and similarly exposed APIs to content developers. Microsoft feared all of these technologies because they facilitated the development of user-oriented software that would be indifferent to the identity of the underlying operating system.

80. Executives at Microsoft received confirmation in early May 1995 that Netscape was developing a version of Navigator to run on Windows 95, which was due to be released in a couple of months. Microsoft's senior executives understood that if they could prevent this version of Navigator from presenting alternatives to the Internet-related APIs in Windows 95, the technologies branded as Navigator would cease to present an alternative platform to developers. Even if non-Windows versions of Navigator exposed Internet-related APIs, applications written to those APIs would not run on the platform Microsoft executives expected to enjoy the largest installed base, i.e., Windows 95. So, as long as the version of Navigator written for Windows 95 relied on Microsoft's Internet-related APIs instead of exposing its own, developing for Navigator would not mean developing cross-platform. Developers of network-centric applications thus would not be drawn to Navigator's APIs in substantial numbers. Therefore, with the encouragement and support of Gates, a group of Microsoft executives commenced a campaign in the summer of 1995 to convince Netscape to halt its development of platform-level browsing technologies for Windows 95.

84. [At a June 21, 1995 meeting,] when [Netscape CEO James] Barksdale brought the discussion back to the particular Windows 95 APIs that Netscape actually wanted to rely on and needed from Microsoft, the representatives from Microsoft explained that if Netscape entered a "special relationship" with Microsoft, the company would treat Netscape as a "preferred ISV." This meant that Netscape would enjoy preferential access to technical information, including APIs. They intimated that Microsoft's internal developers had already created the APIs that Netscape was seeking, and that Microsoft had not yet decided either which ISVs would be privileged to receive them or when access would be granted. The Microsoft representatives made clear that the alacrity with which Netscape would receive the desired Windows 95 APIs and other technical information would depend on whether Netscape entered this "special relationship" with Microsoft.<sup>4</sup>

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<sup>4</sup> Finding 84 is edited to clarify the time frame and briefly describe Mr. Barksdale.

90. Microsoft knew that Netscape needed certain critical technical information and assistance in order to complete its Windows 95 version of Navigator in time for the retail release of Windows 95. Indeed, Netscape executives had made a point of requesting this information, especially the so-called Remote Network Access (“RNA”) API, at the June 21 meeting. As was discussed above, the Microsoft representatives at the meeting had responded that the haste with which Netscape received the desired technical information would depend on whether Netscape entered the so-called “special relationship” with Microsoft. Specifically, Microsoft representative J. Allard had told Barksdale that the way in which the two companies concluded the meeting would determine whether Netscape received the RNA API immediately or in three months.

91. Although Netscape declined the special relationship with Microsoft, its executives continued, over the weeks following the June 21 meeting, to plead for the RNA API. Despite Netscape’s persistence, Microsoft did not release the API to Netscape until late October, i.e., as Allard had warned, more than three months later. The delay in turn forced Netscape to postpone the release of its Windows 95 browser until substantially after the release of Windows 95 (and Internet Explorer) in August 1995. As a result, Netscape was excluded from most of the holiday selling season.

92. Microsoft similarly withheld a scripting tool that Netscape needed to make its browser compatible with certain dial-up ISPs. Microsoft had licensed the tool freely to ISPs that wanted it, and in fact had cooperated with Netscape in drafting a license agreement that, by mid-July 1996, needed only to be signed by an authorized Microsoft executive to go into effect. There the process halted, however. In mid-August, a Microsoft representative informed Netscape that senior executives at Microsoft had decided to link the grant of the license to the resolution of all open issues between the companies. Netscape never received a license to the scripting tool and, as a result, was unable to do business with certain ISPs for a time.

93. Other firms in the computer industry have had encounters with Microsoft similar to the experiences of Netscape described above. These interactions demonstrate that it is Microsoft’s corporate practice to pressure other firms to halt software development that either shows the potential to weaken the applications barrier to entry or competes directly with Microsoft’s most cherished software products.

94. At the same time that Microsoft was trying to convince Netscape to stop developing cross-platform APIs, it was trying to convince Intel to halt the development of software that presented developers with a set of operating-system-independent interfaces.

95. Although Intel is engaged principally in the design and manufacture of microprocessors, it also develops some software. Intel’s software development efforts, which take place at the Intel Architecture Labs (“IAL”), are directed primarily at finding useful ways to consume more microprocessor cycles, thereby stimulating demand for advanced Intel microprocessors. By early 1995, IAL was in the advanced stages of developing software that would enable Intel 80x86 microprocessors to carry out tasks usually performed by separate chips known as “digital signal processors.” By enabling this migration, the software, called Native Signal Processing (“NSP”) software, would endow Intel microprocessors with substantially enhanced video and graphics performance.

99. Along with its concerns about contemporaneous compatibility, Microsoft also complained that Intel had not subjected its software to sufficient quality-assurance testing. Microsoft was

quick to point out that if Windows users detected problems with the software that came pre-installed on their PC systems, they would blame Microsoft or the OEMs, even if fault lay with Intel. Microsoft's concerns with compatibility and quality were genuine. Both pre-dating and over-shadowing these transient and remediable concerns, however, was a more abiding fear at Microsoft that the NSP software would render ISVs, device manufacturers, and (ultimately) consumers less dependent on Windows. Without this fear, Microsoft would not have subjected Intel to the level of pressure that it brought to bear in the summer of 1995.

100. Microsoft began complaining to Intel about its NSP software in inter-company communications sent in the spring of 1995. In May, Microsoft raised the profile of its complaints by sending some of its senior executives to Intel to discuss the latter's incursion into Microsoft's platform territory. Returning from the May meeting, one Microsoft employee urged his superiors to refuse to allow Intel to offer platform-level software, even if it meant that Intel could not innovate as quickly as it would like. If Intel wished to enable a new function, the employee wrote, its only "winning path" would be to convince Microsoft to support the effort in its platform software. At any rate, "[s]ometimes Intel would have to accept the outcome that the time isn't right for [Microsoft]." In the first week of July, Gates himself met with Intel's CEO, Andrew Grove, to discuss, among other things, NSP. In a subsequent memorandum to senior Microsoft executives, Gates reported that he had tried to convince Grove "to basically not ship NSP" and more generally to reduce the number of people working on software at Intel.

101. The development of an alternative platform to challenge Windows was not the primary objective of Intel's NSP efforts. In fact, Intel was interested in providing APIs and DDIs only to the extent the effort was necessary to ensure the development of applications and devices that would spark demand for Intel's most advanced microprocessors. Understanding Intel's limited ambitions, Microsoft hastened to assure Intel that if it would stop promoting NSP's interfaces, Microsoft would accelerate its own work to incorporate the functions of the NSP software into Windows, thereby stimulating the development of applications and devices that relied on the new capabilities of Intel's microprocessors. At the same time, Microsoft pressured the major OEMs to not install NSP software on their PCs until the software ceased to expose APIs. NSP software could not find its way onto PCs without the cooperation of the OEMs, so Intel realized that it had no choice but to surrender the pace of software innovation to Microsoft. By the end of July 1995, Intel had agreed to stop promoting its NSP software. Microsoft subsequently incorporated some of NSP's components into its operating-system products. Even as late as the end of 1998, though, Microsoft still had not implemented key capabilities that Intel had been poised to offer consumers in 1995.

102. Microsoft was not content to merely quash Intel's NSP software. At a second meeting at Intel's headquarters on August 2, 1995, Gates told Grove that he had a fundamental problem with Intel using revenues from its microprocessor business to fund the development and distribution of free platform-level software. In fact, Gates said, Intel could not count on Microsoft to support Intel's next generation of microprocessors as long as Intel was developing platform-level software that competed with Windows. Intel's senior executives knew full well that Intel would have difficulty selling PC microprocessors if Microsoft stopped cooperating in making them compatible with Windows and if Microsoft stated to OEMs that it did not support Intel's chips. Faced with Gates' threat, Intel agreed to stop developing platform-level interfaces that might draw support away from interfaces exposed by Windows.

115. IBM is both a hardware and a software company. On the hardware side, IBM manufactures and licenses, among other things, Intel-compatible PCs. On the software side, IBM

develops and sells, among other things, Intel-compatible PC operating systems and office productivity applications. The IBM PC Company relies heavily on Microsoft's cooperation to make a profit, for few consumers would buy IBM PC systems if those systems did not work well with Windows and, further, if they did not come with Windows included. IBM's software division, on the other hand, competes directly with Microsoft in other respects. For instance, IBM has in the past marketed OS/2 as an alternative to Windows, and it currently markets the SmartSuite bundle of office productivity applications as an alternative to Microsoft's Office suite. The fact that IBM's software division markets products that compete directly with Microsoft's most profitable products has frustrated the efforts of the IBM PC Company to maintain a cooperative relationship with the firm that controls the product (Windows) without which the PC Company cannot survive.

116. Whereas Microsoft tried to convince Netscape to move its business in a direction that would not facilitate the emergence of products that would compete with Windows, Microsoft tried to convince IBM to move its business away from products that themselves competed directly with Windows and Office. Microsoft leveraged the fact that the PC Company needed to license Windows at a competitive price and on a timely basis, and the fact that the company needed Microsoft's support in many more subtle ways. When IBM refused to abate the promotion of those of its own products that competed with Windows and Office, Microsoft punished the IBM PC Company with higher prices, a late license for Windows 95, and the withholding of technical and marketing support.

119. Representatives from IBM and Microsoft, including Bill Gates, met to discuss the relationship between their companies at an industry conference in November 1994. At that meeting, IBM informed Microsoft that, rather than enter into the Frontline Partnership with Microsoft, IBM was going to pursue an initiative it called "IBM First." Consistent with the title of the initiative, IBM would aggressively promote IBM's software products, would not promote any Microsoft products, and would pre-install OS/2 Warp on all of its PCs, including those on which it would also pre-install Windows. IBM thus rejected the terms that would have resulted in an \$8 reduction in the per-copy royalty price of Windows 95.

120. True to its word, IBM began vigorous promotion of its software products. This effort included an advertising campaign, starting in late 1994, that extolled OS/2 Warp and disparaged Windows. IBM's drive to best Microsoft in the PC software venue intensified in June 1995, when IBM reached an agreement with the Lotus Development Corporation for the acquisition of that company. As a consequence of the acquisition, IBM took ownership of the Lotus groupware product, Lotus Notes, and the Lotus SmartSuite bundle of office productivity applications. Microsoft had already identified Notes as a middleware threat, because it presented users with a common interface, and ISVs with a common set of APIs, across multiple platforms. For its part, SmartSuite competed directly with Microsoft Office. In mid-July 1995, IBM announced that it was going to make SmartSuite its primary desktop software offering in the United States.

121. Microsoft did not intend to capitulate. In July, Gates called an executive at the IBM PC Company to berate him about IBM's public statements denigrating Windows. Just a few days later, Microsoft began to retaliate in earnest against the IBM PC Company.

122. The IBM PC Company had begun negotiations with Microsoft for a Windows 95 license in late March 1995. For the first two months, the negotiations had progressed smoothly and at an expected pace. After IBM announced its intention to acquire Lotus, though, the Microsoft negotiators began canceling meetings with their IBM counterparts, failing to return telephone

calls, and delaying the return of marked-up license drafts that they received from IBM. Then, on July 20, 1995, just three days after IBM announced its intention to pre-install SmartSuite on its PCs, a Microsoft executive informed his counterpart at the IBM PC Company that Microsoft was terminating further negotiations with IBM for a license to Windows 95. Microsoft also refused to release to the PC Company the Windows 95 “golden master” code. The PC Company needed the code for its product planning and development, and IBM executives knew that Microsoft had released it to IBM’s OEM competitors on July 17. Microsoft’s purported reason for halting the negotiations was that it wanted first to resolve an ongoing audit of IBM’s past royalty payments to Microsoft for several different operating systems.

123. Prior to the call on July 20, neither company’s management had ever linked the ongoing audit to IBM’s negotiations for a license to Windows 95. IBM was dismayed by the abrupt halt in the license negotiations and the prospect that it might not get a license for Windows 95 until the audit process concluded. IBM’s executives surmised that all of its major competitors had already signed licenses for Windows 95. The PC Company would lose a great deal of business to those competitors during the crucial back-to-school season if it could not begin pre-installing Windows 95 on its PCs immediately. The conclusion of the audit appeared to be weeks, if not months, away. The PC Company thus faced the prospect of missing the holiday selling season as well. IBM executives pleaded with Microsoft to uncouple the license negotiations from the ongoing audit and offered Microsoft a \$10 million bond that Microsoft could use to indemnify itself against any discrepancies that the audit might ultimately reveal. IBM also offered to add a term to any Windows 95 license agreement whereby IBM would pay penalties and interest if any future audit disclosed under-reporting of royalties by IBM.

124. On August 9, 1995, a senior executive at the IBM PC Company went to Redmond to meet with Joachim Kempin, the Microsoft executive in charge of the firm’s sales to OEMs. At the meeting, Kempin offered to accept a single, lump-sum payment from IBM that would close all outstanding audits. The amount of this payment would be reduced if IBM offered a concession that Kempin could take back to Gates. As one possibility, Kempin suggested that IBM agree to not bundle SmartSuite with its PCs for a period of six months to one year. He explained that the prospect of IBM bundling SmartSuite with its PCs threatened the profit margins that Microsoft derived from Office and constituted a core issue in the relationship between the two companies. The IBM executive rejected Kempin’s suggestion. In a follow-up letter, Kempin stated that Microsoft would require approximately \$25 million from IBM in order to settle all outstanding audits. Kempin reiterated that,

If you believe that the amount I am asking for is too much, I would be willing to trade certain relationship improving measures for the settlement charges and/or convert some of the amounts into marketing funds if IBM too agrees to promote Microsoft’s software products together with their hardware offerings.

The message was clear: IBM could resolve the impasse ostensibly blocking the issuance of a Windows 95 license – the royalties audit by de-emphasizing those products of its own that competed with Microsoft and instead promoting Microsoft’s products.

125. IBM never agreed to renounce SmartSuite or to increase its support for Microsoft software, and in the end, Microsoft did not grant IBM a license to pre-install Windows 95 until fifteen minutes before the start of Microsoft’s official launch event on August 24, 1995. That same day, the firms brought the audit issue to a close with a settlement agreement under which

IBM ultimately paid Microsoft \$31 million. The release of Windows 95 had been postponed more than once, and many consumers apparently had been postponing buying PC systems until the new operating system arrived. The pent-up demand caused an initial surge in the sales of PCs loaded with Windows 95. IBM's OEM competitors reaped the fruits of this surge, but because of the delay in obtaining a license, the IBM PC Company did not. The PC Company also missed the back-to-school market. These lost opportunities cost IBM substantial revenue.

132. In sum, from 1994 to 1997, Microsoft consistently pressured IBM to reduce its support for software products that competed with Microsoft's offerings, and it used its monopoly power in the market for Intel-compatible PC operating systems to punish IBM for its refusal to cooperate. Whereas, in the case of Netscape, Microsoft tried to induce a company to move its business away from offering software that could weaken the applications barrier to entry, Microsoft's primary concern with IBM was to reduce the firm's support for software products that competed directly with Microsoft's most profitable products, namely Windows and Office. That being said, it must be noted that one of the IBM products to which Microsoft objected, Notes, was like Navigator in that it exposed middleware APIs. In any event, Microsoft's interactions with Netscape, IBM, Intel, Apple, and RealNetworks all reveal Microsoft's business strategy of directing its monopoly power toward inducing other companies to abandon projects that threaten Microsoft and toward punishing those companies that resist.

141. Still, had Microsoft not viewed browser usage share as the key to preserving the applications barrier to entry, the company would not have taken its efforts beyond developing a competitive browser product, including it with Windows at no additional cost to consumers, and promoting it with advertising. Microsoft would not have absorbed the considerable additional costs associated with enlisting other firms in its campaign to increase Internet Explorer's usage share at Navigator's expense. This investment was only profitable to the extent that it protected the applications barrier to entry. Neither the desire to bolster demand for Windows, nor the prospect of ancillary revenues, explains the lengths to which Microsoft has gone. For one thing, loading Navigator makes Windows just as Internet-ready as including Internet Explorer does. Therefore, Microsoft's costly efforts to limit the use of Navigator on Windows could not have stemmed from a desire to bolster consumer demand for Windows. Furthermore, there is no conceivable way that Microsoft's costly efforts to induce Apple to pre-install Internet Explorer on Apple's own PC systems could have increased consumer demand for Windows.

142. In pursuing its goal of maximizing Internet Explorer's usage share, Microsoft actually has limited rather severely the number of profit centers from which it could otherwise derive income via Internet Explorer. For example, Microsoft allows the developers of browser shells built on Internet Explorer to collect ancillary revenues such as advertising fees; for another, Microsoft permits its browser licensees to change the browser's start page, thus limiting the fees that advertisers are willing to pay for placement on that page by Microsoft. Even if Microsoft maximized its ancillary revenue, the amount of revenue realized would not come close to recouping the cost of its campaign to maximize Internet Explorer's usage share at Navigator's expense. The countless communications that Microsoft's executives dispatched to each other about the company's need to capture browser usage share indicate that the purpose of the effort had little to do with attracting ancillary revenues and everything to do with protecting the applications barrier from the threat posed by Netscape's Navigator and Sun's implementation of Java. For example, Microsoft vice president Brad Chase told the company's assembled sales and marketing executives in April 1996 that they should "worry about your browser share[ ] as much as BillG" even though Internet Explorer was "a no revenue product," because "we will loose [sic] the Internet platform battle if we do not have a significant user installed base." He told

them that “if you let your customers deploy Netscape Navigator, you will loose [sic] leadership on the desktop.”

143. Decision-makers at Microsoft worried that simply developing its own attractive browser product, pricing it at zero, and promoting it vigorously would not divert enough browser usage from Navigator to neutralize it as a platform. They believed that a comparable browser product offered at no charge would still not be compelling enough to consumers to detract substantially from Navigator’s existing share of browser usage. This belief was due, at least in part, to the fact that Navigator already enjoyed a very large installed base and had become nearly synonymous with the Web in the public’s consciousness. If Microsoft was going to raise Internet Explorer’s share of browser usage and lower Navigator’s share, executives at Microsoft believed they needed to constrict Netscape’s access to the distribution channels that led most efficiently to browser usage.

**144. Very soon after it recognized the need to gain browser usage share at Navigator’s expense, Microsoft identified pre-installation by OEMs and bundling with the proprietary client software of IAPs as the two distribution channels that lead most efficiently to browser usage. Two main reasons explain why these channels are so efficient. First, users must acquire a computer and connect to the Internet before they can browse the Web. Thus, the OEM and IAP channels lead directly to virtually every user of browsing software. Second, both OEMs and IAPs are able to place browsing software at the immediate disposal of a user without any effort on the part of the user. If an OEM pre-installs a browser onto its PCs and places an icon for that browser on the default screen, or “desktop,” of the operating system, purchasers of those PCs will be confronted with the icon as soon as the operating system finishes loading into random access memory (“RAM”). If an IAP bundles a browser with its own proprietary software, its subscribers will, by default, use the browser whenever they connect to the Web. In its internal decision-making, Microsoft has placed considerable reliance on studies showing that consumers tend strongly to use whatever browsing software is placed most readily at their disposal, and that once they have acquired, found, and used one browser product, most are reluctant – and indeed have little reason – to expend the effort to switch to another. Microsoft has also relied on studies showing that a very large majority of those who browse the Web obtain their browsing software with either their PCs or their IAP subscriptions.**

**145. Indeed, no other distribution channel for browsing software even approaches the efficiency of OEM pre-installation and IAP bundling. The primary reason is that the other channels require users to expend effort before they can start browsing. The traditional retail channel, for example, requires the consumer to make contact with a retailer, and retailers generally do not distribute products without charging a price for them. Naturally, once Microsoft and Netscape began offering browsing software for free, consumers for the most part lost all incentive to pay for it.**

**148. Knowing that OEMs and IAPs represented the most efficient distribution channels of browsing software, Microsoft sought to ensure that, to as great an extent as possible, OEMs and IAPs bundled and promoted Internet Explorer to the exclusion of Navigator.**

156. Before it decided to blunt the threat that Navigator posed to the applications barrier to entry, Microsoft did not plan to make it difficult or impossible for OEMs or consumers to obtain Windows without obtaining Internet Explorer. In fact, the company’s internal correspondence and external communications indicate that, as late as the fall of 1994, Microsoft was planning to



include low-level Internet “plumbing,” such as a TCP/IP stack, but not a browser, with Windows 95.

157. Microsoft subsequently decided to develop a browser to run on Windows 95. As late as June 1995, however, Microsoft had not decided to bundle that browser with the operating system. The plan at that point, rather, was to ship the browser in a separate “frosting” package, for which Microsoft intended to charge. By April or May of that year, however, Microsoft’s top executives had identified Netscape’s browser as a potential threat to the applications barrier to entry. Throughout the spring, more and more key executives came to the conclusion that Microsoft’s best prospect of quashing that threat lay in maximizing the usage share of Microsoft’s browser at Navigator’s expense. The executives believed that the most effective way of carrying out this strategy was to ensure that every copy of Windows 95 carried with it a copy of Microsoft’s browser, then code-named “O’Hare.” For example, two days after the June 21, 1995 meeting between Microsoft and Netscape executives, Microsoft’s John Ludwig sent an E-mail to Paul Maritz and the other senior executives involved in Microsoft’s browser effort. “[O]bviously netscape does see us as a client competitor,” Ludwig wrote. “[W]e have to work extra hard to get ohare on the oem disks.”

158. Microsoft did manage to bundle Internet Explorer 1.0 with the first version of Windows 95 licensed to OEMs in July 1995. It also included a term in its OEM licenses that prohibited the OEMs from modifying or deleting any part of Windows 95, including Internet Explorer, prior to shipment. The OEMs accepted this restriction despite their interest in meeting consumer demand for PC operating systems without Internet Explorer. After all, Microsoft made the restriction a non-negotiable term in its Windows 95 license, and the OEMs felt they had no commercially viable alternative to pre-installing Windows 95 on their PCs. Apart from a few months in the fall of 1997, when Microsoft provided OEMs with Internet Explorer 4.0 on a separate disk from Windows 95 and permitted them to ship the latter without the former, Microsoft has never allowed OEMs to ship Windows 95 to consumers without Internet Explorer. This policy has guaranteed the presence of Internet Explorer on every new Windows PC system.

**159. Microsoft knew that the inability to remove Internet Explorer made OEMs less disposed to pre-install Navigator onto Windows 95. OEMs bear essentially all of the consumer support costs for the Windows PC systems they sell. These include the cost of handling consumer complaints and questions generated by Microsoft’s software. Pre-installing more than one product in a given category, such as word processors or browsers, onto its PC systems can significantly increase an OEM’s support costs, for the redundancy can lead to confusion among novice users. In addition, pre-installing a second product in a given software category can increase an OEM’s product testing costs. Finally, many OEMs see pre-installing a second application in a given software category as a questionable use of the scarce and valuable space on a PC’s hard drive.**

160. Microsoft’s executives believed that the incentives that its contractual restrictions placed on OEMs would not be sufficient in themselves to reverse the direction of Navigator’s usage share. Consequently, in late 1995 or early 1996, Microsoft set out to bind Internet Explorer more tightly to Windows 95 as a technical matter. The intent was to make it more difficult for anyone, including systems administrators and users, to remove Internet Explorer from Windows 95 and to simultaneously complicate the experience of using Navigator with Windows 95. As Brad Chase wrote to his superiors near the end of 1995, “We will bind the shell to the Internet Explorer, so that running any other browser is a jolting experience.”

161. Microsoft bound Internet Explorer to Windows 95 by placing code specific to Web browsing in the same files as code that provided operating system functions. Starting with the release of Internet Explorer 3.0 and “OEM Service Release 2.0” (“OSR 2”) of Windows 95 in August 1996, Microsoft offered only a version of Windows 95 in which browsing-specific code shared files with code upon which non-browsing features of the operating system relied.

164. Starting with Windows 95 OSR 2, Microsoft placed many of the routines that are used by Internet Explorer, including browsing-specific routines, into the same files that support the 32-bit Windows APIs. Microsoft’s primary motivation for this action was to ensure that the deletion of any file containing browsing-specific routines would also delete vital operating system routines and thus cripple Windows 95. Although some of the code that provided Web browsing could still be removed, without disabling the operating system, by entering individual files and selectively deleting routines used only for Web browsing, licensees of Microsoft software were, and are, contractually prohibited from reverse engineering, decompiling, or disassembling any software files. Even if this were not so, it is prohibitively difficult for anyone who does not have access to the original, human-readable source code to change the placement of routines into files, or otherwise to alter the internal configuration of software files, while still preserving the software’s overall functionality.

166. In late 1996, senior executives within Microsoft, led by James Allchin, began to argue that Microsoft was not binding Internet Explorer tightly enough to Windows and as such was missing an opportunity to maximize the usage of Internet Explorer at Navigator’s expense. Allchin first made his case to Paul Maritz in late December 1996. He wrote:

I don’t understand how IE is going to win. The current path is simply to copy everything that Netscape does packaging and product wise. Let’s [suppose] IE is as good as Navigator/Communicator. Who wins? The one with 80% market share. Maybe being free helps us, but once people are used to a product it is hard to change them. Consider Office. We are more expensive today and we’re still winning. My conclusion is that we must leverage Windows more. Treating IE as just an add-on to Windows which is cross-platform [means] losing our biggest advantage – Windows marketshare. We should dedicate a cross group team to come up with ways to leverage Windows technically more. . . . We should think about an integrated solution – that is our strength.

Allchin followed up with another message to Maritz on January 2, 1997:

You see browser share as job 1. . . . I do not feel we are going to win on our current path. We are not leveraging Windows from a marketing perspective and we are trying to copy Netscape and make IE into a platform. We do not use our strength – which is that we have an installed base of Windows and we have a strong OEM shipment channel for Windows. Pitting browser against browser is hard since Netscape has 80% marketshare and we have <20%. . . . I am convinced we have to use Windows – this is the one thing they don’t have. . . . We have to be competitive with features, but we need something more – Windows integration.

If you agree that Windows is a huge asset, then it follows quickly that we are not investing sufficiently in finding ways to tie IE and Windows together. This must come from you. . . . Memphis [Microsoft's code-name for Windows 98] must be a simple upgrade, but most importantly it must be killer on OEM shipments so that Netscape never gets a chance on these systems.

203. If OEMs removed the most visible means of invoking Internet Explorer, and pre-installed Navigator with facile methods of access, Microsoft's purpose in forcing OEMs to take Internet Explorer – capturing browser usage share from Netscape – would be subverted. The same would be true if OEMs simply configured their machines to promote Navigator before Windows had a chance to promote Internet Explorer. Decision-makers at Microsoft believed that as Internet Explorer caught up with Navigator in quality, OEMs would ultimately conclude that the costs of pre-installing and promoting Navigator, and removing easy access to Internet Explorer, outweighed the benefits. Still, those decision-makers did not believe that Microsoft could afford to wait for the several large OEMs that represented virtually all Windows PCs shipped to come to this desired conclusion on their own. Therefore, in order to bring the behavior of OEMs into line with its strategic goals quickly, Microsoft threatened to terminate the Windows license of any OEM that removed Microsoft's chosen icons and program entries from the Windows desktop or the "Start" menu. It threatened similar punishment for OEMs that added programs that promoted third-party software to the Windows "boot" sequence. These inhibitions soured Microsoft's relations with OEMs and stymied innovation that might have made Windows PC systems more satisfying to users. Microsoft would not have paid this price had it not been convinced that its actions were necessary to ostracize Navigator from the vital OEM distribution channel.

204. Although Microsoft's original Windows 95 licenses withheld from OEMs permission to implement any modifications to the Windows product not expressly authorized by Microsoft's "OEM Pre-Installation Kit," or "OPK," it had always been Microsoft's practice to grant certain OEMs requesting it some latitude to make modifications not specified in the OPK. But when OEMs began, in the summer of 1995, to request permission to remove the Internet Explorer icon from the Windows desktop prior to shipping their PCs, Microsoft consistently and steadfastly refused. As Compaq learned in the first half of 1996, Microsoft was prepared to enforce this prohibition against even its closest OEM allies.

205. In August 1995, Compaq entered into a "Promotion and Distribution Agreement" with AOL whereby Compaq agreed to "position AOL Services above all other Online Services within the user interface of its Products." An addendum to the agreement provided that Compaq would place an AOL icon – and no OLS icons not controlled by AOL – on the desktop of its PCs. Pursuant to its obligations, Compaq began in late 1995 or early 1996 to ship its Presario PCs with the MSN icon removed and the AOL icon added to the Windows desktop. At the same time, Compaq removed the Internet Explorer icon from the desktop of its Presarios and replaced it with a single icon representing both the Spry ISP and the browser product that Spry bundled, i.e., Navigator. Compaq added this icon in part because it recognized Navigator to be the most popular browser product with its consumers; it removed the Internet Explorer icon because it did not want its PCs desktops to confuse novice users with a clutter of Internet-related icons.

206. When Microsoft learned of Compaq's plans for the Presario, it informed Compaq that it considered the removal of the MSN and Internet Explorer icons to be a violation of the OPK process by which Compaq had previously agreed to abide. For its part, AOL informed Compaq

that it viewed the addition of an icon for Spry as a violation of their 1995 agreement. AOL did not object to the presence of a Navigator icon; what concerned AOL was the fact that clicking on this icon brought the user to the Spry ISP. Despite the protests from Microsoft and AOL, Compaq refused to reconfigure the Presario desktop. Finally, after months of unsuccessful importunity, Microsoft sent Compaq a letter on May 31, 1996, stating its intention to terminate Compaq's license for Windows 95 if Compaq did not restore the MSN and Internet Explorer icons to their original positions. Compaq's executives opined that their firm could not continue in business for long without a license for Windows, so in June Compaq restored the MSN and IE icons to the Presario desktop.

208. In its confrontation with Compaq, Microsoft demonstrated that it was prepared to go to the brink of losing all Windows sales through its highest-volume OEM partner in order to enforce its prohibition against removing Microsoft's Internet-related icons from the Windows desktop.

213. In an effort to thwart the practice of OEM customization, Microsoft began, in the spring of 1996, to force OEMs to accept a series of restrictions on their ability to reconfigure the Windows 95 desktop and boot sequence. There were five such restrictions, which were manifested either as amendments to existing Windows 95 licenses or as terms in new Windows 98 licenses. First, Microsoft formalized the prohibition against removing any icons, folders, or "Start" menu entries that Microsoft itself had placed on the Windows desktop. Second, Microsoft prohibited OEMs from modifying the initial Windows boot sequence. Third, Microsoft prohibited OEMs from installing programs, including alternatives to the Windows desktop user interface, which would launch automatically upon completion of the initial Windows boot sequence. Fourth, Microsoft prohibited OEMs from adding icons or folders to the Windows desktop that were not similar in size and shape to icons supplied by Microsoft. Finally, when Microsoft later released the Active Desktop as part of Internet Explorer 4.0, it added the restriction that OEMs were not to use that feature to display third-party brands.

214. The several OEMs that in the aggregate represented over ninety percent of Intel-compatible PC sales believed that the new restrictions would make their PC systems more difficult and more confusing to use, and thus less acceptable to consumers. They also anticipated that the restrictions would increase product returns and support costs and generally lower the value of their machines. Those OEMs that had already spent millions of dollars developing and implementing tutorial and registration programs and/or automatically-loading graphical interfaces in the Windows boot sequence lamented that their investment would, as a result of Microsoft's policy, be largely wasted. Gateway, Hewlett-Packard, and IBM communicated their opposition forcefully and urged Microsoft to lift the restrictions. Emblematic of the reaction among large OEMs was a letter that the manager of research and development at Hewlett-Packard sent to Microsoft in March 1997. He wrote:

Microsoft's mandated removal of all OEM boot-sequence and auto-start programs for OEM licensed systems has resulted in significant and costly problems for the HP-Pavilion line of retail PC's.

Our data (as of 3/10/97) shows a 10% increase in W[indows]95 calls as a % of our total customer support calls . . . .

Our registration rate has also dropped from the mid-80% range to the low 60% range.

There is also subjective data from several channel partners that our system return rate has increased from the lowest of any OEM (even lower than Apple) to a level comparable to the other Microsoft OEM PC vendors. This is a major concern in that we are taking a step backward in meeting customer satisfaction needs.

These three pieces of data confirm that we have been damaged by the edicts that [ ] Microsoft issued last fall.

From the consumer perspective, we are hurting our industry and our customers. PC's can be frightening and quirky pieces of technology into which they invest a large sum of their money. It is vitally important that the PC suppliers dramatically improve the consumer buying experience, out of box experience as well as the longer term product usability and reliability. The channel feedback as well as our own data shows that we are going in the wrong direction. This causes consumer dissatisfaction in complex telephone support process, needless in-home repair visits and ultimately in product returns. Many times the cause is user misunderstanding of a product that presents too much complexity to the common user . . . .

Our Customers hold HP accountable for their dissatisfaction with our products. We bear [ ] the cost of returns of our products. We are responsible for the cost of technical support of our customers, including the 33% of calls we get related to the lack of quality or confusion generated by your product. And finally we are responsible for our success or failure in the retail PC market.

We must have more ability to decide how our system is presented to our end users.

If we had a choice of another supplier, based on your actions in this area, I assure you [that you] would not be our supplier of choice.

I strongly urge you to have your executives review these decisions and to change this unacceptable policy.

215. Even in the face of such strident opposition from its OEM customers, Microsoft refused to relent on the bulk of its restrictions. It did, however, grant Hewlett-Packard and other OEMs discounts off the royalty price of Windows as compensation for the work required to bring their respective alternative user interfaces into compliance with Microsoft's requirements. Despite the high costs that Microsoft's demands imposed on them, the OEMs obeyed the restrictions because they perceived no alternative to licensing Windows for pre-installation on their PCs. Still, the restrictions lowered the value that OEMs attached to Windows by the amount of the costs that the restrictions imposed on them. Furthermore, Microsoft's intransigence damaged the goodwill between it and several of the highest-volume OEMs.

221. Microsoft asserts that the restrictions it places on the ability of OEMs to modify the Windows desktop and boot sequence are merely intended to prevent OEMs from compromising the quality and consistency of Windows after the code leaves Microsoft's physical control, but

before PC consumers first begin to experience the product. In truth, however, the OEM modifications that Microsoft prohibits would not compromise the quality or consistency of Windows any more than the modifications that Microsoft currently permits. Furthermore, to the extent that certain OEM modifications did threaten to impair the quality and consistency of Windows, Microsoft's response has been more restrictive than necessary to abate the threat. Microsoft would not have imposed prohibitions that burdened OEMs and consumers with substantial costs, lowered the value of Windows, and harmed the company's relations with major OEMs had it not felt that the measures were necessary to maximize Internet Explorer's share of browser usage at Navigator's expense.

222. Microsoft asserts that it restricts the freedom of OEMs to remove icons, folders, or "Start" menu entries that Microsoft places on the Windows desktop in order to ensure that consumers will enjoy ready access to the features that Microsoft's advertising has led them to expect. The Windows trademark would be blemished, Microsoft argues, if consumers could not easily find the features that impelled them to purchase a Windows-equipped PC. At the same time that it has put forward this justification, however, Microsoft has permitted OEMs to deactivate Microsoft's Active Desktop and its associated "channels" prior to shipment. More significant is the fact that Microsoft's license agreements require OEMs to bear product support costs. So if a consumer has difficulty locating a feature that he wants to use, he will call a customer service representative employed by the OEM that manufactured his PC. Since only a few calls erase the profit earned from selling a PC system, OEMs are loathe to do anything that will lead to consumer questions and complaints. Therefore, if market research indicates that consumers want and expect to see a certain icon on the Windows desktop, OEMs will not remove it. Since OEMs share Microsoft's interest in ensuring that consumers can easily find the features they want on their Windows PC systems, Microsoft would not have prohibited OEMs from removing icons, folders, or "Start" menu entries if its only concern had been consumer satisfaction. In fact, by forbidding OEMs to remove the most obvious means of invoking Internet Explorer, Microsoft diminished the value of Windows PC systems to those corporate customers, for example, who did not intend for their employees to browse the Web and did not want a browser taking up hardware resources. Incidentally, there is no merit in the hypothesis that OEMs might cause problems in the functioning of the rest of Windows by removing Internet Explorer's desktop icon and program entry, because Microsoft still allows users to do exactly that.

227. To the extent Microsoft is apprehensive that OEMs might, absent restrictions, change the set of APIs exposed by the software on their PCs, the concern is not that OEMs would modify the Windows API set. Rather, the worry is that OEMs would pre-install, on top of Windows, other software exposing additional APIs not controlled by Microsoft. In the case of alternate user interfaces, Microsoft is fearful that, if these programs loaded automatically the first time users turned on their PCs, the programs would attract so much usage that developers would be encouraged to take advantage of any APIs that the programs exposed. Indeed, one user interface in particular that OEMs could configure to load automatically and obscure the Windows desktop – Navigator – exposes a substantial number of APIs. Therefore, Microsoft's real concern has not been that OEM modifications would fragment the Windows platform to the detriment of developers and consumers. What has motivated Microsoft's prohibition against automatically loading shells is rather the fear – once again – that OEMs would pre-install and give prominent placement to middleware that could weaken the applications barrier to entry.

**239. Microsoft has largely succeeded in exiling Navigator from the crucial OEM distribution channel. Even though a few OEMs continue to offer Navigator on some of**

their PCs, Microsoft has caused the number of OEMs offering Navigator, and the number of PCs on which they offer it, to decline dramatically. Before 1996, Navigator enjoyed a substantial and growing presence on the desktop of new PCs. Over the next two years, however, Microsoft's actions forced the number of copies of Navigator distributed through the OEM channel down to an exiguous fraction of what it had been. By January 1998, Kempin could report to his superiors at Microsoft that, of the sixty OEM sub-channels (fifteen major OEMs each offering corporate desktop, consumer/small business, notebook, and workstation PCs), Navigator was being shipped through only four. Furthermore, most of the PCs shipped with Navigator featured the product in a manner much less likely to lead to usage than if its icon appeared on the desktop. For example, Sony only featured Navigator in a folder rather than on the desktop, and Gateway only shipped Navigator on a separate CD-ROM rather than pre-installed on the hard drive. By the beginning of January 1999, Navigator was present on the desktop of only a tiny percentage of the PCs that OEMs were shipping.

241. In sum, Microsoft successfully secured for Internet Explorer – and foreclosed to Navigator – one of the two distribution channels that leads most efficiently to the usage of browsing software. Even to the extent that Navigator retains some access to the OEM channel, Microsoft has relegated it to markedly less efficient forms of distribution than the form vouchsafed for Internet Explorer, namely, prominent placement on the Windows desktop. Microsoft achieved this feat by using a complementary set of tactics. First, it forced OEMs to take Internet Explorer with Windows and forbade them to remove or obscure it – restrictions which both ensured the prominent presence of Internet Explorer on users' PC systems and increased the costs attendant to pre-installing and promoting Navigator. Second, Microsoft imposed additional technical restrictions to increase the cost of promoting Navigator even more. Third, Microsoft offered OEMs valuable consideration in exchange for commitments to promote Internet Explorer exclusively. Finally, Microsoft threatened to penalize individual OEMs that insisted on pre-installing and promoting Navigator. Although Microsoft's campaign to capture the OEM channel succeeded, it required a massive and multifarious investment by Microsoft; it also stifled innovation by OEMs that might have made Windows PC systems easier to use and more attractive to consumers. That Microsoft was willing to pay this price demonstrates that its decision-makers believed that maximizing Internet Explorer's usage share at Navigator's expense was worth almost any cost.

337. Since 1995, more and more ISVs have, like Intuit, enhanced the features of their applications by designing them to take advantage of the type of content and functionality accessible through browsing software. An increasing number of these applications actually rely on browsing software to function. Microsoft's efforts to maximize Internet Explorer's share of browser usage at Navigator's expense were intended to encourage developers to use Windows-specific technologies when they wrote their applications to rely on a browser. In addition to creating this incentive indirectly, by disadvantaging Navigator, Microsoft targeted individual ISVs directly, extracting from them commitments to make their Web-centric applications reliant on technology specific to Internet Explorer.

339. In dozens of "First Wave" agreements signed between the fall of 1997 and the spring of 1998, Microsoft has promised to give preferential support, in the form of early Windows 98 and Windows NT betas, other technical information, and the right to use certain Microsoft seals of approval, to important ISVs that agree to certain conditions. One of these conditions is that the ISVs use Internet Explorer as the default browsing software for any software they develop with a hypertext-based user interface. Another condition is that the ISVs use Microsoft's "HTML

Help,” which is accessible only with Internet Explorer, to implement their applications’ help systems.

340. By exchanging its vital support for the agreement of leading ISVs to make Internet Explorer the default browsing software on which their products rely, Microsoft has ensured that many of the most popular Web-centric applications will rely on browsing technologies found only in Windows and has increased the likelihood that the millions of consumers using these products will use Internet Explorer rather than Navigator. Microsoft’s relations with ISVs thus represent another area in which it has applied its monopoly power to the task of protecting the applications barrier to entry.

377. In late 1995 and early 1996, Navigator seemed well on its way to becoming the standard software for browsing the Web. Within three years, however, Microsoft had successfully denied Navigator that status, and had thereby forestalled a serious potential threat to the applications barrier to entry. Indeed, Microsoft’s Kumar Mehta felt comfortable expressing to Brad Chase in February 1998 his “PERSONAL opinion” that “the browser battle is close to over.” Mehta continued: “We set out on this mission 2 years ago to not let netscape dictate standards and control the browser api’s [sic]. All evidence today says they don’t.”

386. For Microsoft, a key to maintaining and reinforcing the applications barrier to entry has been preserving the difficulty of porting applications from Windows to other platforms, and vice versa. In 1996, senior executives at Microsoft became aware that the number of developers writing network-centric applications in the Java programming language had become significant, and that Java was likely to increase in popularity among developers. Microsoft therefore became interested in maximizing the difficulty with which applications written in Java could be ported from Windows to other platforms, and vice versa.

394. In a further effort intended to increase the incompatibility between Java applications written for its Windows JVM and other Windows JVMs, and to increase the difficulty of porting Java applications from the Windows environment to other platforms, Microsoft designed its Java developer tools to encourage developers to write their Java applications using certain “keywords” and “compiler directives” that could only be executed properly by Microsoft’s version of the Java runtime environment for Windows. Microsoft encouraged developers to use these extensions by shipping its developer tools with the extensions enabled by default and by failing to warn developers that their use would result in applications that might not run properly with any runtime environment other than Microsoft’s and that would be difficult, and perhaps impossible, to port to JVMs running on other platforms. This action comported with the suggestion that Microsoft’s Thomas Reardon made to his colleagues in November 1996: “[W]e should just quietly grow j++ [Microsoft’s developer tools] share and assume that people will take more advantage of our classes without ever realizing they are building win32-only java apps.” Microsoft refused to alter its developer tools until November 1998, when a court ordered it to disable its keywords and compiler directives by default and to warn developers that using Microsoft’s Java extensions would likely cause incompatibilities with non-Microsoft runtime environments.

395. If all Microsoft had done to combat the growth of easily portable Java applications had been to increase the incompatibility between its Java implementation and ones complying with Sun’s standards, the effect might have been limited. For if Sun could have assured developers that a Windows-compatible Java runtime environment that complied with Sun’s standards would be installed on as many Windows PCs as Microsoft’s version, and that it would run Java



applications as well as Microsoft's, developers might have considered the cost in portability associated with relying on Microsoft-specific technologies and instead written their Java applications using Sun's developer tools. When Netscape announced in May 1995 that it would include with every copy of Navigator a copy of a Windows JVM that complied with Sun's standards, it appeared that Sun's Java implementation would achieve the necessary ubiquity on Windows.

407. Had Microsoft not been committed to protecting and enhancing the applications barrier to entry, it might still have developed a high-performance JVM and enabled Java developers to call upon Windows APIs. Absent this commitment, though, Microsoft would not have taken efforts to maximize the difficulty of porting Java applications written to its implementation and to drastically limit the ability of developers to write Java applications that would run in both Microsoft's version of the Windows runtime environment and versions complying with Sun's standards. Nor would Microsoft have endeavored to limit Navigator's usage share, to induce ISVs to neither use nor distribute non-Microsoft Java technologies, and to impede the expansion of the Java class libraries, had it not been determined to discourage developers from writing applications that would be easy to port between Windows and other platforms. Microsoft's dedication to the goal of protecting the applications barrier to entry is highlighted by the fact that its efforts to create incompatibility between its JVM and others resulted in fewer applications being able to run on Windows than otherwise would have. Microsoft felt it was worth obstructing the development of Windows-compatible applications where those applications would have been easy to port to other platforms. It is not clear whether, absent Microsoft's interference, Sun's Java efforts would by now have facilitated porting between Windows and other platforms enough to weaken the applications barrier to entry. What is clear, however, is that Microsoft has succeeded in greatly impeding Java's progress to that end with a series of actions whose sole purpose and effect were to do precisely that.

409. To the detriment of consumers, however, Microsoft has done much more than develop innovative browsing software of commendable quality and offer it bundled with Windows at no additional charge. As has been shown, Microsoft also engaged in a concerted series of actions designed to protect the applications barrier to entry, and hence its monopoly power, from a variety of middleware threats, including Netscape's Web browser and Sun's implementation of Java. Many of these actions have harmed consumers in ways that are immediate and easily discernible. They have also caused less direct, but nevertheless serious and far-reaching, consumer harm by distorting competition.

410. By refusing to offer those OEMs who requested it a version of Windows without Web browsing software, and by preventing OEMs from removing Internet Explorer – or even the most obvious means of invoking it – prior to shipment, Microsoft forced OEMs to ignore consumer demand for a browserless version of Windows. The same actions forced OEMs either to ignore consumer preferences for Navigator or to give them a Hobson's choice of both browser products at the cost of increased confusion, degraded system performance, and restricted memory. By ensuring that Internet Explorer would launch, even if the consumer had removed all conspicuous means of invoking Internet Explorer, Microsoft created confusion and frustration for consumers, and increased technical support costs for business customers. Those Windows purchasers who did not want browsing software – businesses, or parents and teachers, for example, concerned with the potential for irresponsible Web browsing on PC systems – not only had to undertake the effort necessary to remove the visible means of invoking Internet Explorer; they also had to (assuming they needed new, non-browsing features not available in earlier versions of Windows) content themselves with a PC system that ran slower and provided less

**Deleted:** in certain circumstances in Windows 98 even if Navigator were set as the default, and

**Deleted:** and then contend with the fact that Internet Explorer would nevertheless launch in certain cases

available memory than if the newest version of Windows came without browsing software. By constraining the freedom of OEMs to implement certain software programs in the Windows boot sequence, Microsoft foreclosed an opportunity for OEMs to make Windows PC systems less confusing and more user-friendly, as consumers desired. By taking the actions listed above, and by enticing firms into exclusivity arrangements with valuable inducements that only Microsoft could offer and that the firms reasonably believed they could not do without, Microsoft forced those consumers who otherwise would have elected Navigator as their browser to either pay a substantial price (in the forms of downloading, installation, confusion, degraded system performance, and diminished memory capacity) or content themselves with Internet Explorer. Finally, by pressuring Intel to drop the development of platform-level NSP software, and otherwise to cut back on its software development efforts, Microsoft deprived consumers of software innovation that they very well may have found valuable, had the innovation been allowed to reach the marketplace. None of these actions had pro-competitive justifications.<sup>5</sup>

411. Many of the tactics that Microsoft has employed have also harmed consumers indirectly by unjustifiably distorting competition. The actions that Microsoft took against Navigator hobbled a form of innovation that had shown the potential to depress the applications barrier to entry sufficiently to enable other firms to compete effectively against Microsoft in the market for Intel-compatible PC operating systems. That competition would have conduced to consumer choice and nurtured innovation. The campaign against Navigator also retarded widespread acceptance of Sun's Java implementation. This campaign, together with actions that Microsoft took with the sole purpose of making it difficult for developers to write Java applications with technologies that would allow them to be ported between Windows and other platforms, impeded another form of innovation that bore the potential to diminish the applications barrier to entry. There is insufficient evidence to find that, absent Microsoft's actions, Navigator and Java already would have ignited genuine competition in the market for Intel-compatible PC operating systems. It is clear, however, that Microsoft has retarded, and perhaps altogether extinguished, the process by which these two middleware technologies could have facilitated the introduction of competition into an important market.

412. Most harmful of all is the message that Microsoft's actions have conveyed to every enterprise with the potential to innovate in the computer industry. Through its conduct toward Netscape, IBM, Compaq, Intel, and others, Microsoft has demonstrated that it will use its prodigious market power and immense profits to harm any firm that insists on pursuing initiatives that could intensify competition against one of Microsoft's core products. Microsoft's past success in hurting such companies and stifling innovation deters investment in technologies and businesses that exhibit the potential to threaten Microsoft. The ultimate result is that some innovations that would truly benefit consumers never occur for the sole reason that they do not coincide with Microsoft's self-interest.

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<sup>5</sup> Finding 410 is edited to eliminate reference to actions the United States Court of Appeals for the District of Columbia Circuit determined were justified, i.e., "causing Windows to override the user's choice of a default browser in certain circumstances," *United States v. Microsoft Corp.*, 253 F.3d 34, 67 (D.C. Cir. 2001).