Epilogue to Winners, Losers

I. The Trial

As we went to press with the initial printing of this book, the trial was well underway. As we discussed in the appendix, the initial phases of the trial did not go well for Microsoft. The trial continued in much the same vein. Microsoft's defense clearly did not make any serious impression on the Judge Jackson, who seemed entirely enthralled with the government's case. In November of 1999, Judge Jackson issued his Findings of Fact (discussed below), a harshly worded decision in which he adopted much of the government's case. The government prosecutors could hardly have asked for more.

Shortly after issuing his findings of fact, Judge Jackson appointed Richard Posner, a distinguished academic lawyer and jurist, and a leading figure in what is often referred to as the 'Chicago' school of law and economics, to mediate settlement negotiations. Because of Posner's stature, this move was regarded as creating the best chance of a settlement and a signal that Judge Jackson would prefer a such an outcome. Nevertheless, the talks failed, a failure that has been widely attributed to disagreements between the DOJ and the state's attorneys general.

The scathing findings of fact foreshadowed the Findings of Law, issued in early April, that found Microsoft guilty of all counts but one. There was much talk in the press that that the government would ask for some sort of breakup. The proposal that seemed to be receiving the most attention early on and that was being pushed by Microsoft's adversaries would have broken Microsoft up in such a way that Windows would be sold by three competing companies. The competing proposals and other aspects of the case drew the attention of academics and other commentators. [1]

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[1] The three Windows proposal was given its most detailed exposition in a paper by Thomas Lenard of the Progress and Freedom Foundation, a think tank nominally in favor of free markets and reduced government intervention: Thomas M. Lenard "Creating Competition in the Market for Operating Systems: A Structural Remedy for Microsoft", Progress and Freedom Foundation, 2000. Oracle funded a study proposing the same type of breakup—Robert J. Levinson, R. Craig Romaine, and Steven C. Salop, "The Flawed Fragmentation Critique of Structural Remedies in the Microsoft Case," draft dated 1/20/00. A critique of this remedy, based on its high costs can be found in Stan J Liebowitz "Breaking Windows: Estimating the Cost of Breaking up Microsoft Windows" Association for Competitive Technology and the ASCII Group, April 30, 1999 and also "A Fool's Paradise The Windows World After a Forced Breakup of Microsoft." Association for Competitive Technology, February 25, 2000. Tom Hazelitt and George Bittlingmayer, in a cleverly named paper "DOS Capital" examined the impact of the case on stock prices of firms in related industries, concluding that stock market participants view the government's prosecution as bad for the high-tech economy. All these papers can be found at http://www.ssrn.com/. Additionally, John Lott weighed in with a timely book *Are Predatory Commitments Credible* disposing of many game-theoretic arguments being used to support predation claims. Richard McKenzie published a book "Trust on Trial" exploring, among other things, the political background of the case.

After that, the government and Microsoft submitted remedy proposals. The government's proposed remedy included a breakup creating two companies, one specializing in operating systems, and the other containing all the other Microsoft products.

In the end, the judge requested minor fine tuning of the government's proposal, then adopted it essentially word-for-word.

Probably the most surprising aspect of the remedies phase, given the severity of the court's remedy, was the absence of any real process. The trial itself did not include discussion of remedies, and it was widely expected that submissions and witnesses would discuss both the appropriateness and the consequences of the remedies. Although the future of Microsoft was at stake and the potential impact on the economy was large, the company was given less than two weeks to respond to the government's proposed remedies and no witnesses were heard.

In a series of interviews after the decision, Judge Jackson made several statements that seemed most unusual, but that indicated his frame of mind. It appears that much of his decision was based on his view of the veracity of Microsoft's witnesses as opposed to the logic of what they were saying. His reasons for making so few changes to the government's remedy indicate that he did not feel competent to propose remedies on his own, a remarkable admission.[2]

As we write this epilogue, Microsoft, the Department of Justice and the Judge appear to be jockeying for the best position in the appeals process. Microsoft has asked that their appeal be heard in the DC Appellate Court where they have previously (in the case of the previous consent decree discussed in the antitrust appendix) had success in overturning Judge Jackson's injunction against adding Internet Explorer to Windows. That issue, of course, is also central to the current case. The DC court has signaled its interest in the case by responding almost immediately upon being asked that they will hear the case early and that they will hear the case *en banc* (all the justices will hear the case at once). The Department of Justice has requested that the case go directly to the Supreme Court, and Judge Jackson has endorsed that request. A rarely used provision in antitrust law allows a case to be fast tracked to the Supreme Court if the case is deemed of national importance. As we write, the Supreme Court has not yet rendered a decision on whether they will hear the case directly, or send it to the DC Appeals Court instead.

In discussing the court's findings and final order at this stage, we run the risk that subsequent events will eclipse the things we consider here. Yet, taking stock at this point serves a purpose. Whatever the appeals process brings, Judge Jackson's Findings and the litigation that brought them are legal history.

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[2] See "Reluctant Ruling for Judge; Jackson Says He Would Still Prefer Out-of-Court Settlement" Washington Post, June 8, 2000, Pg. A01" by James V. Grimaldi. The Judge is quoted as saying: "It's important you understand what my function is here…I am not an economist. I do not have the resources of economic research or any significant ability to be able to craft a remedy of my own devising."

Given the enormity of the remedy, its tenuous relationship to the subject matter of the case, and the peculiarities of the process that brought it about, it seems particularly likely that it will be modified or discarded in the appeals process. Nevertheless, we give considerable scrutiny to the remedy here. Whatever the outcome of the appeals process, it is likely that it will go on for several years, and the remedy will remain the subject of debate and speculation. For those several years, the district court's remedy will continue to be a focal point. Further, there is ample reason to be interested in this remedy even if doesn't survive the appeals process. It provides a useful example of the reach of government power under the antitrust laws and the belief that bureaucratic arrangements, even those that are hastily engineered, can readily improve on market outcomes. Finally, , the remedy is worth studying for the possibility that it will restructure the software industry and further establish how the courts will deal with companies that establish and maintain important standards.

We also note that the Justice Department has become increasingly emboldened, recently bringing other cases that share certain similarities with the Microsoft case. In the Mastercard/Visa case, for example the government argues that these credit card organizations have hampered innovation, a theme previously used in the Microsoft case. As in the Microsoft case, the Mastercard/Visa case appears to be brought at the behest of a competitor, in this case, American Express. Once again it appears the government is ready to protect competitors instead of competition, using theories that stray far from established economic doctrines that ordinarily provide some foundation for antitrust.

II. Judge Jackson's Rulings

A. The role of lock-in.

Lock-in claims of various sorts have played a central role this throughout this case. As we noted in the appendix, prior to the filing of this case, Microsoft's rivals used lock-in theories to argue that the government needed to play an active role in overseeing market choices of technologies. Lock-in claims were also a part of the government's case at trial. Moreover, in the end, lock-in is central to Judge Jackson's findings and the explanation for several of the most important features of his remedy. Needless to say, given the arguments that we have made in this book, we find the court's use of lock in to be fundamentally flawed. At best, these theories are new, largely unexplored conjectures, with no empirical support. It would be surprising, therefore, that such an important legal matter would be allowed to rest on economic arguments that have so little theoretical or empirical foundation.

In the Findings of Fact, Judge Jackson refers to the lock-in problem as either the "intractable chicken-and-egg problem," the "collective action problem," the "positive feedback loop," or more frequently, as the ``application barrier to entry." Judge Jackson's version of the lock-in story as applied to software operates along these lines: Even if everyone preferred OS/2, we all (including application programmers) might think

that everyone else is going to stick with Windows, and so we each choose Windows to get its large set of applications. In short, we all use Windows because we all use Windows.

For Judge Jackson, this barrier is the source of Microsoft's monopoly power.[3] In his own words (paragraph numbers are as they appear in the findings of fact):

> 39. Consumer demand for Windows enjoys positive network effects... The fact that there is a multitude of people using Windows makes the product more attractive to consumers… The main reason that demand for Windows experiences positive network effects, however, is that the size of Windows' installed base impels ISVs [Independent Software Vendors] 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."
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> 40. What for Microsoft is a positive feedback loop is for would-be competitors a vicious cycle… the small or non-existent market share of an aspiring competitor makes it prohibitively expensive for the aspirant to develop its PC operating system into an acceptable substitute for Windows… Even if the contender attracted several thousand compatible applications, it would still look like a gamble from the consumer's perspective next to Windows, which supports over 70,000 applications.
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> 41. In deciding whether to develop an application for a new operating system, an ISV's first consideration is the number of users it expects the operating system to attract. Out of this focus arises a collective-action problem: Each ISV realizes that the new operating system could attract a significant number of users if enough ISVs developed applications for it; but few ISVs want to sink resources into developing for the system until it becomes established. Since everyone is waiting for everyone else to bear the risk of early adoption, the new operating system has difficulty attracting enough applications to generate a positive feedback loop. The vendor of a new operating system cannot effectively solve this problem by paying the necessary number of ISVs to write for its operating system, because the cost of doing so would dwarf the expected return.

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[3] His definition of the market leaves out all competitors to Windows. The Macintosh, for example, is not really a substitute for Windows according to the Judge. Note that this implies that Windows must also not be a substitute for the Macintosh, and that therefore the Macintosh is a monopoly in its market, as he defines it.

The reader will find this logic very familiar. Re-label the "application barrier to entry" as "prerecorded movie barrier to entry" and you have the VHS/Beta story discussed in chapter 6.[4]

We do not rest with the fact that the judge's argument is analogous to other faulty lock-in arguments. The flaws of his argument stand on their own. The collective action problem can be addressed more creatively than the judge presumes. In this regard, the last sentence of his paragraph 41 is technically wrong. The owner of the hypothesized rival operating system could afford to pay ISVs to write applications so long as the OS owner could contract to receive a percentage of the application revenues. Such an agreement would be reasonable since an OS owner who provides money to application companies should be able to ask for some compensation when these activities further increase the revenues of the application company by increasing the size of the market.[5]

If the new OS is enough better than Windows that it ought to displace it, the net value produced by the new OS will be greater than the value produced by Windows. That means the combined operating system and application revenues would more than cover the costs of writing or porting new programs. (The judge never addresses this issue of relative quality, but the prospect of the failure of products that cost more than they are worth does not suggest any real social problem.) Thus by taking ownership stakes in applications, the owner of a worthwhile operating system would find expected returns larger than the costs. Of course, this still might be very expensive, but it is also very likely that only a small number of programs, the popular programs that generate the vast majority of revenues, really would need to be ported to a superior platform to make it successful. This resolution is not hypothetical: Most providers of operating systems have offered some applications, and the quest for the "killer app" that can establish an operating system is well known.

The judge's chicken-and-egg theory also makes it difficult to explain how Microsoft ever overcame the application barrier in the first place. After all, programmers wouldn't have written programs for Windows "until it has become established," and there would have been no users without programs. Yet Microsoft did overcome this seemingly impenetrable barrier.[6] Although the Judge is correct when he states that Microsoft did not have to confront and overcome an incumbent with 70,000 applications, implying that the first-mover has an advantage, neither did Microsoft have anywhere as large a potential

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[4] A 'barrier' that did not prevent the videorecorder market from working properly and that once again appears to be in the process of being overcome, this time by DVDs, which are not even capable of recording programs.

[5] Actually, a number of alternative arrangements might work. Vertical integration, applications developers being given a share of the OS firm and vice-versa, reciprocal commitments to develop products, etc.

[6] But this success was neither immediate, obvious, or easy. As discussed in chapter 7 Windows 1.0 and Windows 2.0 were notable flops. It wasn't until Windows 3.0, almost five years after the first incarnation, that Windows steamrolled to a large market share. The reason? It was the first version of Windows that worked well.

audience of computer users (with mice!) as currently exists, a disadvantage for the first-mover.

One might suppose that the same factors that allowed Microsoft's operating system to flourish could work on behalf of a superior alternative, but the judge insists that no new entrant could overcome these factors. The judge even suggests that the failure of OS/2 and the Macintosh to dislodge Windows is evidence in favor of the barriers to entry theory. Looked at through the lens adopted by the judge, the economic world is populated by helpless producers and hapless consumers, inertia reigns, market errors are common, and monopolists remain forever entrenched. The actual reasons for the failure of these operating systems are more prosaic.

In fact, OS/2 started out with plenty of developers, but was more expensive than Windows, required beefier computers, routinely crashed during installation, didn't work with many printers and video cards, and seemed invented to create a monopoly.[7] Similarly, Macintosh's disappointing performance has much to do with its high price, Apple's unwillingness to port its operating system to other hardware, and Apple's general disdain for providing backward compatibility.[8] These products' lack of success is readily explained by conventional economic reasons, and does not require speculation about a collective action problem, chickens and eggs, or other theories about barriers to entry.

B. The Logic of the Court's findings.

Judge Jackson's findings of fact and law repeat the government's theory almost verbatim. The Judge found Microsoft to have a monopoly in *operating systems*, i.e., Windows. This finding is an important step in the legal logic of the case. Since Netscape had and continues to have a relatively large share of the browser market, Microsoft could not be argued to hold a monopoly in the browser market, particularly since it overcame Netscape's dominance and clearly constituted new competition during the period of time that the trial addressed. Thus for Microsoft to be found guilty of monopolization under section two of the Sherman Act, its battle with Netscape would have to be related to the operating system. To establish a connection between the operating system and the browser, the government asserted that Netscape and Java were a threat to Windows.

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[7] The story of OS/2 involves a rather juicy irony regarding monopoly and barriers to entry. In its original incarnation, there were to be two versions of OS/2, a regular and lite version. The regular version would only run on machines with the IBM Microchannel architecture, a proprietary standard limited to IBM brand PCs. The lite version, missing networking and communication features, was intended to run on other computers. If successful, this would have moved all business users to IBM PCs and allowed other computer manufacturers to merely share in the home/small business market. The judge could have learned a thing or two about attempted monopolization if he had investigated this story. He might also have viewed the victory of Windows in a different light had he investigated more deeply.

[8] The Macintosh was incompatible with both the Apple II and the Lisa, the two machines that preceded it.

How is it that the browser is a competitor to Windows? Since it is possible for programmers to write programs that work within the Netscape browser, (using the Java language) it is possible to imagine a scenario where so many programs are written for the Netscape browser that computer purchasers care only about whether programs run in the Netscape browser and no longer care about the underlying operating system. Since any operating systems could run the browser, Windows would lose its grip over the operating system market. To protect its operating system monopoly, the judge concluded, Microsoft contrived to reduce Netscape's market share to a level he estimates to be 40% in 2001. He suggests that a market share of 40-50% is insufficient for Netscape to be a viable threat to Windows. He further argued that Netscape needed to be the 'standard' in that market if it were to live up to its potential.

There are two problems with these claims. First, although it is probably true that Netscape never was and never would have been a viable threat to Windows, it is not for lack of market share. If developers were inclined to write programs that ran in the Netscape Browser, as Judge Jackson claimed, then surely 40% of the Windows market, plus its larger share of the Unix, Macintosh, and the other markets would provide a potential market large enough to keep programmers happily raking in revenues. Further, given the ready availability of Netscape, developers could anticipate that the introduction of a worthwhile Netscape-based product would prompt millions of additional Windows users to install the browser on their computers so that they could use the new product. It would be like buying a cable when you buy a printer, except the browser is free. Of course, this assumes that consumers wanted programs that ran in Netscape's browser, an unlikely circumstance, since Java programs tend to run much more slowly than programs optimized for specific hardware types.

Second, the idea that middleware [programs that allow other programs to run on top of them] will evolve to be a viable alternative to an operating system does require a leap of faith. There have always been middleware programs. For example, many programs were written to run on top of Lotus 1-2-3. But the fact is that no middleware has ever become a platform for mainstream programs or a serious alternative to an operating system.[9] The strongest support offered for the government's middleware theory was some evidence that at least one senior Microsoft executive thought that the middleware threat was serious. Again, we have nothing more than a conjecture for which there is no real-world support.

The possibility that Netscape might have evolved into an operating system reaches far into the court's findings. The government's theory, as adopted by the court, is that Microsoft engaged in a broad range of activities to destroy Netscape in order to protect its Windows monopoly from competition. These allegedly predatory actions

[9] There have been many middleware programs such as Lotus 1-2-3, or Hypercard for the Macintosh, language programs such as Basic or C, and many others. Each of these middleware applications had a very large number of programs written to use their features, but none became a serious alternative to an operating system.

included all of Microsoft's efforts to advance Internet Explorer, including building a better browser and enlisting support from ISPs and OEMs.

The theory adopted by the court not only relies on a number of unsupported conjectures, but it also ignores other important features of this market. Perhaps most interestingly, it ignores that other operating systems, such as OS/2 and the Macintosh OS, include a browser. To conclude that Microsoft's investments in the browser were predatory, the court ignores it's own finding that Microsoft's efforts to build a browser improved the breed. And to conclude that giving away Explorer could only be predatory, the court ignores other potential sources of revenue from success in browsers, including server revenue, portal revenue, and Windows revenue.

C. The Remedy[10]

The remedy proposed by the government and adopted by Judge Jackson contains two components. Receiving the lion's share of attention has been the structural component of the remedy, which breaks Microsoft into two separate companies—an applications company and an operating system company. This structural remedy also includes certain conduct restrictions, such as preventing the two companies from recombining and limiting them from doing business with one another. The restrictions that accompany the structural remedy have a duration of ten years. [11]

The second component of the remedy is a separate set of conduct restrictions that have a duration of three years. As we discuss below, these provisions impose potentially enormous costs on Microsoft with very little in the way of expected benefit.

The structural remedy appears fairly simple at first blush. As is often the case, however, the devil is in the details. The beginning text of the 5000+ word remedy contains the substantive part of the structural remedy:[12]

> 1.c The Plan shall provide for the completion, within 12 months of the expiration of the stay pending appeal set forth in section 6.a., of the following steps:
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> 1.c.i. The separation of the Operating Systems Business from the Applications Business, and the transfer of the assets of one of them (the "Separated Business") to a separate entity along with (a) all personnel,

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[10] This section is based in part on an analysis done by Liebowitz for the Association for Competitive Technology. That analysis was entered into the record as an affidavit included with the brief introduced into the remedy phase of the hearings by the Association for Competitive Technology.

[11] Sections 2.b.i and 2.b.ii.

[12] For the complete text go to: http://www.microsoft.com/presspass/trial/jun00/06-07finaljudg.asp

> systems, and other tangible and intangible assets (including Intellectual Property) used to develop, produce, distribute, market, promote, sell, license and support the products and services of the Separated Business, and (b) such other assets as are necessary to operate the Separated Business as an independent and economically viable entity.

Under these provisions, Microsoft is divided into two companies, one built generally along the lines of an applications company (the Application Business, or AppCo) and the other along the lines of an operating systems company (the Operating System Business, or OpCo). We use the term 'generally' because the proposed division of assets and products, in combination with the restrictions on the two companies doing business with one another, does not separate the operating systems components from the applications company in obvious, customary or efficient ways. Section 7 of the remedy, which defines terms, articulates the court's division of the existing business:

> 7.c. "Applications Business" means all businesses carried on by Microsoft Corporation on the effective date of this Final Judgment except the Operating Systems Business. Applications Business includes but is not limited to the development, licensing, promotion, and support of client and server applications and Middleware (e.g., Office, BackOffice, Internet Information Server, SQL Server, etc.), Internet Explorer, Mobile Explorer and other web browsers, Streaming Audio and Video client and server software, transaction server software, SNA server software, indexing server software, XML servers and parsers, Microsoft Management Server, Java virtual machines, Frontpage Express (and other web authoring tools), Outlook Express (and other e-mail clients), Media player, voice recognition software, Net Meeting (and other collaboration software), developer tools, hardware, MSN, MSNBC, Slate, Expedia, and all investments owned by Microsoft in partners or joint venturers, or in ISVs, IHVs, OEMs or other distributors, developers, and promoters of Microsoft products, or in other information technology or communications businesses.

In short, the Application Business gets all the software applications except the operating system, no matter how closely an application might be tied to the operating system. Provision 2.b.ii essentially prevents the AppCo and OpCo from conducting business with one another for a period of ten years after implementation of the breakup plan. This division of properties in section 1c, together with these trade restrictions will impose substantial inefficiencies. In what follows, we examine certain features of the remedy in depth. What can be seen is that the remedy is inconsistent with the Court's findings of facts. It is also a remedy that will weaken, not strengthen, the world of computing that surrounds the Windows operating system.

III. The Unlikely Benefits of the Breakup

The government has alleged that breaking up Microsoft will benefit the economy. These conclusions do not follow from well-established principles, but rather rely on conjectures about economics and speculation about the behavior of both of the successor companies.

First and foremost, note that the OpCo will not directly compete with the AppCo. So unlike most imposed breakups, this structural remedy does not create direct competitors. Thus, the court's remedy will not directly alter market power in either of these markets.

The government asserted that competition would nonetheless increase, and argued two possible ways that this might occur. To support this argument, the government has had to contradict the findings of the court in the liability phase and to ignore other realities of this market.

A. Strengthening of Alternative Operating Systems?

The government asserts that although this breakup does not increase the number of competitors in the OS market, competition will nevertheless be enhanced. The government and its experts suggest that having a separate AppCo will sufficiently strengthen the competitive position of alternative operating systems, particularly Linux, that consequently, some of these other operating systems might overcome the application barrier to entry.[13] They argue that because the AppCo will no longer have a financial interest in Windows, it will no longer have an incentive to protect Windows from other operating systems, and may therefore find it desirable to promote other operating systems to reduce Windows' power.

This argument makes two key assumptions. First, it assumes that the AppCo will find it profitable to port its programs to Linux. Second, it assumes that the porting of the AppCo's products to Linux will have an important impact on Linux' relative competitive position. The first of these is contradicted by current market evidence, the second by the court's own findings.

There is little reason to believe that the AppCo will find it profitable to port its programs to Linux. The government bases much of its claim on the fact that Corel ported the WordPerfect office suite to Linux, arguing that this constitutes evidence that porting

13 Plaintiffs' Memorandum In Support Of Proposed Final Judgment, Page 9.

Microsoft's Office to Linux would be a profitable undertaking once the incentive to protect Windows is removed.[14]

Corel's action, however, cannot be taken as a harbinger of profitable opportunities. As we write this epilogue, Corel has alerted investors of its very possible bankruptcy. It has just received an emergency injection of $30 million to keep it afloat for the next few months.[15] Corel's financial predicament was well known when the government was writing its brief, so the government's claim that Corel is profiting from its Linux investment appears to be just another unexamined assertion. It was also well-known that Corel's recent business decisions have been highly unusual, influenced perhaps by its declining fortunes.[16]

At present, there appear to be virtually no other major desktop applications that have been ported to Linux, including those from such market leaders as Intuit, Symantec, Lotus, Adobe, or Quark.[17] Since most desktop ISVs do not behave as if they believe it is now profitable to port applications to the Linux operating system, there is little reason to believe that the AppCo would find it advantageous to do so either.

Nevertheless, even if the AppCo did port its office suite to Linux, that wouldn't overcome the application barrier to entry, at least according to the theory of that application barrier put forward by the plaintiffs and accepted by the Court. Microsoft Office consists of 5 or 6 very popular applications.[18] Yet, the court's application-barrier-to-entry theory clearly states that the addition of such a small number of applications would not make Linux a viable substitute for Windows. For example, in paragraph 40 of the Findings of Fact the Judge states:

> To provide a viable substitute for Windows, another PC operating system would need a large and varied enough base of compatible applications to reassure consumers that their interests in variety, choice, and currency would be met to more-or-less the same extent as if they chose Windows. Even if the contender attracted several thousand compatible applications,

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[14] On page 29 of Plaintiffs' Memorandum In Support Of Proposed Final Judgment (corrected May 2, 2000) we find: "In spite of Microsoft's claims at trial about the vitality of Linux, it has refused to port Office to Linux; by contrast, competitor Corel, unconstrained by a need to protect an operating system monopoly, has found it profitable to port its Office suite to Linux." Carl Shapiro also argues that Corel's behavior supports the government's view that a Microsoft application company would port its office suite to Linux (see page 9 of his declaration in favor of the government's remedy).

[15] See for example "Corel Cash Crunch May Spur Spinoff of Some Product Lines" Julian Beltrame, The Wall Street Journal online, July 20, 2000.

[16] Corel has been willing to place bets with longer odds than most other software producers as evidenced by the fact that it was one of the very few major ISVs to port its office suite to Java, although that too proved to be a highly unsuccessful undertaking. See "Java Stirs Fervor Among Users But Hasn't Lived Up to Promise," Lee Gomes and Don Clark, The Wall Street Journal Interactive Edition, August 27, 1997.

17 This information comes from querying the web site, www.thelinuxstore.com.

[18] Word, Excel, PowerPoint, Outlook, and depending on the specific suite, FrontPage or Access.

> it would still look like a gamble from the consumer's perspective next to Windows, which supports over 70,000 applications.

Again, in paragraph 44:

> Although Apple's Mac OS supports more than 12,000 applications, even an inventory of that magnitude is not sufficient to enable Apple to present a significant percentage of users with a viable substitute for Windows.

Notice also that the Macintosh has Microsoft Office among its applications, yet the Court did not consider the Macintosh a serious competitive challenge to the Microsoft OS. Ironically, it was Microsoft, in criticizing the application barrier to entry theory, that claimed that a key for a successful operating system depended not so much on the total number of applications as it did on having a few very good products in the most popular categories of applications, a claim rejected by the government and the judge. For Judge Jackson and the government to turn their backs on the Findings of Fact and suggest now that a handful of applications can overturn the application barrier to entry suggests a rather casual attitude toward those found facts.

B. New Competitors in Operating Systems?

The government and its experts have also suggested that their structural remedy will lead to new competition in operating systems. They speculate that the AppCo, will expose sufficient APIs (Application Programming Interfaces—code that allows other programs to call on certain functions in another program) in the Office product that it might turn into a middleware competitor to Windows.[19] This idea that middleware might rise up to become an operating system is an interesting theoretical notion, but one that again, appears to be lacking any factual support.

The desktop PC market has had several application companies that attained large market shares, some of which are presented in chapters 8 and 9. As we noted in section II. B of this chapter, there were thousands of mini applications written for Lotus 1-2-3, and there was even special hardware created specifically to allow it to use more memory than the operating system would normally permit. Yet, there is no evidence that Lotus 1-2-3 ever had the type of general desktop applications written for it that would have made it a competitor to the operating system, which at that time was the far simpler DOS. Similarly, when WordPerfect was the dominant word processor, it was ported to work on all major desktop operating systems, including DOS, the Macintosh, the Amiga, and the Atari ST. Yet, it too never threatened to usurp DOS's position as an operating system.

There is no history that gives real-world support for the claim that the AppCo will become a competitor to the OpCo. On the contrary, in other circumstances in which there

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19 See for example paragraphs 102 and 103 in the declaration of Rebecca Henderson.

has been a dominant application in an important market, there has been no movement toward an OS function for that application. At best, the government's claim must be viewed as highly speculative.

Finally, government's supporting experts have claimed that the AppCo might take actions to weaken the competitive position of the OpCo.[20] This is an application of a more general theory that suggests that a dominant producer at one stage of a production process will have an incentive to weaken any market power of producers in other stages. Operating systems and applications can be understood as different "stages" in the production of computer services. This argument is related to the double marginalization problem discussed below.[21]

While this theory is grounded in fundamental economic reasoning, it is not at all clear that the breakup would alter the competitive landscape in any important way. The number of well financed potential competitors in this industry is quite large, including IBM, Intel, AOL, Texas Instruments, Dell, and even Sony. The addition of one more firm into this mix is unlikely to significantly alter the competitive environment.

IV. Likely Harms of a Breakup

The breakup of any company is likely to impose serious costs. Firms become organized in a particular way in order to maximize their effectiveness. Those that are organized particularly well, that serve customers well and at low costs, survive; those that do not, perish. The most effective prosper. Microsoft has been an extraordinary success story. Its effectiveness in contributing to the creation of the personal computing world had made it the most valuable company in the world in terms of market capitalization. To assume that Microsoft could be rearranged like so many Lego blocks on the basis of a few months inquiry ignores what we understand about the evolution of enterprise.

A. Price Increases

There is a theoretical problem well-known to economists that occurs when two firms with market power produce complementary products—the double marginalization problem. Each firm attempts to charge a markup that would maximize its own profits, taking the other firm's markup as given. The consequence is a higher set of prices than would be chosen by a single firm selling the two goods jointly. Thus, under the assumption that both the AppCo and the OpCo will have market power, prices would be

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20 See Declaration of Carl Shapiro, Page 7.

21 This theory can probably be traced to Bresnahan. See for example: "New Modes of Competition: Implications for the Future Structure of the Computer Industry," page 155 in Competition, Innovation and the Microsoft Monopoly: Antitrust in the Digital Marketplace, edited by Eisenach and Lenard, Progress and Freedom Foundation, 1999.

expected to increase following the breakup. This problem is acknowledged in a declaration by the government's expert Carl Shapiro, and in an Amicus brief by Litan, Noll, Nordhous and Scherer.[22]

While this influence is one of the few things about this case that prompts widespread agreement among economists, it is not the real problem. The real problem concerning price is that Microsoft has long pursued a low-price high-volume strategy. This strategy has paid off by allowing Microsoft to establish and maintain standards and to extend the use of its products to millions of consumers and businesses. The potential for large price increases comes from the possibility that one or both of the successor companies would abandon this strategy.

The analysis in chapters 7-9 demonstrated the effect on software prices of Microsoft's low-price strategy. The price decline attributable to Microsoft's influence is quite large. After the breakup, new leadership will exist in one or both companies and each will have to choose a pricing strategy. If software prices in the markets in which Microsoft participates had fallen only at the rate that prices have fallen in other software markets, they would be at about double where they are now. If the successor AppCo were to raise prices to that level, the impact would be very significant.

Also, the price of Windows, by any reasonable estimate, is now far below the profit maximizing *monopoly* price. According to a recent estimate by two economists not particularly friendly to Microsoft, the monopoly price of Windows is $813. (This estimate is probably low since it assumed a very low a price for computers).[23] Thus, if the OpCo were to abandon the low-price strategy, the increase in Windows' price could be quite large.

B. Disruption Costs

Undoubtedly, a breakup would impose direct costs of reorganization, even with the government allowing Microsoft to determine how to conduct the breakup (within the time and product constraints imposed by the government). These costs include physical relocation of workers, transferring assets, setting up of business plans for the new companies, morale problems among workers somewhat uncertain of their future, setting up separate accounting systems, health plans, and pensions, allocation of overhead between the companies, capital market costs, and so forth.

These costs, although likely to be substantial, are not in themselves likely to be catastrophic, since spin-offs occur with some regularity in the economy. It is important to

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22 Page 49 of the Amici brief contains a discussion of the double marginalization problem, as does page 14 of the declaration of Carl Shapiro.

23 Chris E. Hall and Robert E. Hall, "Toward a Quantification of the Effects of Microsoft's Conduct" American Economic Review, May 2000, Vol. 90: 2, pp 188-91. They assumed a computer price of $1000, whereas Dataquest recently estimated the price to be closer to $1700.

note, however, that because this breakup would occur according to the government's timetable and plan, the reorganization costs can be expected to be larger than the costs of a similarly situated voluntary spin-off, which would be conducted in a manner planned to minimize these costs. Further, voluntary spin-offs typically occur along product lines that have operated as independent establishments well prior to the separation.

Far greater disruption is likely to occur among the businesses that provide Windows-based software products and consumers and producers that use them. Changes in Microsoft marketing, engineering and support staff, the prospect of a dramatic change in pricing policies, the fact of buying software packages from two different suppliers, and concerns about compatibility and continuity of products will increase both costs and uncertainty in the software industry.

C. Loss of Synergies

There are good reasons to believe that Microsoft's structure offers important economic efficiencies. First, there is Microsoft's own success. Second, there is the observation that most companies that have succeeded at providing operating systems have also provided applications. Third, there is a body of economic theory that argues that the boundaries of firms are not arbitrary, but rather develop to capture efficiencies that cannot be captured in separate enterprises.

Both the applications and the OS groups benefit from being part of the same company. For the most part these advantages are the ordinary run-of-the-mill synergies that one expects between company units working on complementary products, what are sometimes called economies of scope. These are efficiencies that ultimately benefit consumers. For example, OS programmers will be better able to fashion an OS that meets the needs of programmers if they have spent some time working as application programmers or have interacted frequently with application programmers. We would expect important benefits to arise from this type of cross-pollination. Of course, there would still be value in asking outside independent software vendors (ISVs) to provide input as well, to broaden the source of information.

While it is true that some of these synergies can be approximated by transactions between separate firms, such efforts are likely to be more expensive and less efficacious. For example, the OS company could rely more extensively on requests from application companies on how to improve the OS, or it could hire application programmers from other companies to gain more continuous feedback. Of course, hiring workers from outside to supply this feedback is far more costly than transferring workers internally. Also, such a practice would impose costs on the firm losing personnel to the OS company, without any offsetting benefits. Sporadic and formal information gathering activities are also likely to be more expensive and less informative than the informal but continuous interactions found in a single firm that can internalize these synergies.

Furthermore, there are direct losses of synergy due to the inherent problems of dividing Microsoft 's integrated software products, the personnel who develop them, and ongoing research projects. As we discuss below, the breakup specifies a poor allocation of those assets and products, with most products going to the AppCo, no matter how much more sensible it might have been to place them with the OpCo.[24.]

V. The Impact of the Conduct Provisions

In addition to the conduct provisions that accompany the structural remedy, which apply for ten years, there are separate conduct provisions that last for three years. There are nine major categories of the three-year conduct restrictions, with many of these having two or three subcategories of rules.

Some of these restrictions are capable of imposing large costs on Microsoft, its developer base, and consumers. Often, these remedies needlessly apply a wrecking-ball where a scalpel would work far better. In the following, we highlight some of the provisions that are likely to fare poorly in a cost-benefit examination. It should also be noted that the actual meaning of some of the provisions remains a matter of discussion. No doubt, these are matters that would be the subject of continuing litigation if the court's final order is implemented.

A. Fragmenting Windows – the Binding Middleware Provision

One seemingly innocuous three-year provision will allow OEMs to choose which components of Windows they wish to install on their machines. It will further require Microsoft to discount the price of Windows to OEMs for components that the OEMs leave out of their computers:

> 3.g. Restriction on Binding Middleware Products to Operating System Products. Microsoft shall not, in any Operating System Product distributed six or more months after the effective date of this Final Judgment, Bind any Middleware Product to a Windows Operating System unless:
>
> > i. Microsoft also offers an otherwise identical version of that Operating System Product in which all means of End-User Access to that Middleware Product can readily be removed (a) by OEMs as

24 The list of applications given to the AppCo that seem to be better suited as part of the OpCo include: Internet Explorer, BackOffice, Internet Information Server, SQL Server, streaming audio and video server software, transaction server software, SNA server software, indexing server software, XML servers and parsers, Microsoft Management Server, voice recognition software, NetMeeting, and developer tools.

> part of standard OEM preinstallation kits and (b) by end users using add-remove utilities readily accessible in the initial boot process and from the Windows desktop; and
>
> ii. when an OEM removes End-User Access to a Middleware Product from any Personal Computer on which Windows is preinstalled, the royalty paid by that OEM for that copy of Windows is reduced in an amount not less than the product of the otherwise applicable royalty and the ratio of the number of amount in bytes of binary code of (a) the Middleware Product as distributed separately from a Windows Operating System Product to (b) the applicable version of Windows.

This remedy requires a la carte pricing for operating systems.

On its surface, who could be against such flexibility? Are not a restaurant's customers better off if the seller cannot include items in the meal that the consumer doesn't want? This sounds reasonable, at least at a superficial level. Yet it is often more efficient, for both consumers and producers, for meals to be sold as bundles of individual items.

Of course, paying for what you use makes the most sense when the price of individual components is related in some fashion to cost or value. In Judge Jackson's remedy, the a la carte prices of the individual items are determined by the amount of computer code, rather than by the usefulness, importance, novelty or creation cost, or market price of a component.[25] This is equivalent, in the restaurant analogy, to pricing the menu items by the number of letters used in the name of the product. Lettuce and spaghetti would have higher prices than steak and lobster. This type of pricing is clearly nonsensical, whether for our hypothetical restaurant, or for OEMs who will be given the inane incentive of choosing components of Windows based in part on the number of bytes of code.

That inefficiency pales, however, next to the consequences of degrading the Windows standard. Operating systems are not at all like restaurants. If everyone eats something different at a restaurant, we celebrate the diversity in tastes. If everyone's operating system has a different set of features a very serious problem arises—the operating system is no longer a standard.

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25 Actually, it is not exactly the size of the code within Windows. Section g.ii states that the price of Windows must be reduced by the ratio of the size of the middleware code *measured by the size of a separately distributed version of the middleware* relative to the size of Windows. One additional problem is that a separately distributed version would likely include code that has nothing to do with the functioning of the middleware product but instead has to do with transferring the product from the disk or Internet to the computer—code for checking the system, binding the code to the system, and so forth.

Any standard loses its value to consumers if it fragments. Metric would lose its value if we each selected our own personal size for a meter. Part of the value of Windows is that it presents a standard to both users and developers of software.

Nevertheless, the government's remedy seems to invite OEMs to fragment the Windows standard. Further, the government's remedy does not have any provisions requiring that OEMs disclose to consumers when they are selling threadbare versions of Windows. Such disclosure might not do much good anyway, since it would be largely indecipherable to typical computer users.

The potential fragmentation problem can be illustrated very simply with the example of audio compression (one of the components that can currently be turned off in Windows 98). The way Windows now works, software developers can count on all users having access to these sound decompression routines, since they are normally turned on during Windows installation. Even if they have been turned off, however, it is relatively easy for software developers to provide instructions to users on how to turn them back on, since these routines reside on the Windows CD.

Under the government remedy, software developers could no longer count on users having access to audio compression routines. OEMs are given a financial incentive to sell machines with 'stripped-down' versions of Windows. Some OEMs might decide to include audio compression, while others might prefer to reduce their costs by not including it. On Christmas morning, when little Johnny turns on the computer to play his new video game, there will be no sound if his parents purchased a computer missing the needed audio compression routines.[26] The software developer now has one very unhappy customer.[27]

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26 Many computer game users have experienced this type of problem because the hardware (e.g., sound cards) in PCs is not fully standardized, and the game developers write their games to work with only the leading sound cards since it would be too expensive to do otherwise. Although the packaging usually states the hardware requirements, many users are not sufficiently sophisticated to know whether the program will work on their machines. The packages currently state whether the product works with DOS, Windows 3.1, Windows 95 and so forth but doesn't have to specify which components of the operating system are installed since the operating system is standardized and the user has easy access to all components. Under provision 3g, the package would have to list all the 'middleware' programs that need to be installed into the operating system in order for the program being purchased to work. This will add a great deal of extra complexity into the purchase decision since consumers, who often barely know which operating system their computer uses, will need to have a far more intimate knowledge of their machine to interpret these restrictions.

27 Defenders of this remedy might claim that the game developer could include on the distribution CD, along with the game, those components of Windows that are needed to run the game but which might have been removed by an OEM. In that case, however, the cost of the game would go up, needlessly raising prices for those customers who already have that Windows component installed.

Multiply this problem by many potential middleware products, and it is easy to see how consumers will suffer from a fragmented market. This is a potentially enormous problem.[28]

Nevertheless, the government asserts that the above concern is unwarranted, and that only a handful of products would be affected.[29] It isn't clear to us exactly what products would fit into this category of middleware products, or where the audio compression example fit in.[30] This has to do with the definition of middleware product, which is as follows:

> 7.r "Middleware Product" means
>
> i. Internet browsers, e-mail client software, multimedia viewing software, instant messaging software, and voice recognition software, or
>
> ii. software distributed by Microsoft that –
>
> 1. is, or has in the applicable preceding year been, distributed separately from an Operating System Product in the retail channel or through Internet access providers, Internet content providers, ISVs or OEMs, and
>
> 2. provides functionality similar to that provided by Middleware offered by a competitor to Microsoft.

Perhaps the government's explanation will provide guidance to courts that are called upon to interpret this issue. Even if the government is correct, however, and only a relative handful of products are affected, there are still potential problems. If some versions of Windows have voice recognition and others not, and some versions have video streaming and others not, the potential for a serious fragmentation problem is still

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[28] A particularly specious claim by the government is that fragmentation, if it occurred, would be nothing new, since Microsoft already allows consumers to remove many components of Windows with the add/remove software feature built into Windows. This is mistaken, however, since the code is always there to replace any features of Windows that were not included in a particular installation. If fragmentation occurs from this middleware provision, it would be different from what occurs with current Windows flexibility in installation. There is a certain consistency in the government's argument, however. Since the government seems to view the removal of middleware in Windows as a non-permanent result, akin to the current add/remove feature of Windows, it would make sense that the government wouldn't perceive a fragmentation problem.

[29] On page 62 of Plaintiffs' Reply Memorandum In Support Of Proposed Final Judgment, (May 17, 2000) we find: "Microsoft ignores the definition of "Middleware Product" (§ 7.p), which is the term to which Section 3.g., applies and which is much narrower than "Middleware" (§ 7.o). That definition ensures that the anti-binding provision will apply to only a small group of products."

[30] Would the audio compression be the type of middleware product that section 3g would proscribe? It doesn't fit 7.r.i. Audio codecs do provide functionality similar to that offered by Microsoft competitors, fitting 7.r.ii.2. It has been distributed separately by third parties, but we do not know if Microsoft would have been considered to have distributed it separately from the operating system as required by 7.r.ii.1 (these codecs are automatically downloaded, for example, by Windows Media player if needed). These are the types of problems that make interpretation of the remedy so murky.

real even with only five or ten middleware products that might or might not be included with Windows.

The government's response to concerns about fragmentation can only be described as extraordinary. The government claims that when OEMs remove Microsoft middleware programs, that the underlying code will still remain resident, to be called by other programs. The government states: "Section 3.g., requires that OEMs and end users be able to remove access only to the middleware product -- in this case the browser -- not to APIs or code."[31] In essence, the government is asking Microsoft to hide the middleware program from view and refund its "price", but to keep its functionality intact. Under this interpretation the government would be correct in its claim that there would be no fragmentation. Nevertheless, under this interpretation Microsoft would be providing essentially the full Windows program to OEMs and end users, while granting discounts for the features that have been 'removed

Of course, OEMs would have every incentive to 'remove' all such middleware products, since their consumers get the products either way. [32]

Interestingly, the very purpose of this provision is thwarted under the government's proposed interpretation. The government would like other manufacturers of middleware to have greater opportunity to have OEMs install their software.[33] Yet if the Microsoft middleware is included for free, what incentive do OEMs have to include competing software from other producers? Exactly the same incentive as if the Microsoft middleware were a part of Windows and no discount were offered. This provision, under the government interpretation, cannot achieve the ends that the government desires. Only under the alternative interpretation, the interpretation that would lead to fragmentation, do alternative producers of middleware have increased likelihood of having their products purchased by OEMs.

The government might more readily achieve a la carte operating systems pricing by requiring that OEMs have the right to remove features for appropriate discounts, but also requiring full disclosure by OEMs that components have been removed.[34] This way, if

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[31] Found on page 63 of Plaintiffs' Reply Memorandum In Support Of Proposed Final Judgment.

[32] We assume that 'stand-alone' middleware products, which will be hidden or missing, are of little direct value to consumers. Using voice recognition as an example, a standalone program is likely to be of limited value since people are going to want to use voice recognition within their favorite word processor. More generally, a stand-alone program is likely to be of little extra value to software that is truly middleware, since the purpose of middleware is, by definition, to be used by other programs.

[33] On page 61 of Plaintiffs' Reply Memorandum In Support Of Proposed Final Judgment we find: "Forced bundling injures consumers directly and injures competition by increasing the costs rival software vendors must incur to get their products distributed effectively."

[34] This is a bit tricky. If the discount were equal to the market price of such software we would find that the price of Windows would quickly go to zero or less since Windows is cheap relative to many third party products (e.g. voice recognition). Instead the various middleware products would together have to be deemed worth a certain portion of the total Windows price and the individual components would share that amount in some relation to their market value.

fragmentation occurs, it will at least be along lines that consumers have chosen. Or, if consumers value standardization, they will be able to assure that they are obtaining a standard version.

B. Reduced Innovation in the Operating System

The remedy also has the potential to hamper innovation in the operating system. Part of this comes from the "Binding Middleware" restriction discussed in the previous section. Obviously, if OEMs can use new middleware innovations without paying for them, Microsoft will have less incentive to create these innovations. The restricted trade between the operating system company and the application company also has the potential to reduce innovation in the operating system. Voice recognition technology can illustrate this problem.

Voice recognition is going to be one of the most useful features that will become available to computer users in the next few years, particularly for users with visual impairment or disabilities hindering the use of their hands. There are currently several firms producing voice recognition software, including IBM, Lernout & Hauspie, and Dragon Systems, with prices ranging from about $100 for basic versions to several hundred dollars for more advanced versions. This software has been improving, but still leaves much to be desired. Most of these programs allow voice recognition to be used with a handful of other programs, usually Microsoft Office and one or two others.

There are important advantages in having voice recognition included in the operating system as compared with having it as a stand-alone program.[35] If it is part of the operating system, every firm writing applications for Windows, instead of just a handful, can take advantage of voice recognition, using the feature built in to Windows, just as they currently draw upon mouse operations or printer drivers. Consumers will also benefit since the cost of voice recognition, based on the historical precedent of Windows pricing, will probably be only a few dollars instead of the few hundred dollars that it now takes to purchase these stand-alone programs.[36]

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35 The analogy here that might make the point more transparent is the situation with printer drivers and DOS. DOS did not include any printer drivers, meaning that each software developers had to create his own printer drivers. Since there were hundreds of printers, this was very expensive and time consuming, as well as being grossly inefficient. Since the effort involved in writing printer drivers would be independent of the number of sales, this cost fell disproportionately on small ISVs making it more difficult for them to compete with large ISVs. Microsoft's inclusion of printer drivers in Windows allowed ISVs to costlessly have their programs print to any printer with a driver, was clearly efficient, and benefited small ISVs the most.

36 The cost to consumers of features such as disk compression, disk fragmentation, undelete programs, fax software, Internet sharing software and so forth have been added into Windows at a rate of pennies on the dollar compared to the previous stand-alone prices.

One would expect that absent the remedy's trade restrictions, Microsoft would adopt the voice recognition software that provides the best combination of price and functionality, since that would create the greatest net value for consumers, and therefore have the most favorable influence on Windows' profitability. This might entail using a product designed in house, or licensing the product from a third party.

How does the government's remedy impede this process? First, provision 2.B.ii essentially prevents the two former Microsoft companies from doing business with one another for a period of ten years, what we call the 'no trade clause'. Here is the text.

> 2.B After Implementation of the Plan and throughout the term of this Final Judgment, the Operating Systems Business and the Applications Business shall be prohibited from:
>
> ii. entering into any Agreement with one another under which one of the Businesses develops, sells, licenses for sale or distribution, or distributes products or services (other than the technologies referred to in the following sentence) developed, sold, licensed, or distributed by the other Business;
>
> Section 2.b.ii shall not prohibit the Operating Systems Business and the Applications Business from licensing technologies (other than Middleware Products) to each other for use in each others' products or services provided that such technology (i) is not and has not been separately sold, licensed, or offered as a product, and (ii) is licensed on terms that are otherwise consistent with this Final Judgment.

Since voice recognition is specifically defined as a middleware product, the last sentence does not overrule 2.b.ii.

There is one other element of the judgment that might seem to control the business relationship between the AppCo and OpCo, section 1.c.ii, which is quoted here:

> 1.c.ii. Intellectual Property that is used both in a product developed, distributed, or sold by the Applications Business and in a product developed, distributed, or sold by the Operating Systems Business as of April 27, 2000, shall be assigned to the Applications Business, and the Operating Systems Business shall be granted a perpetual, royalty-free license to license and distribute such Intellectual Property in its products, and, except with respect to such Intellectual Property related to the Internet browser, to develop, license and distribute modified or derivative versions of such Intellectual Property, provided that the Operating Systems Business does not grant rights to such versions to the Applications Business. In the case of such Intellectual Property that is related to the Internet browser, the license shall not grant the Operating Systems Business any right to develop, license, or distribute modified or derivative versions of the Internet browser.

This paragraph does not seem to be entirely clear and is likely to provide more fodder for litigation. How does 'intellectual property' differ from 'products'? Which products or intellectual properties were developed by the Operating Systems Business versus the Applications Business? If intellectual properties were developed using programmers from each division, how are they to be classified?[37]

Microsoft has made a very substantial investment in voice recognition. Under the government remedy, voice recognition software goes to the AppCo. Suppose that the efficient outcome would be for the AppCo voice recognition software to be included in the OpCo operating system. It appears that this outcome would be disallowed. Instead, the OpCo would have to deal with one of the other voice recognition vendors, causing an inferior product to be included in Windows. The remedy rules Microsoft out of the competition to provide voice recognition software for Windows. If we are correct that voice recognition is destined to be a part of the operating system standard, then Microsoft's voice recognition project will need to be sold off or scrapped. This is just one example of how innovation in the operating system can be effected.

C. Reduced Competition in Non-Desktop Markets.

Although the remedy is draped in the language of increased competition, certain aspects seem designed specifically to reduce competition, particularly in the high-end server markets.

Windows NT (now Windows 2000) is Microsoft's entry in the high-end server and workstation market. These products were not part of the case. There can be no serious claim that NT has a monopoly in the server/workstation market.[38] In this market, Microsoft is the challenger against entrenched incumbents such as IBM and Sun. Competition in this market is clearly enhanced by the presence of NT, but the government's remedy seems intent on reducing such competition.

As NT makes inroads into the server market, competition can only be enhanced. One might have hoped that any remedy would encourage competition in the high-end market. But this is not the case.

Once again, this has to do with the specific division of programs and the no-trade clause. Important components of Microsoft's server software (e.g. transaction server software and the others listed in footnote 24 above) are given to the AppCo. Windows

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[37] The definition of intellectual property given in section 7 is: m. "Intellectual Property" means copyrights, patents, trademarks and trade secrets used by Microsoft or licensed by Microsoft to third parties.

38 The same argument can be made for the Windows CE operating system and the future X-box game machine. In both of these markets, the most successful firms produce both the hardware and the operating system, which the remedy would not allow Microsoft to emulate.

2000 without server software is an emasculated high-end operating system. The benefits of reduced competition in the server market redound to firms such as Sun, IBM, and Oracle that have a large stake in high-end (and high-priced) servers and workstations.

Even if the murky intellectual property clause 1.c.2, allowed some cross licensing, a whole new set of problems would arise. There would then be two competing versions of the software, with each version based upon the same original code. This would create confusion among consumers and hinder the adoption of these programs.

It is particularly interesting how this particular feature of the remedy comports with the politics of this case. Sun and Oracle have been strong political supporters for this antitrust case. They now stand to benefit from reduced competition.

D. Rules on Sabotage

The aim of provision 3.c. is to put in place a system to punish Microsoft should it alter the operating system to intentionally sabotage the performance of a competitor's software product. It is difficult to disagree with the intent of this provision. After all, intentionally degrading the performance of a competitor's product is both economically inefficient, and is the antithesis of fair and unfettered competition.

The text of this provision is as follows:

> 3.c Knowing Interference with Performance. Microsoft shall not take any action that it knows will interfere with or degrade the performance of any non-Microsoft Middleware when interoperating with any Windows Operating System Product without notifying the supplier of such non-Microsoft Middleware in writing that Microsoft intends to take such action, Microsoft's reasons for taking the action, and any ways known to Microsoft for the supplier to avoid or reduce interference with, or the degrading of, the performance of the supplier's Middleware.

While the prevention of sabotage is a reasonable goal, there are real problems with this provision as an operational rule. First, it doesn't distinguish between an action that is taken to sabotage a competitor as opposed to an action that is merely an unavoidable by-product of changes in technology. It is only the former that needs to be prevented. Neither does this provision define the meaning of 'performance'. This leaves the door open for this provision to be used to impose costs on Microsoft for actions that clearly have nothing to do with sabotage. Finally, it would seem that the only way for Microsoft not to run afoul of this provision would be for the operating system remain 100% backwards compatible forever, a very inefficient result.

For example, is a one-tenth of one percent slowdown the type of degradation that this type of provision intends to address? What if the program run 5% slower but is more stable? A more likely result is that the program runs faster on some machines but more

slowly on others, depending on the hardware configuration. What then? This is the computer science version of economist's problems with index numbers such price indexes. They struggle with it just as we do.

It is easy to see how this provision could very easily impose unreasonably burdensome costs on Microsoft for no apparent purpose. The remedy applies this no-sabotage provision to the more general category middleware as opposed to middleware product, so the number of products that might qualify could be quite large.

It doesn't seem very difficult to focus on what this provision is trying to accomplish, and find a lower cost solution. One possibility would be to impose some large fine if an arbitrator determined that Microsoft altered some Windows component solely to sabotage some firm's application.

E. OEM Flexibility in Product Configuration

Provision 3.a.iii prevents Microsoft from entering into contracts or otherwise restricting an OEM from modifying the Windows desktop, startup folder, favorites and other defaults. The purpose of this provision would seem to be to make sure that non-Microsoft products can be put on the desktop and thus improve their competitive position. However there is an important distinction between the purpose and the actual implementation.

The purpose of this provision, as we read it, would be to prevent Microsoft from prohibiting free contracting between OEMs and other parties, or in other words, to open up the ability to contract. Allowing free contracting is always a pro-competitive activity (as long as it is not a contract to collude). The actual implementation of this proposal, however, is just the opposite. It forbids Microsoft from contracting, even when such contracting would be clearly beneficial. Therefore, it is anticompetitive.

Assume, as is always the economist's prerogative, that an Internet Service Provider, say Earthlink, wants to have its icon put on the desktop, and is willing to pay a sufficiently high price to outbid others. Earthlink could negotiate with Microsoft to put an icon on the desktop. Or it could negotiate with dozens of OEMs to put the icon on the desktop. Transaction costs are likely to be lower in negotiating with only a single agent, Microsoft, as opposed to dozens of OEMs.

In the appendix we argued that there are good reasons to expect that contracting ought to be able to ensure the efficient result, regardless of who owns the property rights. If the same result prevails regardless of property rights assignment, then why should it matter if Microsoft is not allowed to sell the desktop space? The answer, once again, is efficiency. If transaction costs are minimized when Earthlink has only a single negotiation, then it would be socially efficient to allow Microsoft to sell the desktop space. Under provision a.iii, however, Microsoft cannot contract with OEMs to prevent OEMs from altering the desktop. Microsoft, therefore, could not guarantee that the

desktop space it sells will actually contain the icon it promised. Only OEMs will be able to guarantee that they can deliver what they sell. The market, in this case will not be able to achieve the efficient result of having Microsoft sell the desktop space.

If the motivation of this provision was to ensure that Microsoft could not keep certain competitors from having icons on the desktop, the provision could have been written to state just that.

VI. Integration, Innovation, and Maintenance

Microsoft's decision to sell its browser, Internet Explorer, as a part of the operating system has been absolutely central to this case. Not surprisingly, the court's treatment of the browser is the aspect of this case that is most likely to affect antitrust doctrine. On this issue, small changes in language here can beg the question. To say, "Microsoft integrated the browser into the operating system" tilts the rhetorical field toward Microsoft. To say "Microsoft bolted the browser to the operating system" tilts the field toward the government.

In the trial, much was made of whether the browser really was integrated into the Windows. Unfortunately, much of the focus on this issue became the computer science issue of whether the browser could be removed without disabling the operating system. This issue is irrelevant. A watch will still work if you remove the second hand.

The real issue is whether integration yields benefits—better products or lower costs—that could not have been accomplished by the purchase of separate goods. The D.C. Circuit Court of Appeals, in its earlier ruling on the issue of browser integration, said as much: "The short answer is thus that integration may be considered genuine if it is beneficial when compared to a purchaser combination." That court also took note of the court's limitations in assessing product quality, concluding that "The question is not whether the integration is a net plus but merely whether there is a plausible claim that it brings some advantage."

Judge Jackson's Findings of Law took issue with this statement, offering the argument that two separate products exist if consumers perceive two markets for two goods. Whatever the outcome of the Microsoft antitrust case, this rule is bad economics that would undermine antitrust practice and damage competition and innovation

Consumer perception of two separate markets would offer very poor guidance on the permissiblity of product integration. Twenty years ago, a thriving industry provided after-market rustproofing for automobiles. New-car buyers in the Northern U.S. and Canada took their cars to aftermarket rustproofers or had dealers arrange rustproofing before delivery. But starting in the mid-seventies, and accelerating dramatically in the early to mid-eighties, automobile manufacturers began to incorporate extensive rustproofing. They improved designs and made heavy use of galvanizing and other coatings. Integrating rustproofing into manufacturing and design worked much better

than adding it on. Today consumers expect integrated rustproofing and long-term warrantees on rust resistance. The small aftermarket for rustproofing that remains is mostly confined to restored older cars and repaired newer ones. No doubt the after-market rustproofers that were crowded out by manufacturers' improvements bewailed the loss of their market, but consumers are much better off.

Here, and in a host of other examples (shirts and buttons, cars and tires), the fact that consumers perceive separate market provides no useful indication about the advantage of integration.

Judge Jackson does attempt to ground his finding of two separate products in consumer sovereignty, drawing on the *Jefferson Parish* and *Eastman Kodak* cases:

> The significance of those cases, for this Court's purposes, is to teach that resolution of product and market definitional problems must depend upon proof of commercial reality, as opposed to what might appear to be reasonable. In both cases the Supreme Court instructed that product and market definitions were to be ascertained by reference to evidence of consumers' perception of the nature of the products and the markets for them, rather than to abstract or metaphysical assumption as to the configuration of the 'product' and the 'market.'… In the instant case, the commercial reality is that consumers today perceive operating systems and browsers as separate 'products,' for which there is separate demand. (Findings of Law, p. 29).

There are two problems with this. First, consumers can perceive separate markets, even when the benefits of integration overwhelm the costs. Separate markets exist for cars and rustproofing, or shirts and buttons, cars and tires, yet few people would object to these integrations. Interestingly, an additional consideration for the *Jefferson Parish* court was whether significant numbers of consumers, perceiving separate markets, were being forced to buy something that they didn't wish to buy from the defendant. Second, with changes in technology, both cost-benefit comparisons and consumer perceptions can change. So the "commercial reality" that "consumers today perceive" does not resolve much. In 1975 consumers undoubtedly perceived separate markets and products for cars and rustproofing. A contract that compelled consumers to buy added-on rustproofing only from authorized car dealers might well have flunked a cost-benefit test, while harming independents like Ziebart. But ten years later, few would have disputed the benefits of factory manufactured-in rust resistance. Where technology change offers new product integration, a rule that compels a look at consumer perceptions as though frozen in time will be harmful.

This particular form of innovation—adding functionality to existing products—is especially important for the software industry. We noted in the appendix that because software is durable, sales of software will depend heavily on product improvements. Product improvements will consist largely of adding functionality to existing products.

A standard is a terrible thing to waste. If the owner-producer-provider of a standard is not permitted to update the standard, or the products that embody the standard, the standard will perish. Efficiency in the market for standards requires that producers be permitted to incorporate innovations in their products. In our analysis of standards and technology choice, in chapter three and elsewhere, we showed that standards offering the largest surpluses could be expected to prevail in the marketplace. In part, this would occur because the owners of more productive standards would be willing to invest more to establish their products. But suppose that once a standard is established, improvements are prohibited, or somehow handicapped. Such a prohibition would have two harmful effects. First, it might mean that the best available product—an improved version of the established standard—would be prohibited. Second, it might prompt unwarranted instability in standards, forcing consumers to invest unnecessarily in products based upon new standards.

The connection to the Microsoft case will be evident to the reader. The Finding of Law can be understood to mean that because Windows is the standard for personal computing, Microsoft was prohibited from extending Windows by adding new functionality to the standard if any competitor offered that functionality as an add-on. The court's remedy certainly reinforces that position by making it much more expensive for Microsoft to add new features to Windows. If the district court's interpretation of the rules on product integration are adopted into antitrust law, Windows will be a weaker standard that may well give way prematurely to a rival that is not hobbled by this legal restriction—at least not initially. And other standards will be weaker, less flexible, and less enduring.

VII. Conclusions

The particular remedy chosen by the government and approved by the judge is defective. Its key defect is the lack of logical consistency between the claims made in the case and the nature of the structural remedy proposed. It is difficult to avoid concluding that the remedy serves hardly any purpose except a punitive one.

The proposed structural and conduct remedies will impose costs. No one disputes that breakups are costly. The government's own experts agree that software prices are likely to rise. The capricious allocation of products, the fragmentation of the operating system, the rules forbidding trade between the split-up companies, all imposes clear and significant costs. The intentional handicapping of operating systems that played no role in this case will only work to decrease competition in the server and hand-held markets. Synergies will be lost.

When the theory of the case is based on a defective view of markets, it is not surprising that the findings would be flawed, as would the remedy imposed. Network theories, we have argued, do not warrant being enshrined in our antitrust laws. They can be only if conjecture is elevated above observation.

THE DISTRICT COURT'S REMEDY

ORDERED, ADJUDGED, AND DECREED as follows:

1. Divestiture

a. Not later than four months after entry of this Final Judgment, Microsoft shall submit to the Court and the Plaintiffs a proposed plan of divestiture. The Plaintiffs shall submit any objections to the proposed plan of divestiture to the Court within 60 days of receipt of the plan, and Microsoft shall submit its response within 30 days of receipt of the plaintiffs' objections.

b. Following approval of a final plan of divestiture by the Court (the "Plan")[39] (and the expiration of the stay pending appeal set forth in section 6.a), Microsoft shall implement such Plan.

c. The Plan shall provide for the completion, within 12 months of the expiration of the stay pending appeal set forth in section 6.a., of the following steps:

i. The separation of the Operating Systems Business from the Applications Business, and the transfer of the assets of one of them (the "Separated Business") to a separate entity along with (a) all personnel, systems, and other tangible and intangible assets (including Intellectual Property) used to develop, produce, distribute, market, promote, sell, license and support the products and services of the Separated Business, and (b) such other assets as are necessary to operate the Separated Business as an independent and economically viable entity.

ii. Intellectual Property that is used both in a product developed, distributed, or sold by the Applications Business and in a product developed, distributed, or sold by the Operating Systems Business as of April 27, 2000, shall be assigned to the Applications Business, and the Operating Systems Business shall be granted a perpetual, royalty-free license to license and distribute such Intellectual Property in its products, and, except with respect to such Intellectual Property related to the Internet browser, to develop, license and distribute modified or derivative versions of such Intellectual Property, provided that the Operating Systems

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[39] Definitions of capitalized terms are set forth in section 7, below.

Business does not grant rights to such versions to the Applications Business. In the case of such Intellectual Property that is related to the Internet browser, the license shall not grant the Operating Systems Business any right to develop, license, or distribute modified or derivative versions of the Internet browser.

iii. The transfer of ownership of the Separated Business by means of a distribution of stock of the Separated Business to Non-Covered Shareholders of Microsoft, or by other disposition that does not result in a Covered Shareholder owning stock in both the Separated Business and the Remaining Business.

d. Until Implementation of the Plan, Microsoft shall:

i. preserve, maintain, and operate the Operating Systems Business and the Applications Business as ongoing, economically viable businesses, with management, sales, products, and operations of each business held as separate, distinct and apart from one another as they were on April 27, 2000, except to provide the accounting, management, and information services or other necessary support functions provided by Microsoft prior to the entry of this Final Judgment;

ii. use all reasonable efforts to maintain and increase the sales and revenues of both the products produced or sold by the Operating Systems Business and those produced or sold by the Applications Business prior to the Implementation of the Plan and to support research and development and business development efforts of both the Operating Systems Business and the Applications Business;

iii. take no action that undermines, frustrates, interferes with, or makes more difficult the divestiture required by this Final Judgment without the prior approval of the Court; and

iv. file a report with the Court 90 days after entry of this Final Judgment on the steps Microsoft has taken to comply with the requirements of this section 1.d.

2. Provisions Implementing Divestiture

a. After Implementation of the Plan, and throughout the term of this Final Judgment, neither the Operating Systems Business nor the Applications Business, nor any member of their respective Boards of Directors, shall acquire any securities or assets of the other Business; no Covered Shareholder holding securities of either the Operating Systems Business or the Applications Business shall acquire any securities or assets of or shall be an officer, director, or employee of the other Business; and no person who is an officer, director, or employee of the Operating Systems Business or the Applications Business shall be an officer, director, or employee of the other Business.

b. After Implementation of the Plan and throughout the term of this Final Judgment, the Operating Systems Business and the Applications Business shall be prohibited from:

i. merging or otherwise recombining, or entering into any joint venture with one another;

ii. entering into any Agreement with one another under which one of the Businesses develops, sells, licenses for sale or distribution, or distributes products or services (other than the technologies referred to in the following sentence) developed, sold, licensed, or distributed by the other Business;

iii. providing to the other any APIs, Technical Information, Communications Interfaces, or technical information that is not simultaneously published, disclosed, or made readily available to ISVs, IHVs, and OEMs; and

iv. licensing, selling or otherwise providing to the other Business any product or service on terms more favorable than those available to any similarly situated third party.

Section 2.b.ii shall not prohibit the Operating Systems Business and the Applications Business from licensing technologies (other than Middleware Products) to each other for use in each others' products or services provided that such technology (i) is not and has not been separately sold, licensed, or offered as a product, and (ii) is licensed on terms that are otherwise consistent with this Final Judgment.

c. Three months after Implementation of the Plan and once every three months thereafter throughout the term of this Final Judgment, the Operating Systems Business and the Applications Business shall file with the Plaintiffs a copy of each Agreement (and a memorandum describing each oral Agreement) entered into between them.

d. Throughout the term of this Final Judgment, Microsoft, the Operating Systems Business and the Applications Business shall be prohibited from taking adverse action against any person or entity in whole or in part because such person or entity provided evidence in this case.

e. The obligations and restrictions set forth in sections 3 and 4 herein shall, after the Implementation of the Plan, apply only to the Operating Systems Business.

3. Provisions In Effect Until Full Implementation of the Plan of Divestiture . The provisions in this section 3 shall remain in effect until the earlier of three years after the Implementation of the Plan or the expiration of the term of this Final Judgment.

a. OEM Relations.

i. Ban on Adverse Actions for Supporting Competing Products. Microsoft shall not take or threaten any action adversely affecting any OEM (including but not limited to giving or withholding any consideration such as licensing terms; discounts; technical, marketing, and sales support; enabling programs; product information; technical information; information about future plans; developer tools or developer support; hardware certification; and permission to display trademarks or logos) based directly or indirectly, in whole or in part, on any actual or contemplated action by that OEM:

1. to use, distribute, promote, license, develop, produce or sell any product or service that competes with any Microsoft product or service; or
2. to exercise any of the options or alternatives provided under this Final Judgment.

ii. Uniform Terms for Windows Operating System Products Licensed to Covered OEMs. Microsoft shall license Windows Operating System Products to Covered OEMs pursuant to uniform license agreements with uniform terms and conditions and shall not employ market development allowances or discounts in connection with Windows Operating System Products. Without limiting the foregoing, Microsoft shall charge each Covered OEM the applicable royalty for Windows Operating System Products as set forth on a schedule, to be established by Microsoft and published on a web site accessible to plaintiffs and all Covered OEMs , that provides for uniform royalties for Windows Operating System Products, except that –

1. the schedule may specify different royalties for different language versions, and
2. the schedule may specify reasonable volume discounts based upon actual volume of total shipments of Windows Operating System Products.

Without limiting the foregoing, Microsoft shall afford Covered OEMs equal access to licensing terms; discounts; technical, marketing, and sales support; product information; technical information; information about future plans; developer tools or developer support; hardware certification; and permission to display trademarks or logos. The foregoing requirement insofar as it relates to access to technical information and information about future plans shall not apply to any bona fide joint development effort by Microsoft and a Covered OEM with respect to confidential matters within the scope of that effort. Microsoft shall not terminate a Covered OEM's license for a Windows Operating System Product without having first given the Covered

OEM written notice of the reason for the proposed termination and not less than thirty days' opportunity to cure. Microsoft shall not enforce any provision in any Agreement with a Covered OEM that is inconsistent with this Final Judgment.

iii. OEM Flexibility in Product Configuration. Microsoft shall not restrict (by contract or otherwise, including but not limited to granting or withholding consideration) an OEM from modifying the boot sequence, startup folder, internet connection wizard, desktop, preferences, favorites, start page, first screen, or other aspect of a Windows Operating System Product to –

1. include a registration sequence to obtain subscription or other information from the user;
2. display icons of or otherwise feature other products or services, regardless of the size or shape of such icons or features, or to remove the icons, folders, start menu entries, or favorites of Microsoft products or services;
3. display any user interfaces, provided that an icon is also displayed that allows the user to access the Windows user interface; or
4. launch automatically any non-Microsoft Middleware, Operating System or application, offer its own Internet access provider or other start-up sequence, or offer an option to make non-Microsoft Middleware the Default Middleware and to remove the means of End-User Access for Microsoft's Middleware Product.

b. Disclosure of APIs, Communications Interfaces and Technical Information. Microsoft shall disclose to ISVs, IHVs, and OEMs in a Timely Manner, in whatever media Microsoft disseminates such information to its own personnel, all APIs, Technical Information and Communications Interfaces that Microsoft employs to enable –

i. Microsoft applications to interoperate with Microsoft Platform Software installed on the same Personal Computer, or

ii. a Microsoft Middleware Product to interoperate with Windows Operating System software (or Middleware distributed with such Operating System) installed on the same Personal Computer, or

iii. any Microsoft software installed on one computer (including but not limited to server Operating Systems and operating systems for handheld devices) to interoperate with a Windows Operating System (or Middleware distributed with such Operating System) installed on a Personal Computer.

To facilitate compliance, and monitoring of compliance, with the foregoing, Microsoft shall create a secure facility where qualified representatives of OEMs, ISVs, and IHVs shall be permitted to study, interrogate and interact with relevant and necessary portions of the source code and any related documentation of Microsoft Platform Software for

the sole purpose of enabling their products to interoperate effectively with Microsoft Platform Software (including exercising any of the options in section 3.a.iii).

c. Knowing Interference with Performance. Microsoft shall not take any action that it knows will interfere with or degrade the performance of any non-Microsoft Middleware when interoperating with any Windows Operating System Product without notifying the supplier of such non-Microsoft Middleware in writing that Microsoft intends to take such action, Microsoft's reasons for taking the action, and any ways known to Microsoft for the supplier to avoid or reduce interference with, or the degrading of, the performance of the supplier's Middleware.

d. Developer Relations. Microsoft shall not take or threaten any action affecting any ISV or IHV (including but not limited to giving or withholding any consideration such as licensing terms; discounts; technical, marketing, and sales support; enabling programs; product information; technical information; information about future plans; developer tools or developer support; hardware certification; and permission to display trademarks or logos) based directly or indirectly, in whole or in part, on any actual or contemplated action by that ISV or IHV to –

   i. use, distribute, promote or support any Microsoft product or service, or
   ii. develop, use, distribute, promote or support software that runs on non-Microsoft Middleware or a non-Microsoft Operating System or that competes with any Microsoft product or service, or
   iii. exercise any of the options or alternatives provided under this Final Judgment.

e. Ban on Exclusive Dealing. Microsoft shall not enter into or enforce any Agreement in which a third party agrees, or is offered or granted consideration,

   to –

   i. restrict its development, production, distribution, promotion or use of, or payment for, any non-Microsoft Platform Software,
   ii. distribute, promote or use any Microsoft Platform Software exclusively,
   iii. degrade the performance of any non-Microsoft Platform Software, or
   iv. in the case of an agreement with an Internet access provider or Internet content provider, distribute, promote or use Microsoft software in exchange for placement with respect to any aspect of a Windows Operating System Product.

f. Ban on Contractual Tying. Microsoft shall not condition the granting of a Windows Operating System Product license, or the terms or administration of such license, on an OEM or other licensee agreeing to license, promote, or distribute any other Microsoft software product that Microsoft distributes separately from the Windows Operating System Product in the retail channel or through Internet access providers, Internet

content providers, ISVs or OEMs, whether or not for a separate or positive price.

g. Restriction on Binding Middleware Products to Operating System Products. Microsoft shall not, in any Operating System Product distributed six or more months after the effective date of this Final Judgment, Bind any Middleware Product to a Windows Operating System unless:

   i. Microsoft also offers an otherwise identical version of that Operating System Product in which all means of End-User Access to that Middleware Product can readily be removed (a) by OEMs as part of standard OEM preinstallation kits and (b) by end users using add-remove utilities readily accessible in the initial boot process and from the Windows desktop; and

   ii. when an OEM removes End-User Access to a Middleware Product from any Personal Computer on which Windows is preinstalled, the royalty paid by that OEM for that copy of Windows is reduced in an amount not less than the product of the otherwise applicable royalty and the ratio of the number of amount in bytes of binary code of (a) the Middleware Product as distributed separately from a Windows Operating System Product to (b) the applicable version of Windows.

h. Agreements Limiting Competition. Microsoft shall not offer, agree to provide, or provide any consideration to any actual or potential Platform Software competitor in exchange for such competitor's agreeing to refrain or refraining in whole or in part from developing, licensing, promoting or distributing any Operating System Product or Middleware Product competitive with any Windows Operating System Product or Middleware Product.

i. Continued Licensing of Predecessor Version. Microsoft shall, when it makes a major Windows Operating System Product release (such as Windows 95, OSR 2.0, OSR 2.5, Windows 98, Windows 2000 Professional, Windows "Millennium," "Whistler," "Blackcomb," and successors to these), continue for three years after said release to license on the same terms and conditions the previous Windows Operating System Product to any OEM that desires such a license. The net royalty rate for the previous Windows Operating System Product shall be no more than the average royalty paid by the OEM for such Product prior to the release. The OEM shall be free to market Personal Computers in which it preinstalls such an Operating System Product in the same manner in which it markets Personal Computers preinstalled with other Windows Operating System Products.

4. Internal Antitrust Compliance. This section shall remain in effect throughout the term of this Final Judgment, provided that, consistent with section 2.e, this section shall not apply to the Applications Business after the Implementation of the Plan.
    a. Within 90 days after the effective date of this Final Judgment, Microsoft shall establish a Compliance Committee of its corporate Board of Directors, consisting of not fewer than three members of the Board of Directors who are not present or former employees of Microsoft.
    b. The Compliance Committee shall hire a Chief Compliance Officer, who shall report directly to the Compliance Committee and to the Chief Executive Officer of Microsoft.
    c. The Chief Compliance Officer shall be responsible for development and supervision of Microsoft's internal programs to ensure compliance with the antitrust laws and this Final Judgment.
    d. Microsoft shall give the Chief Compliance Officer sufficient authority and resources to discharge the responsibilities listed herein.
    e. The Chief Compliance Officer shall:
        i. within 90 days after entry of this Final Judgment, cause to be delivered to each Microsoft officer, director, and Manager, and each platform software developer and employee involved in relations with OEMs, ISVs, or IHVs, a copy of this Final Judgment together with additional informational materials describing the conduct prohibited and required by this Final Judgment;
        ii. distribute in a timely manner a copy of this Final Judgment and such additional informational materials to any person who succeeds to a position of officer, director, or Manager, or platform software developer or employee involved in relations with OEMs, ISVs or IHVs;
        iii. obtain from each officer, director, and Manager, and each platform software developer and employee involved in relations with OEMs, ISVs or IHVs, within 90 days of entry of this Final Judgment, and for each person thereafter succeeding to such a position within 5 days of such succession, a written certification that he or she:

has read, understands, and agrees to abide by the terms of this Final Judgment; and

1. has been advised and understands that his or her failure to comply with this Final Judgment may result in conviction for criminal contempt of court;

        iv. maintain a record of persons to whom this Final Judgment has been distributed and from whom, pursuant to Section 4.e.iii, such certifications have been obtained;
        v. establish and maintain a means by which employees can report potential violations of this Final Judgment or the antitrust laws on a confidential basis; and
        vi. report immediately to Plaintiffs and the Court any violation of this Final Judgment.

f. The Chief Compliance Officer may be removed only by the Chief Executive Officer with the concurrence of the Compliance Committee.

g. Microsoft shall, with the supervision of the Chief Compliance Officer, maintain for a period of at least four years the e-mail of all Microsoft officers, directors and managers engaged in software development, marketing, sales and developer relations related to Platform Software.

5. Compliance Inspection. This section shall remain in effect throughout the term of this Final Judgment.

a. For purposes of determining or securing implementation of or compliance with this Final Judgment, including the provisions requiring a plan of divestiture, or determining whether this Final Judgment should be modified or vacated, and subject to any legally recognized privilege, from time to time:

i. Duly authorized representatives of a Plaintiff, upon the written request of the Assistant Attorney General in charge of the Antitrust Division of the United States Department of Justice, or the Attorney General of a Plaintiff State, as the case may be, and on reasonable notice to Microsoft made to its principal office, shall be permitted:

(1) Access during office hours to inspect and copy or, at Plaintiffs' option, demand Microsoft provide copies of all books, ledgers, accounts, correspondence, memoranda, source code, and other records and documents in the possession or under the control of Microsoft (which may have counsel present), relating to the matters contained in this Final Judgment; and

(2) Subject to the reasonable convenience of Microsoft and without restraint or interference from it, to interview, either informally or on the record, its officers, employees, and agents, who may have their individual counsel present, regarding any such matters.

ii. Upon the written request of the Assistant Attorney General in charge of the Antitrust Division of the United States Department of Justice, or the Attorney General of a Plaintiff State, as the case may be, made to Microsoft at its principal offices, Microsoft shall submit such written reports, under oath if requested, as may be requested with respect to any matter contained in this Final Judgment.

iii. No information or documents obtained by the means provided in this section shall be divulged by a representative of a Plaintiff to any person other than a duly authorized representative of a Plaintiff, except in the course of legal proceedings to which the Plaintiff is a party (including grand jury proceedings), or for the purpose of securing compliance with this Final Judgment, or as otherwise required by law.

iv. If at the time information or documents are furnished by Microsoft to a Plaintiff, Microsoft represents and identifies in writing the material in any such information or documents to which a claim of protection may be asserted under Rule 26(c)(7) of the Federal Rules of Civil Procedure, and Microsoft marks each pertinent page of such material, "Subject to claim of protection under Rule 26(c)(7) of the Federal Rules of Civil Procedure," then 10 calendar days notice shall be given by a Plaintiff to Microsoft prior to divulging such material in any legal proceeding (other than a grand jury proceeding) to which Microsoft is not a party.

6. Effective Date, Term, Retention of Jurisdiction, Modification.

   a. This Final Judgment shall take effect 90 days after the date on which it is entered; provided, however that sections 1.b and 2 (except 2.d) shall be stayed pending completion of any appeals from this Final Judgment.
   b. Except as provided in section 2.e, the provisions of this Final Judgment apply to Microsoft as defined in section 7.o of this Final Judgment.
   c. This Final Judgment shall expire at the end of ten years from the date on which it takes effect.
   d. The Court may act sua sponte to issue orders or directions for the construction or carrying out of this Final Judgment, for the enforcement of compliance therewith, and for the punishment of any violation thereof.
   e. Jurisdiction is retained by this Court for the purpose of enabling any of the parties to this Final Judgment to apply to this Court at any time for such further orders or directions as may be necessary or appropriate for the construction or carrying out of this Final Judgment, for the modification of any of the provisions hereof, for the enforcement of compliance herewith, and for the punishment of any violation hereof.
   f. In accordance with the Court's Conclusions of Law, the plaintiff States shall submit a motion for costs and fees, with supporting documents as necessary, no later than 45 days after the entry of this Final Judgment.

7. Definitions.
   a. “Agreement” means any agreement, arrangement, alliance, understanding or joint venture, whether written or oral.
   b. “Application Programming Interfaces (APIs)” means the interfaces, service provider interfaces, and protocols that enable a hardware device or an application, Middleware, or server Operating System to obtain services from (or provide services in response to requests from) Platform Software in a Personal Computer and to use, benefit from, and rely on the resources, facilities, and capabilities of such Platform Software.
   c. “Applications Business” means all businesses carried on by Microsoft Corporation on the effective date of this Final Judgment except the Operating Systems Business. Applications Business includes but is not limited to the development, licensing, promotion, and support of client and server applications and Middleware (e.g., Office, BackOffice, Internet

Information Server, SQL Server, etc.), Internet Explorer, Mobile Explorer and other web browsers, Streaming Audio and Video client and server software, transaction server software, SNA server software, indexing server software, XML servers and parsers, Microsoft Manageme nt Server, Java virtual machines, Frontpage Express (and other web authoring tools), Outlook Express (and other e-mail clients), Media player, voice recognition software, Net Meeting (and other collaboration software), developer tools, hardware, MSN, MSNBC, Slate, Expedia, and all investments owned by Microsoft in partners or joint venturers, or in ISVs, IHVs, OEMs or other distributors, developers, and promoters of Microsoft products, or in other information technology or communications businesses.

d. "Bind" means to include a product in an Operating System Product in such a way that either an OEM or an end user cannot readily remove or uninstall the product.

e. "Business" means the Operating Systems Business or the Applications Business.

f. "Communications Interfaces" means the interfaces and protocols that enable software installed on other computers (including servers and handheld devices) to interoperate with the Microsoft Platform Software on a Personal Computer.

g. "Covered OEM" means one of the 20 OEMs with the highest volume of licenses of Windows Operating System Products from Microsoft in the calendar year preceding the effective date of the Final Judgment. At the beginning of each year, starting on January 1, 2002, Microsoft shall redetermine the Covered OEMs for the new calendar year, based on sales volume during the preceding calendar year.

h. "Covered Shareholder" means a shareholder of Microsoft on the date of entry of this Final Judgment who is a present or former employee, officer or director of Microsoft and who owns directly or beneficially more than 5 percent of the voting stock of the firm.

i. "Default Middleware" means Middleware configured to launch automatically (that is, by "default") to provide particular functionality when other Middleware has not been selected for this purpose. For example, a default browser is Middleware configured to launch automatically to display Web pages transmitted over the Internet or an intranet that bear the .htm extension, when other software has not been selected for this purpose.

j. "End-User Access" means the invocation of Middleware directly or indirectly by an end user of a Personal Computer or the ability of such an end user to invoke Middleware. "End-User Access" includes invocation of Middleware by end users which is compelled by the design of the Operating System Product.

k. "IHV" means an independent hardware vendor that develops hardware to be included in or used with a Personal Computer.

l. "Implementation of the Plan" means full completion of all of the steps described in section 1.c.

m. "Intellectual Property" means copyrights, patents, trademarks and trade secrets used by Microsoft or licensed by Microsoft to third parties.

n. "ISV" means any entity other than Microsoft (or any subsidiary, division, or other operating unit of any such other entity) that is engaged in the development and licensing (or other marketing) of software products intended to interoperate with Microsoft Platform Software.

o. "Manager" means a Microsoft employee who is responsible for the direct or indirect supervision of more than 100 other employees.

p. "Microsoft" means Microsoft Corporation, the Separated Business, the Remaining Business, their successors and assigns (including any transferee or assignee of any ownership rights to, control of, or ability to license the patents referred to in this Final Judgment), their subsidiaries, affiliates, directors, officers, managers, agents, and employees, and all other persons in active concert or participation with any of them who shall have received actual notice of this Final Judgment by personal service or otherwise.

q. "Middleware" means software that operates, directly or through other software, between an Operating System and another type of software (such as an application, a server Operating System, or a database management system) by offering services via APIs or Communications Interfaces to such other software, and could, if ported to or interoperable with multiple Operating Systems, enable software products written for that Middleware to be run on multiple Operating System Products. Examples of Middleware within the meaning of this Final Judgment include Internet browsers, e-mail client software, multimedia viewing software, Office, and the Java Virtual Machine. Examples of software that are not Middleware within the meaning of this Final Judgment are disk compression and memory management.

r. "Middleware Product" means

   i. Internet browsers, e-mail client software, multimedia viewing software, instant messaging software, and voice recognition software, or

   ii. software distributed by Microsoft that –

      1. is, or has in the applicable preceding year been, distributed separately from an Operating System Product in the retail channel or through Internet access providers, Internet content providers, ISVs or OEMs, and

      2. provides functionality similar to that provided by Middleware offered by a competitor to Microsoft.

s. "Non-Covered Shareholder" means a shareholder of Microsoft on the record date for the transaction that effects the transfer of ownership of the Separated Business under Section 1.c.iii who is not a Covered Shareholder on the date of entry of this Final Judgment.

t. "OEM" means the manufacturer or assembler of a personal computer.

u. "Operating System" means the software that controls the allocation and usage of hardware resources (such as memory, central processing unit time, disk space, and peripheral devices) of a computer, providing a "platform" by exposing APIs that applications use to "call upon" the Operating System's underlying software routines in order to perform functions.

v. "Operating System Product" means an Operating System and additional software shipped with the Operating System, whether or not such additional software is marketed for a positive price. An Operating System Product includes Operating System Product upgrades that may be distributed separately from the Operating System Product.

w. "Operating Systems Business" means the development, licensing, promotion, and support of Operating System Products for computing devices including but not limited to (i) Personal Computers, (ii) other computers based on Intel x86 or competitive microprocessors, such as servers, (iii) handheld devices such as personal digital assistants and cellular telephones, and (iv) television set-top boxes.

x. "Personal Computer" means any computer configured so that its primary purpose is to be used by one person at a time, that uses a video display and keyboard (whether or not the video display and keyboard are actually included), and that contains an Intel x86, successor, or competitive microprocessor, and computers that are commercial substitutes for such computers.

y. "Plaintiff" means the United States or any of the plaintiff States in this action.

z. "Plan" means the final plan of divestiture approved by the Court.

aa. "Platform Software" means an Operating System or Middleware or a combination of an Operating System and Middleware.

bb. "Remaining Business" means whichever of the Operating Systems Business and the Applications Businesses is not transferred to a separate entity pursuant to the Plan.

cc. "Separated Business" means whichever of the Operating Systems Business and the Applications Businesses is transferred to a separate entity pursuant to the Plan.

dd. "Technical Information" means all information regarding the identification and means of using APIs and Communications Interfaces that competent software developers require to make their products running on any computer interoperate effectively with Microsoft Platform Software running on a Personal Computer. Technical information includes but is not limited to reference implementations, communications protocols, file formats, data formats, syntaxes and grammars, data structure definitions and layouts, error codes, memory allocation and deallocation conventions, threading and synchronization conventions, functional specifications and descriptions, algorithms for data translation or reformatting (including compression/decompression algorithms and encryption/decryption algorithms), registry settings, and field contents.

ee. "Timely Manner": disclosure of APIs, Technical Information and Communications Interfaces in a timely manner means, at a minimum, publication on a web site accessible by ISVs, IHVs, and OEMs at the earliest of the time that such APIs, Technical Information, or Communications Interfaces are (1) disclosed to Microsoft's applications developers, (2) used by Microsoft's own Platform Software developers in software released by Microsoft in alpha, beta, release candidate, final or other form, (3) disclosed to any third party, or (4) within 90 days of a final release of a Windows Operating System Product, no less than 5 days after a material change is made between the most recent beta or release candidate version and the final release.

"Windows Operating System Product" means software code (including source code and binary code, and any other form in which Microsoft distributes its Windows Operating Systems for Personal Computers) of Windows 95, Windows 98, Windows 2000 Professional, and their successors, including the Windows Operating Systems for Personal Computers codenamed "Millennium," "Whistler," and "Blackcomb," and their successors.