IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF COLUMBIA

UNITED STATES OF AMERICA, **Plaintiff,** **v.** **MICROSOFT CORPORATION,** **Defendant.**	**Civil Action No. 98-1232 (TPJ)**
STATE OF NEW YORK, *ex. rel.* **Attorney General ELIOT SPITZER, *et al.*,** **Plaintiffs,** **v.** **MICROSOFT CORPORATION,** **Defendant.**	**Civil Action No. 98-1233 (TPJ)** **PUBLIC – REDACTED VERSION**

DECLARATION OF REBECCA M. HENDERSON

I. Qualifications

1. My name is Rebecca Henderson. I am the Eastman Kodak LFM Professor of Management at the MIT Sloan School of Management, where I have been teaching since 1988. I am also a Research Associate at the National Bureau of Economic Research, and Department Head for Strategy at *Management Science*. I received my S.B. in Mechanical Engineering from MIT in 1981, and my Ph.D. in Business Economics from Harvard University in 1988. My C.V. is attached hereto.

2. I am a specialist in the economics of technological change and in the competitive dynamics of technology intensive industries. I study the dynamics of competition over time and the ways in which technological shocks may impact the incentives and capabilities of established firms. My research focuses upon persistence in patterns of behavior. It compares and contrasts economic incentives and organizational constraints as determinants of the ways in which firms make decisions about investments in new technology and the management of the innovative process. In the course of this research I have routinely evaluated detailed evidence about the history of particular technologies and the internal workings of firms.

3. I have taught a course in "technology strategy" since 1988. The course draws heavily on economic theory to explore the patterns of competition in technology-intensive industries and is designed to provide students with a portfolio of tools useful for framing strategic actions with respect to innovation and new product development. I teach a condensed version of this course to practicing managers, a majority of whom hold senior leadership positions in their organizations. I also work as a consultant to the senior management of both large and small firms on strategic issues. Both my teaching and my consulting have given me an important opportunity to explore the

validity of the ideas that I present in real world settings.

4. I have been retained by the Department of Justice to consider issues relevant to remedy in this case. With the assistance of specialists in information technology and related markets, I have studied the industry and the record in this case. I have focused particularly on how the dynamics of emerging technology may affect the future of the industry.

5. My testimony briefly summarizes Microsoft's past anticompetitive conduct and its effects, explains how Microsoft has both the incentives and the ability to continue this pattern of anticompetitive conduct, and sets out the potential harm that could result from permitting Microsoft to act on its incentives. I close with a brief explanation of what I believe to be an appropriate remedy in this matter. My colleagues Paul Romer and Carl Shapiro address the proposed remedy in more depth. I have read their declarations and agree with their conclusions.

II. Microsoft's Past Anticompetitive Conduct and Its Effects

A. Introduction

6. As the Court found, Microsoft enjoys a monopoly in Intel-compatible PC operating systems. FOF 30. This monopoly is protected by a sizable applications barrier to entry (FOF 36–56), and its possession gives Microsoft both the incentive and the ability to attempt to destroy, co-opt or subvert any technology that threatens to reduce or erode this barrier.

7. Microsoft's monopoly is particularly threatened by the development of "cross-platform middleware" -- software that exposes APIs that are not controlled by Microsoft and that could be accessed using a range of operating systems. FOF 68, 72. Cross-platform middleware has the potential to erode the applications barrier to entry by making it possible for applications developers to write to a set of APIs that Microsoft does not control. If a significant number of applications were written to these alternative interfaces, then consumers might be willing to buy a

competitor's operating system, secure in the knowledge that they could still access a critical mass of applications. Such a development could reduce Microsoft's monopoly power in PC operating systems.

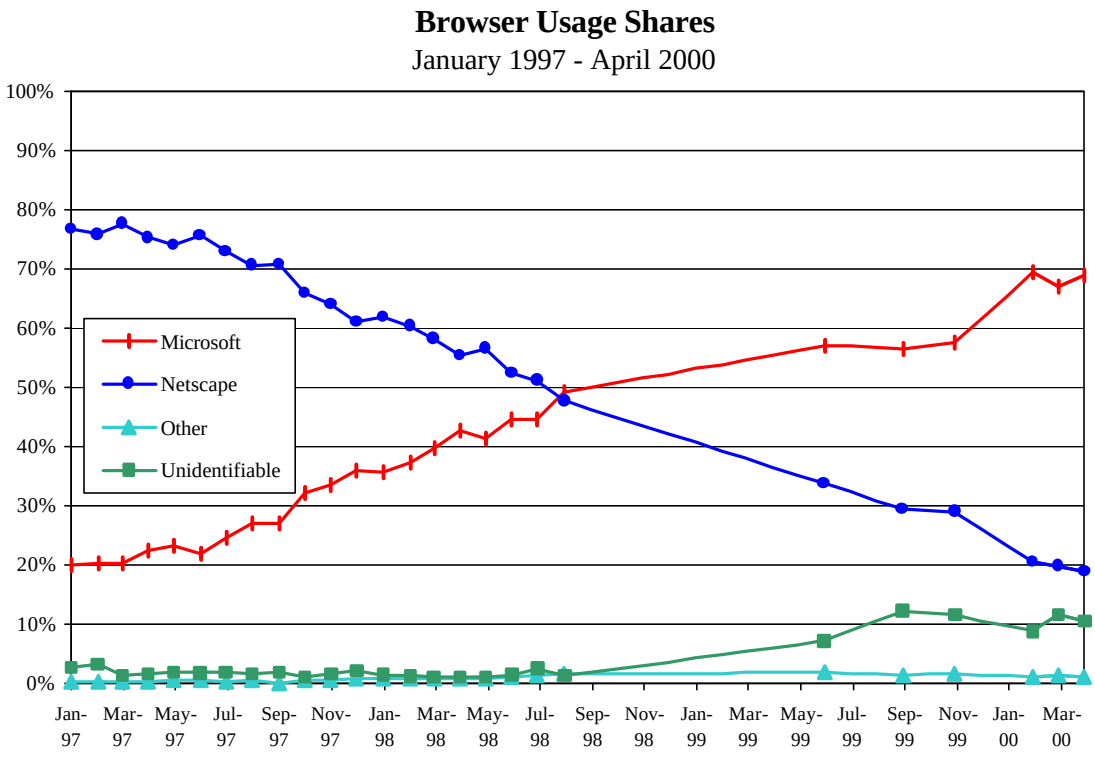
8. Microsoft therefore has the incentive to support the development of middleware only to the extent that it promises to be a pure complement to the Windows PC operating system. If Microsoft were not a monopolist it would have much greater incentives to ensure that its operating system could interoperate with a wide range of middleware. However, Microsoft's desire to protect its operating system monopoly means that it has strong incentives to short-circuit competition in any potentially cross-platform middleware that threatens to facilitate substitutes for the Windows operating system. It thus has incentives to ensure either that any potential middleware platform is firmly under Microsoft's control or that no robust alternative to the Microsoft platform emerges.

9. Microsoft came to believe that both the Netscape Browser and Java had the potential to develop into "cross-platform middleware," since both potentially enabled the development of full-featured PC applications on a range of platforms. Microsoft moved against these challenges with devastating effect. The Court's Finding of Fact catalogue the anticompetitive tactics that Microsoft used against Netscape, Java and others.

10. Microsoft's predatory conduct has crushed the possibility that Netscape might emerge as a viable alternative platform for full-featured applications development. FOF 373-374, 377-383. Between August 1998, shortly before the trial opened, and the close of evidence in June 1999, Internet Explorer's usage share rose from 49% to 57%, according to AdKnowledge. By April of this year it had risen to 69%. Over the same time period, Netscape's share has fallen from 48% to 34% to 19%.[1] RX 23. As Microsoft itself recently proclaimed "The browser wars are over." RX

[1] The Court found that data from AdKnowledge provided a useful measure of browser usage share. FOF

20 (Microsoft job advertisement).



Source: AdKnowledge

11. Microsoft's success in preventing the emergence of browser-based alternative platforms that would threaten the applications barrier to entry, along with its current overwhelming and increasing share of browser usage, reinforces its ability to prevent the emergence of other threats.

12. Microsoft's power in PC operating systems, in combination with the absence of a viable competing browser platform to which developers might be tempted to write cross platform PC applications, now gives Microsoft the ability to control all of the interfaces through which the PC interacts with other software. GX 611 ("The world of the Internet is rapidly becoming Windows centric, because Windows will be the most popular client operating system by a wide margin."). As a result, any company that needs its products to interface with the vast majority of the world's PCs must use Microsoft's interfaces, and must grapple with Microsoft's formidable monopoly

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369.

power. Microsoft has both the incentive and the ability to continue its anticompetitive conduct, and absent relief Microsoft is free to deal with any future middleware threats that might emerge to the PC operating system monopoly in the same way that it dealt with Netscape.

13. Such an outcome would cause further serious consumer harm. As Microsoft has long recognized, improvements in technology and increases in the bandwidth available to PC consumers increase the possibility that other technologies could develop into attractive cross-platform middleware. DX 1490, GX 21. Server operating systems, other platform software running on servers, or other technology running on devices other than the PC, could increasingly threaten to lower the entry barriers protecting its monopoly.

14. Server-based computing could reduce the applications barrier to entry in the PC operating system market. If server-based applications are supported in a way that permits end user access to full-featured application functionality on a truly cross-platform basis, users will be able to access them through any PC operating system they choose. Indeed, server software already acts as cross-platform middleware for a few network-centric applications. Web-based e-mail programs, for example, can be hosted on almost any server operating system and used to send mail to and from a wide range of clients, including Windows PCs, handheld computers and wireless phones.

15. As the bandwidth available to PC consumers expands, server software could become an increasingly attractive platform for developers interested in writing full-featured applications for PC owners. For example an accounting package could be "hosted" on a web server. If it were designed to be sufficiently cross-platform, and if technology permits, consumers could access its functionality using either a Windows PC or an alternative device. Another possibility is that "distributed computing" – a technology in which PCs and/or alternative clients can "borrow" computing functionality from computers across the web – could become an important as a means of

accessing sophisticated functionality on a flexible basis without having the application resident on their PCs.

16. It is also possible that some of the middleware now being developed for alternative client devices -- such as the handheld computer, the Personal Digital Assistant (PDA), the so- called "Internet Appliance," or the wireless telephone -- might one day attract developers in large numbers. If ported to the PC, this middleware could then begin to erode the applications barrier to entry to the PC operating system market.

17. Any threat that these technologies might represent to Microsoft is undoubtedly a long way off, since there continue to be formidable technical barriers both to the widespread implementation of full-featured server-based applications and to the development of any of the alternative devices to a level from which they could stimulate competition in PC operating systems. In the short run the vast majority of these technologies are more likely to be complements to the PC rather than substitutes.

18. Nevertheless, permitting Microsoft to act on its incentives and to use its formidable monopoly power to eliminate the procompetitive potential of these technologies would deprive consumers of both the free choice that results from the process of competition on the merits and the considerable value that would be created by a process of vigorous competition in this vibrant and diverse technological space. It would also effectively suppress any possibility of genuine competition in the market for PC operating system software itself.

B. The Purpose and Intended Effects of the Proposed Remedy

19. Separation of the applications business from the operating systems business is an appropriate remedy that will restore middleware competition and make it significantly less likely that Microsoft will be able to repeat its pattern of anticompetitive behavior.

20. A separation will use the power of the market to correct the problems created by Microsoft's conduct. Rather than relying on an extensive set of permanent prohibitions that may be difficult to enforce, or which may have undesirable side effects, this remedy will quickly put in place market-based incentives which rely on the firms' basic profit motive to promote competition. It will ensure that the competitive energies of both firms are focused on creating value in the marketplace rather than on evading regulation.

21. The separation will create a large, well-funded and highly profitable applications company with a strong incentive to take actions that will reduce the barrier to entry protecting Microsoft's PC operating system monopoly and that will promote competition in the PC operating system market.

22. The applications company will have incentives that Microsoft does not have today. It will have the incentive to ensure that Microsoft's applications, including Office, can work with competing PC operating systems and other viable platforms. The availability of the world's most popular office productivity suite on alternative platforms would serve to reduce the barriers to entry protecting Microsoft's monopoly, which will, in turn, increase the potential for competition in the PC operating systems market.

23. An independent applications company will also have the incentive and the ability to maintain the cross-platform capabilities of IE, and to develop key applications, including Office, into cross-platform middleware in their own right. Office is, like Navigator, an application in wide demand for its own sake that rivals Windows in its level of market penetration. Like Navigator, it exposes APIs -- indeed many applications are already written directly to Office, and an independent company would have an incentive to promote this capability even more. Like Navigator, Office could also provide a valuable distribution channel for complementary

middleware. An independent applications company will thus serve to recreate exactly the type of competitive threat that Microsoft encountered in facing Netscape's Navigator.

24. The separation will also immediately eliminate Microsoft's ability to use its control of its applications and tools for anticompetitive purposes, a tactic that Microsoft has used to considerable effect in the past.

25. In the longer term, the separation of the applications company will erode the applications barrier to entry and thus weaken Microsoft's monopoly power in PC operating systems. This will reduce the operating business's incentive and ability to behave anticompetitively.

26. The conduct remedies that have been proposed are necessary because the separation will take some time to implement and because the market-based incentives that it will unleash will also take time to reduce Microsoft's monopoly power. It will probably take a couple of years, for example, for the applications business to introduce a generation of entirely new products. In the meantime, the conduct remedies are necessary to prevent Microsoft taking advantage of its monopoly position to frustrate the purpose of the separation before it has a chance to take effect. They will prevent Microsoft from using the tactics that it employed so successfully against Netscape and others, and from exploiting its monopoly power in other potentially illegal ways.

27. A separation is superior to long-term Court supervision of Microsoft's behavior, since supervision will necessarily be intrusive and less effective. The kinds of actions that Microsoft has employed historically to protect its monopoly are often difficult to detect in a timely manner. Moreover, no matter how detailed a conduct remedy may be, Microsoft has the incentive to develop and implement new and different tactics to evade its terms in order to preserve its monopoly power.

28. It is critical that the Court act immediately to implement these remedies. Microsoft has

already used its prodigious power to place "an oppressive thumb on the scale of competitive fortune." Conclusions of Law at 20. Permitting it to continue illegally advantaging its own products and excluding competition will cause very significant consumer harm. The Court has a unique opportunity to create the conditions that will open up vigorous competition in middleware again and that may also introduce competition into PC operating systems. Acting now will preserve competition in one of the most important sectors of the economy and will generate benefits for consumers for many years to come.

III. Microsoft Has Both The Incentives And The Ability To Continue Pursuing This Pattern Of Anticompetitive Conduct

A. Microsoft's Incentives

29. Microsoft today has the same incentives to protect its monopoly and the applications barrier to entry that it has had since it first acquired monopoly power. Microsoft benefits from discouraging the widespread adoption of any software that has the potential to facilitate competition to the Windows operating system. It therefore has the incentive to use its monopoly power to destroy or subvert any potentially cross-platform middleware and to deter developers from writing cross-platform applications that might run on it. FOF 68.

30. An applications developer chooses the platform on which his or her product will run, and uses interfaces to communicate with that platform.[2] Middleware similarly uses interfaces to communicate with the underlying operating system.[3]

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[2] I use the word "interface" to refer generally to the set of rules or mechanisms for communication between two pieces of software. Interfaces as I use it here comprises both "Applications Programming Interfaces" and "Communications Interfaces" as defined in the proposed Decree and discussed by Professor Felten. "Technical information" as the term is used in the decree, is of course also important for interoperability.

[3] Applications and middleware may also use interfaces to communicate with other applications

31. Because Microsoft owns the Windows PC operating system, it owns and controls the interfaces that allow products to interoperate with Windows. Microsoft can choose to keep its interfaces "open" (details made available to all), "closed" (details kept only for use by Microsoft's own developers), or some combination of the two. Some Windows interfaces are widely available as published APIs, other interfaces are available on a preferential basis to favored developers, and yet others are available only within Microsoft. FOF 84, 90-91 (Microsoft offered to give Netscape favored access to APIs, and delayed in providing them when Netscape refused the offer); GX 282 (Maritz: "Agreed to release RL DDI [device driver interface] under gentlemen's agreement that [Intel] pull out of 3DR"); DX 1786 (acknowledging that information relating to the Windows registry's routing of media data is undocumented). Moreover, Microsoft retains the right to decide which interfaces will be open and which will be closed as Windows develops.

32. Microsoft can also decide whether Windows will only interoperate with other software through Microsoft-controlled interfaces. For example, Microsoft can choose whether Windows will use public interfaces like HTTP and LDAP or a proprietary Microsoft interface for a particular function.

33. If Microsoft did not possess the PC operating system monopoly, one would expect it to look favorably on middleware that exposed robust, attractive APIs. However, Microsoft's desire to protect its PC operating system monopoly means that it has strong incentives either to ensure that the key interfaces exposed by the middleware are under Microsoft's control or simply to cripple or destroy any non Microsoft-controlled middleware interfaces that might emerge. For instance, in discussing how to "prevent a new, alternative client/server object model from growing up 'on the

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and middleware.

net, '" Maritz asked, "What is worse, an open object model or an alternative non-Microsoft one?", clearly implying that neither was a desirable outcome for Microsoft. GX 498, at MS98 0168615. Microsoft has shown that it is willing to impose significant costs on its OEMs and customers in pursuit of this goal. FOF 221.

34. Just as it did with Netscape and Java, Microsoft can also subvert development of new non-Microsoft middleware. It has every incentive to encourage developers to write complementary software for Windows or other Microsoft platforms as long as there is no risk that the software will facilitate competition in PC operating systems. For the same reason, namely the desire to encourage complements, in some circumstances it has incentives to support interfaces that it did not develop. For example, Microsoft's support for TCP/IP enables users to access useful functionality over the Internet. However when Microsoft believes complementary middleware might threaten the applications barriers to entry, it has strong incentives to migrate users and developers from non-Microsoft interfaces to Microsoft-specific interfaces.

35. Microsoft's Brad Silverberg explained this well-established Microsoft strategy in the context of a previous standards battle with Novell's Netware:

> It seems very clear to me that if you are currently on the losing end of a standard battle, your strategy needs to be: (a) adopt the standard so you don't force customers to choose between you and the standard, (b) bootstrap that so you have a reasonable installed base, (c) begin to change the standard on top of it to get people dependent on 'you.'

RX 9 (1/19/94 Silverberg e-mail to Maritz). Once people are dependent on you, Silverberg concluded, you "start to turn the crank." Id.

36. With regard to Netscape, Paul Maritz explained this strategy even more bluntly as "embrace, extend, and extinguish." McGeady, 11/9/98pm, at 55:7-14. Microsoft "would embrace Internet standards, extend them, presumably, in incompatible ways that others couldn't follow and

thereby extinguish the competition." McGeady, 11/9/98pm, at 53:19-54:8. These incentives led Microsoft to suppress competition in browsers through a variety of anticompetitive means.

37. Looking forward, a number of other technologies might develop into threats to the Microsoft monopoly, including software supporting applications that can run on alternative clients, the technologies that support distributed computing, and server operating systems and other server software. This kind of middleware would be physically located on either the server and/or on an alternative device, but its strategic role could nevertheless be similar to that of the browser.

38. Although computer and communications technology continues to evolve, Microsoft's incentives remain very much in force. Microsoft has recently introduced the Windows 2000 family of operating systems. The 2000 family includes Windows 2000 Professional and three versions of Windows 2000 server operating systems. While Windows 2000 Professional (the PC operating system) can interoperate with a variety of servers, it offers a significant number of functions that can only be implemented if the consumer is using a server running a Windows 2000 server operating system, including such features as security (Microsoft's implementation of Kerberos), the ability to retain user-specific settings, data, and applications regardless of which Windows 2000-based PC the consumer uses on a network (Intellimirror), and the ability to access an administratively-defined set of network resources (Group Policy).

39. Microsoft has designated Windows 2000 as a successor to Windows 98 for business consumers, and it is widely reported that it also plans to migrate the home consumer to the Windows 2000 architecture. Windows 2000 incorporates many server-based middleware products that have historically been sold or distributed separately by Microsoft or other firms, including a directory service (Active Directory), an application server (Microsoft Transaction Server - MTS), and a web server (Internet Information Server - IIS). While Windows 2000 makes

use of some public interfaces, such as the TCP/IP protocol, it also implements Microsoft-specific (and proprietary) versions of several formerly public and open published interfaces.

40. Microsoft's decision to develop server-based middleware is not in itself a cause for competitive concern. Cause for concern lies rather in the fact that Microsoft has the incentive and the ability to take anticompetitive actions now or in the future that would greatly reduce the possibility that new technologies will ever develop into potential platform threats. As in the case of the browser, in the long term Microsoft has an incentive to be "open" and "interoperable" to complementary technologies only as long as there is no significant risk that they will evolve into products that might facilitate competition to the operating system. As soon as such a risk emerges, Microsoft has the incentive to strangle it in the cradle.

B. Microsoft's Ability To Continue to Engage In Anticompetitive Activity

41. Unfortunately Microsoft's ability to act on these incentives has been considerably strengthened by its victory in the browser war. Microsoft now has three potent weapons that can be mobilized to crush potentially threatening technologies: its formidable monopoly power, its strong position in applications, and its overwhelming dominance in browser usage share.

1. Microsoft's PC Operating System Monopoly

42. Microsoft continues to have a strong and durable monopoly in PC operating systems, protected by an extensive applications barrier to entry. FOF 18, 33-56. As discussed above, Microsoft has complete control over the interfaces through which the monopoly PC operating system communicates with other software and other computers, the ability to release or withhold information about the operating system as it sees fit, and the ability to manipulate the terms and conditions under which Windows is licensed. These are all substantial sources of power. While the development of alternative devices and of server-based computing has the potential to facilitate the erosion of the applications barrier to entry and to trigger an explosion of new choices for PC consumers, they remain very much latent threats. FOF 56.

43. The PC will certainly remain the key applications platform for some time to come. According to Bill Gates, the PC is "going to be at the center of everything going forward… the PC will in a sense be the control center that will make all these devices work on your behalf." RX 10 (Nightly Business Report Transcript 4/25/2000). Microsoft's Steve Ballmer predicted 130 million PCs will be sold this year alone. RX 11, at 3 (PC Forum 3/14/00). In contrast, in the words of one Microsoft executive, "There have been less than 10 million Palm units sold. That's a rounding error in units and revenue for us." RX 12, at 4 (Newsweek 4/17/00) (Quoting Craig Mundie). Middleware technologies, whether they are running on the PC or on the server, will be

forced to operate in a world where the majority of consumer access to middleware-based applications is through these Windows PCs.

44. Even those middleware producers who write for devices other than the PC will be working in a world in which the PC will be the dominant interface. For example, users of PDAs (such as the Palm Pilot) are likely to want to have their Palms access and synchronize data from their PC, and producers of set-top web boxes will want to ensure that their devices can access web sites developed with the Windows-based PC and the IE browser as their primary audience.

a. Control of Information

45. Microsoft can and does use its monopoly power in a variety of ways to encourage consumers to use Microsoft-specific technology to the exclusion of threatening potentially cross-platform middleware. In the first place, it can use its control over information about the Windows operating system as both a carrot and a stick in its dealings with third parties.

46. In the case of the browser, for example, Microsoft offered early access to key operating system information to ISVs willing to commit to the use of IE technologies and to Microsoft-specific implementations of Java (FOF 337-340, 401), while withholding from Netscape information about the key APIs it needed in order to implement Navigator for Windows. FOF 84, 90-93. Similarly, when Apple had technical problems with QuickTime on IE, Gates instructed Paul Maritz to use the opportunity to "get as much mileage as possible out of our browser and Java relationship." GX265.

47. Even when Microsoft purports to make something open, it has discretion over how rapidly and how effectively it communicates the necessary information. FOF 391-393; GX 1931 (email thread about how Microsoft concealed the availability of the Java RMI class library on Windows). For example, many developers have found that even in the case of published APIs it is often

critical to have access to additional information about the functioning of Windows in order to produce quality applications that run smoothly on Windows. FOF 337-340, 401 (First Wave agreements); GX 2276 (quoting Microsoft witness Gordon Eubanks.).

48. Since any middleware that desires to be genuinely cross-platform must be able to work with Windows and with IE, the ability to withhold information in this way – or to use information as an inducement to ISVs to adopt Microsoft-controlled middleware – remains a potent tool. In the worst case, Microsoft can use its control over the Windows operating system to ensure that consumers who attempt to use alternative middleware are met with a "jolting experience." FOF 160, 171; GX 334.

b. Control of Interfaces

49. Microsoft can also choose to keep some key interfaces closed. In the case of Windows 2000, for example, some of the PC interfaces that Microsoft uses to implement functionality that is available only when used with Windows 2000 server have not been published. Since cross-platform middleware such as server-based software requires access to the PC operating system in order to begin to erode the applications barrier to entry, closed interfaces to the desktop could have serious anticompetitive effects, further reinforcing the barriers to entry. Given Microsoft's incentive to perpetuate its PC operating system monopoly, its ability to close these kinds of interfaces for purely anticompetitive reasons remains a serious concern going forward.

50. Microsoft's choices with respect to Kerberos, for example, do not admit of a potentially benign interpretation. Kerberos is a security technology that performs authentication of users and assigns them access rights to certain functionality. It is an open, extensible standard published by the Internet Engineering Task Force (IETF). In Windows 2000, Microsoft has incorporated Kerberos extensions into its PC operating system but has not published the extensions, with the

result that no non-Microsoft server can utilize the security features of the PC operating system. For instance, according to a Windows 2000 product manager at Microsoft, Windows 2000 PCs cannot log in to a Unix Kerberos server and receive access to Windows 2000 resources such as file and print. RX 13, at 3 (Interactive Week 2/28/00). Microsoft's monopoly position in PC operating systems, coupled with its ubiquitous distribution, means that Microsoft has the power to ensure this proprietary security feature is included on all PCs.

51. The effect of this is to require all networks that install Windows 2000 on the desktop to install Windows 2000 on the server if they wish to be able to use the security features built into the desktop operating system. This increases the likelihood that Microsoft will use its PC operating system monopoly to prevent the emergence of alternative server based middleware technologies.

c. Tying

52. Microsoft also has the demonstrated ability to tie separate products to its operating system and to prohibit OEMs from removing them in order to prevent competitive middleware from weakening the applications barrier to entry. FOF 155 – 209. It can also use tying to inflict additional costs on the users and distributors of potentially competitive middleware (FOF 172 – 174), and can use its ability to raise the price of earlier versions of the operating system to prod OEMs to ship the tied version. FOF 57.

53. As new threats emerge, Microsoft can again tie separate products to the client operating system without regard to OEM needs or customer demand, solely to disadvantage competitive initiatives. FOF 173-174.

d. Bribing Potentially Threatening Middleware Suppliers

54. Microsoft's position also allows it to offer the producers of potentially threatening middleware myriad valuable inducements, including Microsoft's agreement not to compete, cash,

or other bribes, in order to persuade alternative middleware developers either not to support genuinely cross-platform middleware or to support Microsoft-specific interfaces.

55. For example, in an attempt to persuade Netscape not to compete on a platform level, Microsoft offered not to develop Mac OS, Unix, and Windows 16-bit browsers, and to assist Netscape in developing value-added software applications that relied on Microsoft Internet technologies. FOF 79, 83-89.

56. The offer of Microsoft cooperation and the threat of Microsoft competition remain significant weapons to persuade ISVs to forego working with possibly competitive technologies. Indeed, because of Microsoft's position in operating systems, browsers and applications, and the uniquely broad distribution capabilities that these provide, it can offer both bribes and threats that no other firm can hope to match.

e. Control Over OEMs

57. One of the most potent weapons afforded Microsoft by its PC operating system monopoly is its control over distribution channels. Microsoft has several different types of customers, many of whom license several software products, including the operating system. The fact that these customers have no choice as to where to license the Windows operating system means that Microsoft has a variety of means to ensure both that its own, proprietary technologies are adopted and that potentially cross-platform middleware is not.

58. During the browser wars, Microsoft used a variety of measures to ensure that OEMs supported its strategic initiatives and excluded technologies Microsoft considered threatening. These measures were largely effective in convincing OEMs to support IE in preference to Navigator and in most cases to prevent OEMs from shipping and/or promoting Navigator. FOF 239-241. These measures included:

- Offering OEMs reductions in the royalty price for Windows 95 in exchange for promoting Internet Explorer and in some cases abstaining from promoting Navigator, FOF 64, 139, 230-241;

- Offering or withholding access to early betas, source code, and other valuable programs and support depending on the OEM's willingness to support Microsoft's programs to the exclusion of competitors, FOF 128-129;

- Threatening to withdraw the Windows license to OEMs that wished to remove IE, FOF 203-208;

- Refusing to allow OEMs to reconfigure the start-up sequence for the PC to promote alternative technologies, FOF 209-227;

- Using tying and bundling to encourage the adoption of Microsoft's interfaces and to foreclose the adoption of potential competitors interfaces, FOF 175-177, 191, 192;

- Punishing the IBM PC company with higher prices, late licensing for Windows 95, and withholding of technical and marketing support for Windows 95 because of Microsoft's dissatisfaction with IBM's competition with Microsoft's core products, Windows and Office, FOF 115-132.

59. Actions of this kind remain potent weapons should Microsoft attempt to use them to force adoption of its own server based middleware. For example, the vast majority of OEMs currently selling servers are also major suppliers of PCs, dependent on Microsoft for access to the Windows operating system. At the moment several of these OEMs ship Windows on their PCs and Unix on their servers. Up until now, Unix's clear superiority over NT for many server uses has prevented Microsoft from being able to foreclose competition among server operating systems. As Microsoft's technology improves, it is increasingly probable that Microsoft will be able to use its market power to exclude server competitors from this channel.

f. Bribes and/or coercion of ISPs, ISVs, IAPs, ICPs and others

60. In the browser war, Microsoft was able to use the power of its PC monopoly to convince both important distributors and other important third parties to exclude Netscape and favor IE.

FOF 242-310 (Microsoft's actions to exclude Navigator from the IAP channel); FOF 311-335 (Microsoft's attempts to restrict ICP distribution of Navigator and payments to Netscape); FOF 341-356 (foreclosing Apple as an effective distribution channel for Navigator).

61. Microsoft took similar actions with regard to Java (FOF 403 (limiting Real Networks' ability to support Sun and Netscape interfaces); FOF 404-406 (Microsoft's successful carrot and stick approach to convince Intel not to support Java)), and with regard to other potentially troublesome technologies. FOF 94-103 (Microsoft's coercive conduct to convince Intel to stop developing platform level interfaces).

62. Microsoft also used its control of the PC to offer very significant inducements to ISVs who would write to IE, rather than to Netscape. FOF 129, 339, 136. As the Court found, "the ability of an ISV to compete in the marketplace for software running on Windows products is highly dependent on Microsoft's cooperation." FOF 338. Microsoft did not hesitate to manipulate its cooperation to achieve its anticompetitive goals. FOF 337-40.

63. Looking forward, a variety of different players are likely to be important to the distribution of middleware products. For example, designing and building server-based applications are likely to draw upon a diverse and rapidly changing set of skills, and a variety of firms will probably spring up to meet demand for them. ASPs (Application Service Providers), systems houses and other potential channel partners are all likely to be important potential partners for new middleware vendors, as are key customers, technology consultants, communications specialists and others. Together these firms will form a class of actors whose cooperation will be vital to the diffusion of any alternative cross-platform server-based middleware. Unfortunately, this emerging middleware is likely to be just as vulnerable as the browser to the array of anticompetitive tactics that Microsoft can use to undermine critically important third party support.

64. Microsoft can again make valuable offers to these kinds of players, including distribution with Windows, IE or Office, Microsoft endorsements, logos and other promotional benefits, preferential access to Windows betas, technical support and source code, to induce them to distribute Microsoft-specific middleware at the expense of competing middleware, to adopt and/or support Microsoft proprietary interfaces and to refrain from adopting and/or supporting interfaces of potentially threatening middleware. Microsoft's ability to both bribe and threaten these types of important third parties has only increased as the prospect of browser-based alternative platforms faded.

2. Microsoft's Position in Applications

65. Microsoft's strong position in applications also gives it a potent weapon in its attempt to thwart any potential middleware threat. Microsoft Office, for example, is the most widely used office suite in the world. RX 19 (Microsoft Press Release 9/14/98). Dean Schmalensee testified that the major Office components have been the "category leaders" in their respective categories since 1993-94. Schmalensee Direct ¶ 72 and Table 2. In 1999, Steve Ballmer stated that "there are over a 100 million legitimate Office users worldwide" and that "[a]bout 80 percent of all the electronic information in most companies is stored in Office documents." RX 14, at 2, 4 (Microsoft Press Pass, Office 2000 Launch, 6/7/99).

66. Since it exposes APIs and is almost as widely distributed as Windows, Office also has the potential, if it were owned by an independent company, to evolve into an attractive cross-platform application development environment in its own right. However Microsoft's control of its applications gives it a number of powerful tools that taken together greatly reduce the likelihood that any competing middleware, including Office, might emerge as an attractive PC applications development platform. It can keep Office unavailable on alternative platforms and can ensure that

it does not develop into cross-platform middleware. Microsoft can also ensure that its applications support only Microsoft-controlled or compliant interfaces and can use preferential access to Office as both a carrot and a stick in working with OEMs, other distributors, and ISVs.

67. Microsoft has used this weapon in the past. For example, Microsoft used its control of Office to force Apple to disadvantage Netscape, and to favor Internet Explorer. FOF 341-356.

68. Microsoft also used its market power in Office to force Office users to use IE. GX 351 (1/28/97 Gates e-mail instructing staff that it would be the wrong strategy not to force Office users to use IE and to make unilateral extensions to HTML, instructing them to patent elements of Microsoft's HTML rendering engine and make it extremely hard to clone, and explaining sarcastically that if his staff does not want "to do anything proprietary" in the browser, they "have to stop viewing HTML as central to our strategy and get another strategy"); McGeady, 11/9/98pm, at 55:2 - 3 ("We're going to fight with OS and Apps arm," quoting Maritz); GX 514 (Office targeted "XL [Excel] and Access publishing features only at IE4" because browser share is "still the major goal.").

69. Microsoft is continuing to use Office in this way. For example, on July 11, 1999, Bill Gates instructed his subordinates to demonstrate to a hand-held computer OEM "

REDACTED – UNDER SEAL

" RX 1.

70. Similarly internal Microsoft documents suggest that Microsoft planned to create " REDACTED " between Office and its companion server product BackOffice and its Windows CE operating system in order to, amongst other goals, " REDACTED

" RX 3, at MSCE 0002336.

71. Microsoft also used its position in tools to keep developers from having easy mechanisms or methods for writing cross-platform applications. For example, in order to preserve the difficulty of porting Windows applications to other platforms, and thus reinforce the applications barrier to entry, Microsoft subverted the cross-platform capabilities of the Java technology by a number of means. One method was to ship development tools intended to create applications that ran only on Windows while intentionally failing to warn developers that the products of these tools would operate only on the Win-32 platform. FOF 394; see also FOF 386-393, 407, GX 1332 (11/26/96 Reardon email: "[We] should just quietly grow J++ [Microsoft's developer tools] share and assume that people will take advantage of our classes without ever realizing they are building win32-only java apps"). Similarly, one of the threats that Microsoft made to Apple was to use whatever resources necessary to develop and market authoring tools that would create content incompatible with Apple's QuickTime software if Apple did not abandon the QuickTime platform on Windows. FOF 106-107.

72. Microsoft's ability to use its applications and tools in anticompetitive ways remains an important means of creating obstacles for alternative platforms.

C. The Importance of Microsoft's Victory in the Browser War

1. Microsoft has eliminated Netscape as a platform threat

73. Microsoft's significantly enhanced ability to stem potential middleware threats is the result, in very substantial part, of its past anticompetitive campaign against Netscape. FOF 411. As I summarized above, by April of this year Internet Explorer's usage share had risen to 69%, while Netscape's had fallen to around 19%. RX 23.

74. A successful independent browser would have been of enormous assistance to the further development of independent middleware for a number of reasons. In the first place, it would have

provided an interface to other applications and, more importantly, to servers on the Internet and elsewhere that was not controlled by the dominant operating system vendor. FOF 69, 72. As Microsoft acknowledges, Microsoft browsers are not a platform threat to Windows. Maritz, 1/26/99pm, at 48:22 - 49:7; Schmalensee 6/24/99am, at 51:23 - 52:16. In the second place, a widely-distributed browser outside of Microsoft's control could have served as distribution vehicle for other competitively valuable middleware such as the Java virtual machine. FOF 76.

75. Going forward, if there were a widely-distributed browser outside Microsoft's control, new middleware initiatives that involved software running on the client could achieve widespread distribution without Microsoft's sufferance by exactly this mechanism, and server-based middleware could get access to its potential end-user customers by interacting with the browser.

76. More generally, a successful middleware initiative outside Microsoft's control, whether it is the browser or not, makes later independent middleware initiatives more likely by a variety of mechanisms, since complementarities among alternative technologies, and collaborations among their providers, are important in the development of alternatives to Windows. FOF 77.

77. The browser might thus have become an ideal platform for web-centric and network-centric cross-platform applications. The browser enables developers to write cross-platform applications without additional porting costs. FOF 69. As the Court found, "for at least the next few years, the overwhelming majority of consumers accessing server-based applications will do so using an Intel-compatible PC system and a browser," (FOF 27) and a "browser product is particularly well positioned to serve as a platform for network-centric applications that run in association with Web pages." FOF 69. Or as Microsoft's Ballmer expressed it: "the browser is as much a platform for what people will want to do in the Internet over the next several years as DOS was the platform for what people would want to do on personal computers." RX 21, at 4.

78. With the browser threat crushed, it will be harder for new middleware initiatives to obtain a foothold and easier for Microsoft to thwart such initiatives. Microsoft's strategic position is stronger now than it was in 1995 - 98, given both its operating system monopoly on the PC and its browser dominance. As Microsoft consolidates its hold over the browser marketplace, its ability to cripple new server-based threats to its operating system monopoly will increase.

79. Even if AOL should, as Microsoft has argued, switch to Navigator in 2001, this would not be effective in making Navigator a sufficiently attractive platform to threaten the applications barrier to entry, particularly, in light of Microsoft's increasing influence over network-centric interfaces. FOF 304, 383. This situation is not likely to be altered in a material way by the recently announced release of a new version of Navigator.

80. Microsoft's success in crushing the threat that Netscape represented is also important since in the absence of an effective remedy, potential middleware suppliers will have substantial incentives not to invest in threatening technologies if they believe they can be subjected to the same type of predatory campaign as Netscape. FOF 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…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.").

2. The Importance of Browser Interfaces

81. Owning the dominant browser gives Microsoft great influence over the evolution of important Internet interfaces. As Paul Maritz recognized, "By controlling the client, you also control the servers." GX 498, at MS980168614. See also GX 279 (discussing the role of standards in establishing Internet platform, Maritz explained, "The key is to win the client (patch

up the server later)"). This set of interfaces goes beyond the browser APIs to which developers can directly write applications, to include the set of interfaces that constitute the communications protocols between the browser and the network. For information to be received and viewed in Internet Explorer, the developer has to follow these interfaces.

82. Microsoft's competitors agree with Microsoft on the importance of browser interfaces. Ron Rasmussen, an executive with operating system supplier Santa Cruz Operation, testified: "if there is one person or one company who controlled the browser and its look and feel and how it presented applications, it could severely enhance or detract from the application functionality of the . . . on the server." Rasmussen Dep., 12/15/98am, at 67:14 - 68:3. Similarly Brian Croll of Sun testified that "having a degree of control over the browser" is "critical" because the browser is "linked very closely to whether a server is useful or not." Because the "two sides need to talk to each other," Sun cannot sell servers if the browser "can't talk to the server." Croll Dep., 12/15/98pm, at 60:22 – 61:16.

83. Microsoft's conduct in this case reflects its understanding of the importance of this influence over browser interfaces. Microsoft offered numerous benefits of high value, including early access to operating system betas, to ISVs and others in order to extract "commitments to make their Web-centric applications reliant on technology specific to Internet Explorer" specifically for the purpose of protecting the applications barrier to entry. FOF 337-40.

84. Developers and content providers will generally choose to write to the interfaces that will enable them to reach the broadest possible audience. FOF 361. This led Microsoft, when it had a low market share in browsers, to pledge to write Internet Explorer to conform to some of the public interfaces promulgated by the World Wide Web Consortium (W3C). RX 15 (Microsoft Press Release, 7/8/97). In fact, Microsoft itself had difficulty when its market share was only

30% in convincing its own Office developers to take advantage of IE 4 features. GX 514, at MS7 0075706.

85. Given IE's dominant position today, web developers have an incentive to write to IE's interfaces first and foremost, and now that it has a dominant share, Microsoft has stated that it may not always choose to support public interfaces. RX 16 (MSDN Online 2/7/00). To the extent that Microsoft is able to impose Microsoft-specific interfaces on the Internet, the capabilities of users of non-Microsoft browsers to view content may be degraded or eliminated. Cf. FOF 322 (Microsoft contracts requiring that content providers offer content viewable only with IE or "with acceptable degradation when used with other browsers").

86. The ability to influence development of web-based applications is a highly valuable tool for future anticompetitive campaigns should Microsoft choose to mount them. As web-based applications grow in importance, so does Microsoft's ability to steer them towards being IE-centric, and, given its control over the browser-to-operating system interface, Windows-centric as well.

IV. Unless Prevented, Microsoft's Continued Anticompetitive Conduct Will Cause Great Harm to Innovation and Competition

87. Microsoft has both the incentives and the ability to forestall competition in any middleware that presents a potential platform threat. Indeed Microsoft's victory in the browser war, its dominant share of browser usage and its success in ensuring that the Netscape browser is not viewed as a viable competitive platform has placed Microsoft in an extraordinarily strong position. Permitting Microsoft to continue its pattern of predatory behavior and to enjoy the benefits of its illegally won victories over Netscape and Java would seriously harm PC consumers.

88. Left unchecked, Microsoft's actions can cripple the competitive process in a vibrant and important arena. The technologies that might support either fully-featured server-based PC applications or robust applications development platforms on alternative clients are complex, interdependent and nascent. In these circumstances permitting the competitive process to play out is particularly likely to be a significant source of value. By shutting down competition on the merits, Microsoft's continued predatory conduct would create two kinds of harm: it would deprive consumers of the ability to choose among competitive products and it would lowering the quality of the goods and services themselves.

89. Firms developing server-based middleware without the benefit of a PC operating system monopoly have strong incentives to support open, robust interfaces that are compatible with many applications and many kinds of clients. Such open interfaces would allow both applications developers and consumers to "mix and match" across technologies, giving them freedom to design and purchase new products, new services and even entirely new business models. Applications developers that can choose to use any one of three clients, three pieces of middleware software and three servers, for example, benefit from the power of "combinatorics" – the nine elements can be combined in up to twenty-seven different ways. The same nine elements bound together into mutually exclusive sets with closed, proprietary interfaces would present applications developers and consumers with only three distinct choices.

90. The history of the computer industry and the introduction of the PC provides a classic example of this effect. Prior to the advent of Sun's workstations and of the PC, computer architectures were largely closed. Computer manufacturers might make available details about selected interfaces in an attempt to persuade third party developers to write applications that would run on its operating systems, but many critical interfaces were tightly closed and held as

proprietary information by computer developers. For example, Apollo, a successful pioneer in workstations, used an almost entirely proprietary hardware architecture that was tightly linked to its proprietary operating system. IBM in mainframes and DEC in minicomputers took a similar approach. IBM's entry into PCs evolved towards a very different model. IBM licensed key elements of the PC from other firms, including, most famously, the operating system and the microprocessor. It also permitted Microsoft to license the operating system to competing firms. Third party firms were able to "clone" key elements of the design and to trigger an explosion of entry and competition whose extraordinary effects are widely acknowledged.

91. Looking forward, there are a wide variety of technologies that could be part of a server-based middleware solution, including applications servers, transaction servers and web servers, server operating systems, and a number of potentially associated technologies including XML, CORBA and Enterprise Java Beans. These technologies – and others whose names we do not yet know -- could potentially be combined in many different ways, the vast majority of which we cannot predict.

92. Moreover, the emergence of server-based software as viable cross-platform middleware capable of supporting the development of full-featured applications could trigger an explosion of entry and innovation in applications and in the wide variety of products and technologies that would support them. Hosting applications on the server, for example, may facilitate consumers' ability to "rent" applications over the web, increasing the ease with which they can experiment with many different alternatives and ensuring that they always have access to the latest version. Robust server-based cross-platform middleware could give innovators the choice of many different client-side devices. Middleware platforms designed to support alternative clients such as PDAs, handheld computers or telephones might also stimulate a wave of innovation and value

creation.

93. In short, the combination of wide-ranging technical possibilities with the potential development of entirely new products and services could unleash a wave of creativity and invention of unprecedented scope. This is likely to result in a wide diversity of products and services orientated towards an equally wide diversity of consumers and consumer needs, a situation ripe for tremendous value creation. Other than by letting the market choose, we have no way of knowing which of these combinations – of technologies and of uses – is most likely to create value for which kinds of consumers. Under these circumstances, allowing the competitive process to unfold is particularly important since it is unlikely that any single firm, no matter how smart or well informed, could design and produce every desirable combination or implementation of potentially useful middleware.

94. Competition would allow for experimentation, for entry by many different firms with very different views of how the technology should evolve, and for consumers to make their own choices among those offerings.

95. Not all of these innovations will threaten the PC operating system monopoly. However, some combinations of technologies may prove compelling to a large number of consumers and threatening to Microsoft's monopoly. In that event, Microsoft can short-circuit the competitive process, damaging consumers who would prefer to use the new alternatives and possibly inflicting collateral damage on consumers who use related middleware and applications.

96. The court must act quickly and decisively if it is to preserve the possibility of real competition. If new middleware is to emerge as a cross-platform threat to the Windows operating system, applications developers must believe that it will be viable into the foreseeable future and must begin to write applications for it. This will not happen if developers come to believe that

Microsoft will be able to act with respect to any new threats as it acted with respect to the browser. Applications developers are fully aware that Microsoft has very strong incentives to forestall the emergence of any non-Microsoft server-based middleware platform. They also know that Microsoft's control of the operating system, its strong position in applications, and its dominant position in browsers give it very significant opportunities to act aggressively to forestall the competitive process, to favor its own solution and generally to make life difficult for any alternatives.

97. There is no evidence that Microsoft has changed or intends to change its business practices. In July of 1995, after Microsoft had agreed to a consent decree settling earlier Sherman Act charges, Bill Gates told Intel, "This antitrust thing will blow over. We haven't changed our business practices at all." GX 940, at 15. After his testimony in this trial, Brad Chase reportedly stated, "We haven't changed anything we do in dealing with other companies." RX 17. NYT, 2/13/00 at 4.

98. Absent an effective remedy, there is a very real danger that Microsoft will use its PC operating system monopoly to strangle the potential of any emerging middleware threat in its cradle. Expectations change very fast: if Microsoft can succeed in killing any expectation that non-Microsoft interfaces will present a viable alternative, Microsoft will have undermined the conditions necessary for the growth of any threat before it even begins. Under these circumstances time is very much on Microsoft's side.

V. A Separation of the Applications Company Will Restore Competition and Reduce Microsoft's Incentives And Abilities To Engage In Anticompetitive Conduct

A. The Separation Will Create Incentives for the Applications Company to Reduce, Rather than Reinforce, Barriers to Entry in the Operating System Market.

99. The separation of the applications company is an appropriate remedy that will accomplish two things: it will restore the competitive conditions that Microsoft's illegal actions have destroyed and it will make it significantly less likely that Microsoft will be able to repeat its past pattern of anticompetitive conduct. It is particularly powerful because it harnesses the power of the market to correct the problems created by Microsoft's predatory campaign.

100. The separation of the applications company will fundamentally change its incentives. An independent applications company will have incentives to reduce, rather than reinforce, the applications barrier to entry protecting the operating system market, both to gain the benefits of sales on alternative platforms and to reduce the company's dependence on the operating systems monopoly.

101. As long as the applications business is controlled by the operating system monopoly, the operating system business has the incentive to use the applications business to reinforce the barrier to entry protecting the monopoly. For Microsoft, alternative clients or cross-platform middleware of any kind are threats to be controlled or destroyed. For an independent applications company, they will be promising complements, to be supported and encouraged. An independent applications company will have incentives to support competing PC operating systems and a wide variety of potentially cross-platform middleware, including server-based software.

B. An Independent Applications Company Would Have Strong Incentives to Develop the Full Cross-Platform Potential of Its Software

102. The separation will have the effect of putting important middleware into the hands of a firm that has no incentive to protect Windows. Both Office and IE, for example, are popular applications that expose APIs and are widely distributed. Both have the potential to develop into cross-platform middleware that could threaten to erode the applications barrier to entry that

protects Windows. An independent applications company has strong incentives to develop this potential. An independent firm controlling Office and IE might threaten Windows much as Netscape threatened Windows in 1996.

103. An applications company with both the incentive and the ability to sustain IE as a piece of cross-platform software and to develop Office into a piece of cross-platform middleware in its own right could be a powerful threat to the Windows monopoly. Office is, like Navigator, an application in wide demand for its own sake that rivals Windows in its level of penetration. Like Navigator, it exposes APIs, APIs that Microsoft actively promotes and that developers use. Felton, 12/14/98am, at 37:10 - 38:1; Devlin, 2/4/99am, at 41:21 - 42:3. Like Navigator, it could also provide a valuable distribution channel for complementary middleware.

C. An Applications Company Would Provide An Alternative Means of Distribution for Middleware

104. An independent applications company could become an alternative means of distribution for non-Microsoft-controlled middleware. For example, an independent applications company might have had incentives to distribute either Navigator or a cross-platform Java virtual machine, whereas Microsoft certainly did not. Since several of Microsoft's applications are very widely distributed the creation of an independent applications company would reduce Microsoft's ability to foreclose important distribution channels.

D. By Providing Market Incentives, The Separation Will Lead To A Reduction in Barriers to Entry

105. The applications that make up the applications barrier to entry are numerous and diverse, but Microsoft's applications, particularly Office, play an important role in maintaining it. Because 80% of the information in most companies is stored in Office formats, (RX 14 at 4), consumers are understandably reluctant to purchase an operating system that does not support the applications

needed to access and manipulate that data. While Office's availability on a particular platform is probably not alone sufficient to ensure that an alternative platform has the critical mass of applications that could lead to competition in operating systems, its absence is certainly a major stumbling block. It was widely believed, for example, that Microsoft stopping development of the next generation of Mac Office would be "Apple's death notice." FOF 344.

106. If applications such as Office were to be made available on alternative platforms, there would be a greater probability than there is now that other operating systems could overcome the applications barrier to entry that protects Microsoft's monopoly. Their availability would both increase consumers' confidence in such alternative platforms and change expectations among developers. If consumers were confident that they would be able to use the familiar Word and Excel formats on a new platform, for example, and that they would have backward compatibility with their existing documents, they would be far more likely to feel comfortable moving to a new platform. The porting of Office and other key Microsoft applications to another platform could also play a major role in changing the expectations of developers, since developers will be confident that consumers will be more likely to move to the new platform.

E. Separation of Microsoft's Application Business Makes a Repetition of Past Conduct Less Likely Because It Will Erode Microsoft's Monopoly Power

107. The creation of an independent applications company will serve to reduce Microsoft's monopoly power by restoring competitive conditions in potentially cross-platform middleware and ultimately in PC operating systems. As Microsoft's monopoly power begins to crumble away both its incentives and its abilities to repeat its past illegal conduct will be reduced. The separation of the applications business thus makes it significantly less likely that Microsoft will be able to repeat its pattern of anticompetitive conduct.

108. In the short run, the separation makes it impossible for Microsoft to use control of the applications business as either a stick or a carrot in its dealing with OEMs, ISVs and other third parties. In the longer run, it promises to significantly reduce Microsoft's monopoly power, making it impossible for Microsoft to use this power to crush competition.

F. Microsoft Will Not Be Able to Use Applications And Tools As A Weapon

109. As I outlined above, Microsoft has historically used control of its applications, particularly Office, to preserve the monopoly. Microsoft threatened to withhold Mac Office, a profitable product that was close to shipping, from Apple in order to disadvantage Navigator. It has also used its applications to disadvantage competing middleware. Microsoft designed Office to force users to use IE to perform some Office functions and Gates recommended that this tactic be used again to encourage the use of the Microsoft PDA operating system.

110. A Microsoft-controlled applications business also has the incentive to ensure that its developer tools cannot easily take advantage of the capabilities provided by potentially threatening middleware. The separation of the applications company removes Microsoft's ability to use these kinds of weapons to protect its operating system monopoly.

G. Separation of Microsoft's Application Business Is Superior to Long-Term Regulation of Microsoft's Behavior.

111. A regulatory alternative capable of achieving the same ends would necessarily have to be highly intrusive and would almost certainly be significantly less effective. As Tim Schaaff of Apple testified, Chris Phillips of Microsoft told him, "by the time [governing bodies] were able to figure out what was really going on, . . . it didn't matter if they understood the whole picture because … it wouldn't matter anymore." GX 1458 (Schaaff, 1/13/99, at 209:8 – 12).

VI. The Conduct Provisions Reduce Microsoft's Ability To Engage In Anticompetitive Conduct Before The Separation Has The Opportunity To Take Effect And Will Help To Restore Competitive Conditions.

112. While the creation of an independent applications company will almost certainly lead to the reduction of the applications barrier to entry and a subsequent reduction in Microsoft's monopoly power, even under the best of conditions this process is likely to take some time. As long as Microsoft has control of the PC operating system monopoly, it has incentives to engage in illegal conduct in the attempt to forestall competition. In the short term, it is therefore vital to implement the conduct remedies that have been proposed in order to ensure that Microsoft does not succeed in irreversibly crippling potential competition before the effects of the separation have had the chance to work themselves through. In the long term, the market-based incentives unleashed by the separation will make continued conduct restrictions unnecessary.

113. The conduct remedies will prevent a repetition of Microsoft's prior anticompetitive conduct. They therefore seek to curtail Microsoft's abilities to act illegally using each of the seven mechanisms that I outlined above:

- Control of information
- Control of interfaces
- Tying
- Bribing potential middleware suppliers
- Using control over OEMs
- Bribing and/or coercing other third parties

114. The majority of the conduct restrictions are straightforward prohibitions of these tactics. To prevent Microsoft from abusing its ability to tie products to the operating system, the decree bans contractual tying and prohibits Microsoft binding any middleware product to a Windows operating system without simultaneously offering consumers the choice of a version that does not include the new product. Similarly, the provisions forbidding Microsoft to offer any consideration in exchange for actual or potential competitors agreeing not to compete with Microsoft are

designed to prevent the firm from bribing potential middleware suppliers. The sections that govern Microsoft's relationships with its OEMs – the ban on adverse actions, and the requirements to offer uniform licensing terms and to permit flexibility in product configuration -- are all designed to prevent Microsoft abusing its monopoly power in the distribution channel. The remedies governing Microsoft's relations with ISVs and forbidding exclusive dealing are designed to ensure that Microsoft does not bribe or coerce third parties into supporting its own solutions at the expense of competitive offerings.

115. All of these provisions are important. However the two provisions relating to the disclosure of APIs, interfaces and technical information and to the conscious interference with performance reinforce each other and are exceptionally urgent.

116. These provisions are designed to curtail Microsoft's ability to use its control of operating system information and interfaces to quash potential middleware by attacking it in the most fundamental way possible: by using its ability to make sure that it does not work.

117. As I have noted here, Microsoft controls the operating system software that runs on the overwhelming majority of the world's PCs. The applications developers who write full-featured PC applications will not write to a platform that does not allow them to access these PCs.

118. However, no piece of software can interoperate with the Windows operating system if it does not have access to the necessary technical information or if the interfaces that it needs are closed. In these circumstances, as long as the PC operating system monopoly remains intact, Microsoft holds the power of life and death over any potentially threatening middleware.

119. This power has been substantially enhanced by its conduct in this case. As I have noted, Microsoft now has a dominant position in browsers as the result of its anticompetitive campaign, and this position gives it unparalleled influence over the interfaces between the PC, the Internet,

and other servers. If unrestrained, Microsoft can use this power in a number of ways. It can:

- Exclude competitors unilaterally by ensuring that the interfaces relating to important PC functions are closed;
- Injure competitors by changing interfaces in a way that adversely affects competitor's performance;
- Dole out or withhold information to reward or punish potential competitors; or
- Dole out or withhold information to deprive potential competitors of necessary third party support;

120. As long as Microsoft retains its monopoly power, the ability to withhold information and to deny interoperability in this way will be a fearsome threat. The development of server-based full-featured PC applications, for example, would be completely crippled if these applications could not be accessed from a Windows PC, or could only be accessed in a disadvantaged way, since no one would be willing to invest in building them.

121. Requiring Microsoft to disclose its interface information, and restraining conscious interference with performance, provides a necessary check on Microsoft's ability to exploit its illegally obtained position to exclude competitors.

VII. The Proposed Remedies Will Not Harm Microsoft's Business or the Industry

122. The separation will not harm Microsoft's business (except by removing market power) or the industry.

123. The conduct restrictions are only in effect until three years after the separation. They will ensure that Microsoft does not abuse its monopoly power in the period before the separation can have its effect, and they will not materially affect Microsoft's ability to conduct its business.

124. Both the operating system and the applications groups within Microsoft are thriving entities with well-established products. Under the terms of the decree the integrity of Microsoft's existing

product line will be preserved, and separating them will not harm consumers, partners, or competitors. Moreover, given that Microsoft claims that it provides all the information and assistance necessary to allow ISVs to write excellent software, the separation of the applications company should not harm its technical capabilities. Indeed Mr. Gordon Eubanks, who testified on behalf of Microsoft in the current case, and who is on record as stating that his company's close working relationship with Microsoft is central to his firm's competitive advantage (GX 2276), was recently reported as saying that he did not think the industry would suffer from the remedy proposed by the government. RX 18.

125. The remedies will have the effect of reducing Microsoft's monopoly power, and stockholders will be harmed to the extent that Microsoft will lose its ability to profit from this power. However after the separation the two companies will be uniquely positioned to compete vigorously and effectively in both new and existing markets, and in the long run Microsoft's stockholders may benefit from the explosion of innovation that will result from the pro-competitive effects of the remedy.

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III. Conclusions

126. If Microsoft is permitted to build upon the fruits of its victory in the browser war and to continue its campaign of anticompetitive conduct, consumers will be greatly harmed. Microsoft's control of the PC operating system gives it both incentive and ability to crush any software that threatens to facilitate the erosion of the application barrier to entry. The remedies proposed will prevent Microsoft from crippling competition and will release a flood of innovative energy. Rapid action is vital to ensure that innovation and consumer choice in this particularly important sector of the economy are preserved.

I declare under penalty of perjury that the foregoing is true and correct. Executed on April 28, 2000 in Washington, DC.

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Rebecca Henderson

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Harvard University	Ph.D.	1983-1988
Doctorate in Business Economics, Thesis: *The Failure of Established Firms in the Face of Technological Change: A Study of Photolithographic Alignment Equipment*.		
Massachusetts Institute of Technology	S.B.	1978-1981
Mechanical Engineering		

Academic Employment:

Eastman Kodak LFM Professor, MIT Sloan School, 1999-
Tenured Associate Professor, MIT Sloan School, 1995-1999
Research Associate, National Bureau of Economic Research, 1995-
Thomas Henry Carroll Foundation Visiting Professor of Management, Harvard Business School, 1996-1997
Robert Noyce Associate Professor, MIT Sloan School, 1993-1995
Research Fellow, National Bureau of Economic Research, 1990-1995
Visiting Assistant Professor, Stanford Graduate School of Business, 1992-1993
Assistant Professor, MIT Sloan School, 1988-1992

Non Academic Employment:

McKinsey and Company	Summer associate	Summer 1986
Harvard University	Research assistant, K. Clark	Summer 1985
General Electric	Analyst, strategic planning	Summer 1984
McKinsey and Company	Analyst	1981-1983

Honors and Awards:

ASQ Award for Scholarly Contribution	1996
Runner-up, Teacher of the Year	1990-93, 1995-96, 1998-99
Dively Award for best thesis proposal, Harvard	1988
Alumane Award, (outstanding female graduate) MIT	1981

Publications

Journal Articles (Refereed).

"Untangling the Origins of Competitive Advantage" Jointly with Iain Cockburn & Scott Stern. Forthcoming in the Strategic Management Journal.

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