B. Microsoft tied its Internet Explorer browser to Windows 95 and Windows 98 in order to impede browser rivals such as Netscape, and for no legitimate purpose

93. A central part of Microsoft's predatory campaign to prevent Netscape's browser from developing into a platform that could erode the applications barrier to entry was Microsoft's tying of its Internet Explorer browser to Windows 95 and Windows 98 and its refusal to offer, or to permit OEMs to offer, an unbundled option.

93.1. Internet browsers and personal computer operating systems are separate products. Consumers view browsers and operating systems as separate products and demand one without the other. In response to that separate demand, Microsoft and other software firms have found it efficient to promote and distribute browsers and operating systems separately. See infra Part V.B.1; ¶¶ 96-119.

93.2. Despite the existence of this separate demand for browsers and operating systems, Microsoft tied its browser to its Windows operating system, and refused to offer an unbundled option, for the purpose of hindering the development of Netscape and other browsers. See infra Part V.B.2; ¶¶ 120-149.

93.2.1. Microsoft tied Internet Explorer 1 and 2 to Windows 95 by requiring OEMs to obtain Internet Explorer in order to obtain Windows 95 and prohibited OEMs from removing Internet Explorer.

93.2.2. Subsequently, fearing that its merely contractual tie was not sufficient to eliminate the threat that Netscape's browser posed to its operating system monopoly, Microsoft changed its product design in Internet Explorer 3 and 4 to commingle browser and operating system code. Still, recognizing the desire of users to have the Windows 95 operating

system without Internet Explorer, Microsoft designed and advertised an easy means for users to remove the browser. Microsoft, however, refused to provide a version of Windows 95 from which the browser had been removed or to permit OEMs to remove the browser from the PCs they sold.

93.2.3. Microsoft designed Windows 98 to further implement the tying arrangement by eliminating the end user's ready ability to "uninstall" Internet Explorer and by interfering with his ability to choose a different default browser.

93.3. There is no sound justification for Microsoft's tying Internet Explorer to Windows. See infra Part V.B.3; ¶¶ 150-167.

93.4. Microsoft's tying arrangement and contractual prohibition on unbundling inflicted significant harm on competition and consumers. See infra Part V.B.4; ¶¶ 168-176.

1. Internet Explorer and Windows operating systems are separate products

94. Internet browsers and operating systems, including Internet Explorer and Windows, are separate products that are sold in separate product markets. There is separate demand for both browsers and operating systems that is efficient for suppliers to meet.

a. Browsers and operating systems are universally recognized by industry participants to be separate products

(1) An Internet browser supplies web browsing

95. An Internet web browser ("Internet browser") is a software program that enables its user to view, retrieve, and manipulate content located on the Internet's World Wide Web and other networks (hereinafter "web browsing").

ii. Microsoft's own dictionary defines a "web browser" as a "client application that

enables a user to view HTML documents on the World Wide Web, another network, or the user's computer; follow the hyperlinks among them; and transfer files." MICROSOFT PRESS, COMPUTER DICTIONARY (3d ed. 1997), at 505 (GX 1050).

iii. Professor Franklin Fisher defined a browser as "the application that permits users to access and browse the world wide web or, for that matter, other networks." Fisher, 1/6/99am, at 5:3-5.

iv. Dr. Warren-Boulton defined a browser as "software that enables computer users to navigate and view content on the World Wide Web." Warren-Boulton Dir. ¶ 68.

(2) Industry participants view a browser as an application, and not as part of an operating system

96. Industry participants -- including consumers, other operating system vendors, ISVs, corporate information technology officers, academic computer scientists, and the industry press (including Microsoft's own computing dictionary) -- universally regard web browsers as application programs separate from the underlying operating system.

96.1. Other operating system vendors, even those that bundle a browser or multiple browsers with their operating system products, have always considered the browser to be a separate application.

viii. Apple Computer's Avadis Tevanian testified: "The fact that Internet Explorer and Navigator are bundled with the Mac OS does not make them part of the operating system. The Mac OS operating system will continue to function if either or both of these browsers are removed . . . [and] we permit value added resellers the flexibility . . . to remove browsers or other applications . . . ." Tevanian Dir. ¶ 26; see also Tevanian Dir. ¶¶ 8-9 (explaining the difference between operating systems and applications).

ix. John Soyring from IBM testified that "IBM has not found it necessary technically to integrate the browser with the operating system -- the browser worked well running on the operating system like any application." Soyring Dir. ¶ 18.

x. Sun officials consistently describe Sun's "HotJava" browser as an

"application that performs web-browsing functionality." Sasaki Dep. (played 12/16/98pm), at 22:5-18.

xi. Brian Croll testified that the browser that Sun bundles with the Solaris operating system environment is "an application that runs on the environment. That's basically on top of the CDE." Croll Dep. (played 12/15/98pm), at 38:12-14. Croll later defined an "application" as "a piece of software that sits on top of the operating system and that people use and performs a function that they are looking for." Id. at 66:11-16.

xii. Ron Rasmussen from The Santa Cruz Operation testified that SCO "bundles" Netscape Navigator with its OpenServer and Unixware products (Rasmussen Dep. (played 12/15/98am), at 54:10 - 56:25), but that "our view is that the browser is an application." Rasmussen Dep. (played 12/15/98am), at 64:20. Rasmussen also testified that "when SCO says 'we bundle a feature,' it means its a feature which is not part of the core base operating system functionality. It means that it's something that the user can choose to install or remove, and the operating system, whose primary function it is to serve applications, will still function properly." Rasmussen Dep. (played 12/15/98am), at 55:14-19.

96.2. Consumers also regard browsers as applications rather than as parts of any operating system product.

i. Jon Kies, the Senior Product Manager at Packard Bell/NEC, testified that "browsers are considered by most of our customers as a third party application." Kies Dep. (played 12/16/98am), at 7:19-20.

ii. Glenn Weadock concluded from his research and interviews that corporate information managers "typically consider browser software as application software, like email or word processing, not as an operating system or as part of a particular operating system." Weadock Dir. ¶ 22 (collecting illustrative statements by corporate managers). Weadock further testified: "No corporate PC manager, in fact no one outside of the Microsoft organization, has ever described a Web browser to me as operating system software or as part of Windows 95 or any other operating system." Weadock Dir. ¶ 22 (emphasis in original).

iii. Boeing's Scott Vesey testified: "From my perspective, I would view them as software applications because they are tools that are

used to interpret data rather than what I would normally view as the operating system, which is the components of software that are used to directly manipulate the hardware that forms that PC. The applications are used to interpret or parse data." Vesey Dep., 1/13/99, at 284:15 - 285:9.

iv. Netscape's Jim Barksdale testified: "Consumers have had no problem appreciating that browsers are separate products," and "still demand Netscape Navigator and Netscape Communicator separately from any operating system products." Barksdale Dir. ¶ 90.

96.3. When the industry press or prospective customers evaluate the features and quality of Internet Explorer, they invariably compare it to Netscape's Navigator browser application, and not to any operating system.

i. Barksdale testified that "the industry as a whole recognizes browsers as separate products from operating systems. Browser market share is tracked (separately from operating system market share) by many third party organizations, such as IDC and DataQuest. The 'browser wars,' referring to the commercial battle between Netscape Navigator and Microsoft Internet Explorer, are frequently reported on in the press. I have seen many product reviews comparing Navigator to Internet Explorer; I have never seen a product review comparing Navigator to any Windows operating system." Barksdale Dir. ¶ 90.

ii. An internal Gateway presentation from March 1997 includes a detailed "Basic Feature Comparison" between "Netscape and Microsoft Browser Products." GX 357 (sealed).

iii. Many press reviews of browsers directly and explicitly compare Internet Explorer to Netscape Navigator and Communicator and talk about them as applications independent of any particular operating system. See, e.g., GX 1262 (1996 ZDNet review); GX 1272 (1997 CMPnet review); GX 1274 (1997 PC Week Online review); GX 1285 (1997 ComputerShopper.com review); GX 1287 (1998 PC Magazine Online review); GX 1288 (1998 ZDNet News review).

96.4. Experts in software design describe browsers as applications, and not as

parts of any operating system.

i. James Gosling of Sun Microsystems testified that "the browser is best understood as a software application, not as a part of a computer's operating system. This is true both as a matter of function and as a matter of software design. As a matter of function, browsers perform tasks for the end user that relate to obtaining and displaying content on the Internet or other networks. Users may wish to choose a particular Internet browser that best fits their needs, or if they have no need to 'browse the Web,' perhaps no browser at all. Technically, browsers are treated by the computer like any other application. In virtually every operating system with which I am familiar, the particular files that enable browsing are loaded into memory and used in exactly the same way as other software applications. Even in Windows 98, where Microsoft apparently loads some browser-related files into memory even when the user may never need that functionality, these files are loaded in the same way as other software applications. In essence, Microsoft simply shifts the time required to load the browser code from when it is first needed by the user to every time the computer boots up." Gosling Dir. ¶¶ 38-39.

ii. Gosling also testified: "A browser is an application that, like a JVM, runs on the operating system installed on a user's computer. It permits the user to access information encoded in hypertext markup language, or HTML, and other types of content found on the Internet or other networks, and to navigate around these networks." Gosling Dir. ¶ 34; Gosling, 12/9/98pm, at 41:20-23.

iii. Professor Felten testified that "Internet Explorer is part of the distribution which Microsoft sells under the name Windows 98. However, their Internet Explorer is an application which can be separated from Windows 98." Felten, 12/14/98am, at 30:21-24.

iv. Marc Andreessen testified that "I can't say that I ever thought that a browser was necessarily separate from everything. But it would certainly be fair to say that I think that the browser has been separate from an operating system, for example." Andreessen Dep., 7/15/98, at 122:20 - 123:7 (DX 2555).

v. Even Dr. Michael Dertouzos, Director of the Laboratory for Computer Science at M.I.T. and formerly on Microsoft's witness list, agreed: "Historically and today, it is the case that browsers are

treated as applications." Dertouzos Dep., 1/13/99, at 414:2-4.

(3) In its ordinary commercial conduct, Microsoft treats Internet Explorer as a separate product

97. Microsoft similarly treats Internet Explorer as a product separate from its Windows line of operating system products.

(a) Microsoft promotes Internet Explorer as a product, positions it in competition with other Internet browsers, and tracks its market share relative to those of other browsers

97.1. Microsoft distributes Internet Explorer separately from Windows in a variety of different channels, including retail sales, service kits for ISVs, free downloads over the Internet, and with other products produced both by Microsoft and third-party ISVs.

i. On cross-examination, Microsoft's Cameron Myhrvold conceded that Internet Explorer is distributed separately from Windows in "many, many ways." Myhrvold, 2/9/99pm, at 37:7 - 38:7.

ii. An internal Microsoft "Timeline Summary"

GX 669 (sealed).

iii. When asked whether Microsoft released "something called Internet Explorer 3 separately from OSR2 around the time that OSR2 was released," Carl Stork answered that Microsoft "released it on the Web and I believe we released it in some kind of a retail Internet starter kit type of product as well." Stork Dep., 8/11/98, at 38:18-23 (DX 2595).

97.2. From the introduction of Internet Explorer 1.0 in mid-1995 to the present day, Microsoft has always promoted and marketed Internet Explorer as a product separate from Windows.

i. Soyring testified that "Microsoft itself has at certain times treated Internet Explorer as separate from Windows. In the fall of 1997, Microsoft held a

major public relations event to introduce Internet Explorer 4, independent of Microsoft's promotion of Windows." Soyring Dir. ¶ 19.

ii. In describing Microsoft's marketing plans for Internet Explorer in August of 1995, Yusuf Mehdi wrote that Microsoft would "treat it as a distinct product in the sense of setting up clear news, reviews, and feature coverage objectives." GX 153.

97.3. Microsoft's internal strategy documents dealing with Internet Explorer consistently described Netscape Navigator (and not any of Microsoft's traditional operating system competitors) as Internet Explorer's "primary competitor" and identified gaining "browser share" vis-a-vis Netscape as the primary objective for Internet Explorer marketing efforts.

i. An "Internet Product Management Strategy" in November 1995 identifies Netscape as the "primary competitor" and lists as its objective to "Make the IE the people's choice of Web browsers via aggressive distribution and promotion." GX 673, at MS6 6005881.

ii. In notes from an offsite meeting among the Internet Explorer project team in November 1997, Microsoft's Chris Jones describes the role of the Internet Explorer team as "gain browser share." GX 364, at MS7 004722.

iii. In December 1996, Microsoft's David Cole wrote: "There is still the message here that Internet Explorer is still a browser, where Nav is groupware. No credit for Netmeeting, mail, news, etc. We need to change that perception." Microsoft's Yusuf Mehdi responded that "it is probably a good example though of the need to have a single group taking on communicator else we wil never get the full message across. I have thought more about our conversation and more firmly believe that you need a single group and product that you market against communicator. It makes sense to me that this use the IE brand and team because of equity, experience, and relevancy in product, team, and marketing. The group would market IE4 which includes: Active Desktop, Browser, Mail, News, Netmeeting, FrontPad, Admin Kit, etc." GX 658, at MS6 6010327.

iv. In June 1997, Chris Jones sent a memo to Bill Gates entitled "How to get to 30% share in 12 months." The memo contains a lengthy discussion of how Microsoft should design and market Internet Explorer to take market share away from Netscape. GX 334, at MS98 0104679.

97.4. Internal Microsoft assessments of Internet Explorer's success invariably compared its features, performance, and market penetration to those of Netscape Navigator.

i. A March 1997 Microsoft "Competitive Guide" compared the features of Internet Explorer 4.0 against those of Netscape Communicator. GX 477, at MS7 004179.

ii. Chris Jones' notes from a November 1997 Internet Explorer team meeting claims that "[w]e have won every head to head review against Netscape." GX 364, at MS7 004719.

97.5. In fact, the contemporaneous documents show that Microsoft regularly tracked Internet Explorer's market share relative to that of Netscape Navigator.

i. A January 1998 "IE International Business Review" slide presentation breaks down 1997 browser shares in both domestic and international markets. GX 815, at MS98 0202889.

ii. An October 1996 e-mail from Yusef Mehdi to Paul Maritz and others reports current browser share as measured by weekly call downs, share at random web sites, and Internet Explorer downloads. GX 344.

iii. See also e.g., GX 713 (April 1998 Mehdi email comparing Internet Explorer and Navigator share and noting that "48 is a big number and implies that we have caught Netscape"); GX 495 (comparison of Internet Explorer and Navigator share); GX 700 (same); GX 708 (same); GX 713 (same); GX 714 (same); GX 714A (same); GX 716 (same).

(b) Microsoft treated Internet Explorer and Windows separately until the issue arose in litigation

(1) Before litigation, Microsoft called Internet Explorer a browser in its ordinary commercial conduct

98. In the ordinary course of its business, Microsoft has frequently described Internet Explorer as a browser application rather than a part of the operating system.

i. In a July 1995 memo to the OEMs, Microsoft described Internet Explorer as a

"32-bit Windows 95 World Wide Web browser and graphical FTP utility." GX 36.

ii. In December 1995, Brad Silverberg wrote to Bill Gates and Paul Maritz that Internet Explorer 3.0 "is a standalone web browser that runs on Win95." GX 37.

iii. See also GX 141 (Windows 95 would contain "[a]ll the necessary plumbing" to access the Internet, including a TCP/IP stack and support for the PPP and SLIP protocols, and that it would "[s]upport[] popular third party Internet applications, such as Mosaic").

99. Microsoft also entered into extensive agreements with PC OEMs, ISVs, ISPs, and ICPs regarding the placement and promotion of Internet Explorer that were separate from any agreements regarding licensing terms for Windows and that invariably referred to Internet Explorer as a "browser," not as a part of the operating system.

i. A September 1996 amendment to a May 1996 licensing agreement with Compaq required Compaq to "Offer the Microsoft Internet Explorer as the preferred worldwide web browser for users of any COMPAQ Internet Product(s) listed in Exhibit B [Support Software CD for Compaq Desktop, Portable and Workstation Products and Compaq Resource Kit for Microsoft Windows NT]." GX 1130, at MSV 0005706 (Ex. D, Amd. 1).

ii. A July 1996 license and distribution agreement with Compaq required Compaq to "Offer the Microsoft Internet Explorer as the preferred worldwide web browser for users of the Support Software CD for Compaq Desktop Products." GX 1137, at MSV 005747.

iii. The Internet Sign Up Wizard Referral and Microsoft Internet Explorer License and Distribution Agreement with AT&T, dated July 23, 1996,

GX 1212, at MS6 5000435 (Ex. B, §6) (sealed).

iv. The August 1995 Internet-Sign Up Wizard Referral Agreement with CompuServe

GX 1144, at MS6 5001138 (Exhibit B, Section 5) (sealed).

v. The December 1995 Internet Explorer Source License & Distribution Agreement with CompuServe required that Compuserve to "ship the Internet Explorer as its primary World Wide Web browser software client for Windows 95 . . . ." GX 1125, at MS6 5000091.

vi. An August 1996 Internet-Sign Up Wizard Referral and Microsoft Internet Explorer License and Distribution Agreement with Earthlink

GX 1141, at MS6 5000015 (Exhibit C, § 6) (sealed).

vii. A May 1996 Internet Explorer Addendum to Strategic Relationship Framework Agreement with MCI

GX 1132, at MS6 6008292 (sealed).

viii. A September 1996 Promotion & Distribution Agreement with Prodigy

GX 1148, at MS6 50010000 (Section 3.1) (sealed).

ix. Numerous Memoranda of Understanding that Microsoft entered with major OEMs in July and August of 1997 provided significant inducements for those OEMs to promote and distribute Microsoft's upcoming Internet Explorer 4 browser, which initially was offered and distributed wholly separate from any operating system release. See, e.g., GX 163 (under seal) (8/29/97 "Memorandum of Understanding ("MOU") re: Internet Explorer 4.0,"

GX 1166 (under seal) (7/21/97 MOU with DEC, similar language); GX 1168 (under seal) (8/8/97 MOU with Packard-Bell, similar language); GX 1171 (under seal) (8/20/97 MOU with Dell, similar language).

x. See also e.g., GX 856, at MS98 0100300 (Section 2.3(d)) (July 1997 Disney

Active Desktop agreement); GX 1159, at TM 000057 (June 1997 Hollywood Online Active Desktop agreement); GX 1157, at MS98 0100570 (Section 2.2) (June 1997 Intuit agreement); GX 1153, at MS98 0100811 (Section 2.1(a)) (December 1996 Pointcast agreement); GX 855, at WD 0004 (Section 2.3) (July 1997 Wired Digital Active Desktop agreement); GX 1166 (July 1997 IE4 launch event agreement).

100. Similar references to Internet Explorer as a "browser" appear in Microsoft's internal and external correspondence right up to the present day.

i. Microsoft describes Internet Explorer 5.0 as a “smaller, faster, more stable browser." GX 688.

ii. An Internet Explorer 5 OEM Marketing Review from May 1998 asserts that "IE has around 50% browser share," and that end users "view both browsers as parity products." GX 233, at MS98 0125654.

(2) Since litigation began, however, Microsoft has made a concerted effort to change its language in order to aid its legal position

101. Recently, however, in order to support its litigation position that Internet Explorer and Windows 98 are the same product, Microsoft officials have made a concerted effort to reposition Internet Explorer and change the terminology used by Microsoft personnel.

i. When Bill Gates was preparing to testify before the Senate in March 1998, he sent an e-mail to top Microsoft executives suggesting the need for a "survey . . . where ISVs declare whether they think having the browser in the operating system the way we are planning to do it makes sense and is good." GX 377, at MS98 0122148. Nathan Myrhvold responded that the survey was "a GREAT idea," but that "it is CRUCIAL to make the statement . . . worded properly. Saying 'put the browser in the OS' is already a statement that is prejudicial to us. The name 'Browser' suggests a separate thing. I would NOT phrase the survey or other things in terms of ‘put the browser in the OS.’ Instead you need to ask a more neutral question about how internet technology needs to merge with local computing. I have been pretty successful in trying this on various journalists and industry people." GX 377, at MS98 0122146 (emphasis in original).

ii. That same month, James Allchin wrote to Yusuf Mehdi that he was "very concerned over how IE is presented in win98 (and NT5). Even the simple things

like the About Box makes it appear separate. Furthermore, our IE web site needs a sweep . . . where we ensure it is clear th[at] IE is just a capability of Windows . . . ." GX 378. Mehdi responded that they were "making good progress reviewing the language of ie as a feature of windows with the web team. (we don't refer to it as a product or even browser, it is browsing software)." GX 378.

b. The recognition that browsers and operating systems are separate products reflects the marketplace reality that consumers, for a wide variety of reasons, demand operating systems and Internet browsers separately

102. Consistent with the universal recognition that browsers and operating systems are separate products and that different browsers have different characteristics, many consumers desire to separate their choice of operating system from their choice of browser.

i. Professor Fisher testified: "There is a market for Internet browsers. Before Microsoft gave away its browser for free, a price for browsers was determined in the market and the market could have continued to perform this function. There is substantial demand for browsers that is separate from the demand for operating systems. Browsers are distributed separately from the operating system by ISPs and by retailers. There is demand for operating systems without browsers and for operating systems with a choice of browsers." Fisher Dir. ¶ 80.

ii. A survey conducted by Compaq in February 1998 of 283 PC decision makers at U.S. companies found that "About 80% of companies wipe or reformat the hard drives of new desktops. . . . The operating system re-installed most often are OSR2 and the retail version of Windows 95. Large businesses lean more toward the retail version of Windows 95," which does not include a browser. GX 1242, at 7.

iii. Dell's Joseph Kanicki testified: "'Some businesses and government customers prefer not to have Internet Explorer pre-installed on their computers because, one, the customer may have its own software or software standards which do not include the latest version of Internet Explorer; two, the customer may wish to install a competitive browser instead of Internet Explorer; or three, the customer may wish to prevent its employees from accessing or attempting to access the Internet or World Wide Web.'" Kanicki Dep., 1/13/99, at 332:12 - 333:22 (quoting Kanicki Decl. ¶ 2).

(1) Some consumers demand browsers and operating systems separately because different browsers have different features and they prefer to obtain a PC containing only the desired browser

103. Although Netscape Navigator and Internet Explorer deliver roughly comparable functionality to the end-user, they are not identical. Each program has unique attributes that may appeal to different audiences, and there is considerable dispute as to which product's implementation of even their shared features is superior.

i. See infra Part V.B.3.c.(1)(a); Part V.B.4.c.

(2) Some consumers, particularly corporate customers, demand browsers and operating systems separately because they prefer to standardize on the same browser across many PCs and across different operating systems

104. Many corporations use a variety of different hardware and operating system platforms in various departments throughout their organization.

i. Scott Vesey of Boeing testified that "Boeing is a multi-platform company and that it supports computers that operate with a number of different operating systems," including Unix, Macintosh, and a variety of Windows platforms. Vesey Dep., 1/13/99, at 269:13 - 270:24.

ii. Weadock testified that in his interviews, "some managers (including those at Informix, Ford, Federal Express, Boeing, and Morgan Stanley/Dean Witter) have stated that their organizations deploy a variety of operating systems and hardware platforms, and therefore prefer a browser having greater cross-platform availability and compatibility." Weadock Dir. ¶ 24a.

105. Such organizations experience significant benefits in the form of increased productivity and lower training and support costs from standardizing on one browser across all of their various hardware and operating system platforms.

i. Vesey testified that the "various browser standardization or browser acquisition

decisions that Boeing has made" were "made separately from decisions about acquiring an operating system," and that he would "prefer" to have "the option of continuing to be able to choose what Web browser Boeing uses independently from any decisions Boeing might make about what operating system to use." Vesey Dep. (played 11/17/98am), at 52:12 - 53:14.

ii. An internal Boeing presentation entitled "ARR 525 Recommendation: Windows Browser Evaluation" by Scott Vesey in October 1997 identified "[p]latform support" as a key issue and noted that "Solaris, HP-UX . . . and AIX are standard UNIX variants within Boeing, and that IE 4.0 for UNIX/Solaris would not be in production until Q1 98. In contrast, Communicator 4.0 was available on all platforms." GX 634, at TBC 000537.

iii. Vesey testified that the "Netscape browser was a product that we could run across all of the platforms that we had currently installed in the Boeing company both Windows, Macintosh, and Unix workstations using a common software product with common user interface." Vesey Dep., 1/13/99, at 271:6-24.

iv. Microsoft's Joe Belfiore testified that Microsoft makes the user interface of the cross-platform versions of Internet Explorer consistent with the Windows version to decrease training costs. Belfiore Dep., 1/13/99, at 369:13 - 370:21.

v. In discussing the benefits to organizations from having a standard word processor, a standard spreadsheet, or a standard web browser, Weadock testified that "[t]here are many benefits, many cost savings, and configuration savings. You have benefits to the user in terms of productivity. They don't get distracted. They -- they can learn one application and use that to do word processing or to do web browsing. There are also advantages in terms of technical support. You don't have to teach your technical support staff all about how to support two browsers. You can teach them how to support one browser because that's the standard in the company." Weadock, 11/17/98am, at 70:11-15; see also Weadock Dir. ¶¶ 38-39.

vi. Joe Kanicki of Dell Computer explained that, in Dell's experience, corporations often want to standardize on a single browser for "stability and for support. The total cost of ownership for the corporation stabilizes. The more frequently products are revised, the more expensive it is or potentially could be for a corporation to stay up with those revisions." Kanicki Dep., 1/13/99, at 331:3 - 332:10

106. Standardizing on one browser also permits an organization to develop specialized internal applications or viewable content more cheaply and with confidence that those resources

will be compatible with all its internal systems that focus on the Internet.

i. Vesey testified that "the single defining quality" that makes the web valuable to Boeing is the ability "to put an electronic document in one place and have it be accessible by virtually anybody, irrespective of platform." Vesey Dep. (played 11/17/98am), at 23:13-19.

ii. Vesey testified that, if Boeing had to deploy both Navigator and Internet Explorer, its support costs would "'be higher due to a couple of things. Probably first and foremost would be that the potential for a web application developer to develop an application that depended specifically on a particular site, from the end user perspective that would possibly be the biggest impact. They would have to know . . . when I'm assessing this particular web site, I have to use this particular browser. And then if they tried to go to that site with an alternative browser, they wouldn't be able to render whatever content was available there. The other reason, the other essential reason, would have to do with . . . the local use of the software. On the Windows 95 desktop there is a default browser setting. And the default browser behavior, generally speaking, when you have IE 4 and Netscape 4 installed, you can alternate between having either set as the default browser. . . . In some cases, those default browser settings do become confused and can make it difficult for the user to get a particular browser configured as the default browser. So that can become confusing for end users." Vesey Dep., 1/13/99, at 288:2 - 289:11.

iii. Glenn Weadock testified that "companies often develop intranets designed to work with a -- with a particular browser." He also testified that "if something works and looks right in Navigator, it may not work and look right to employees who are running Internet Explorer." Weadock, 11/17/98am, at 73:15-19.

iv. Weadock testified that users sometimes "develop their own applications that (if useful and well designed) may spread throughout an organization. The development of intranets internal company networks based on Internet technologies has accelerated this trend. The greater the degree of software standardization, the greater the likelihood that such user-developed applications can work properly throughout the organization." Weadock Dir. ¶ 38.

v. Weadock testified that "some organizations develop their own custom software that only works with a particular browser, and that compatibility with that custom software may provide an ongoing motivation to use that particular browser." Weadock Dir. ¶ 24c.

107. For these reasons, a company that desires to standardize on a single browser across

several different hardware and operating system platforms will want to make its browser choice independent of the decision to purchase any one operating system.

i. Weadock testified: "If a company is deciding, in part at least, on which browser it wants to standardize on, based on a variety of hardware platforms in the organization running different operating systems, then it's a very short logical jump to state that companies are making this browser decision independent from the decision that they make about any one operating system." Weadock, 11/17/98am, at 16:8-15.

ii. Based on his research and interviews with corporate information managers, Glenn Weadock testified that organizations generally want to make browser decisions and operating system decisions separately. Weadock Dir. ¶ 21; see also Vesey Dep. (played 11/17/98), at 52:12 - 53:14 (Boeing). Weadock testified that there is substantial demand for the original (retail) version of Windows 95 among corporations, "[b]ecause they have the greatest control over what applications they can install onto it, because it is the cleanest version of Windows 95. It doesn't contain software that they don't want. And, in particular, it doesn't contain Internet Explorer, which they may not want." Weadock, 11/17/98am, at 62:12-20; Weadock, 11/16/98pm, at 24:23 - 25:4 (testifying that some users may elect to forego the technological advances of later versions of Windows and use the retail version of Windows 95 because it did not come with a web browser).

108. Microsoft recognized this separate demand for browser standardization across, and independent of, demand for operating systems.

i. David Cole urged his Win32 Internet Explorer 4 team to assist the teams working on the Win16, Unix and Mac versions of Internet Explorer since "[g]etting the cross platform versions done is key to market share on all platforms, including Win32." GX 60, at MS7 004624.

ii. A January 1998 draft of a Transition Plan for Internet Explorer 5 for Macintosh included the following: "Microsoft has now put out several versions of Internet Explorer on several platforms. While the win32 version of IE has continued to make serious strides in terms of functionality, and major inroads in terms of market share, the cross-platform versions have not made the same market share gains. While the lack of cross-platform market share is troubling, the negative impact on win32 IE market share is unacceptable . . . . As we talk to more and more customers, it is becoming increasingly apparent that the cross-platform browsers directly affect overall IE market share exponentially." GX 370, at MS98 0121263.

iii. In November 1997, Brian Hall reported on a focus group study of Internet Explorer 4 and Navigator 4 users, listing as a "key takeaway" that "The desire is for one 'core browser' with similar UI and same content and feature support across platforms." GX 219, at MS7 006361.

iv. Paul Maritz wrote in a June 1996 e-mail: "We have no desire to sell anything on UNIX. However, owing to customer demand, we are going to have to provide an IE solution on UNIX." GX 653, at MS98 0156372.

v. According to Microsoft's own data, corporations "want our offerings to be as consistent as possible" "to avoid confusion among their users and support staff . . . [t]hey want uniformity on authoring, deployment, management, and general browser user interface." GX 217, at MS98 0109147.

(3) Some consumers demand browsers and operating systems separately because they may wish to upgrade one without upgrading the other

109. Many consumers and OEMs demand browsers and operating systems, including Internet Explorer and Windows, separately in order to have the ability to upgrade the operating system without changing browsers.

i. Microsoft's Bill Veghte testified that Microsoft considered shipping Windows 98 with Internet Explorer 3 instead of Internet Explorer 4, because there was OEM demand for hardware-related improvements like USB support that were ready for inclusion before IE4 was completed. Veghte Dep., 1/13/99, at 783:2 - 786:8.

ii. Gateway's James Von Holle testified that Gateway asked Microsoft to release support for new hardware devices, including "AGP graphics, DVD disks, and dual displays," for Windows 95, instead of holding those features for Windows 98. Von Holle Dep., 1/13/99, at 302:6 - 303:12.

iii. An internal Gateway list

GX 357, at GW 026522 (sealed).

iv. Dell's Joseph Kanicki testified that when customers who do not have the current version of Internet Explorer are updating their operating systems, they may not want to upgrade to the new version of Internet Explorer. Kanicki Dep., 1/13/99, at 335:17 - 336:2.

110. Conversely, consumers may want to obtain upgrades to their browser application software without altering their operating system.

i. As Glenn Weadock testified, "changing operating system software has a greater potential for creating problems than changing a single application does, inasmuch as all applications rely on the operating system" and a change to the operating system "can cause unwanted problems with other applications still residing on the system, or confusion among users now confronted with changes to the operating system." Weadock Dir. ¶ 32g.

ii. Microsoft's Chris Jones acknowledged that customers may want to get "the latest browsing technology" but have their "start menu and task bar . . . remain the same." Jones Dep., 1/13/99, at 552:22-24.

iii. Veghte testified that it remains important for Microsoft to ship Internet Explorer 5 as a separate product "because there will be a class of customers that may want to get those capabilities without upgrading their operating system." Veghte Dep., 1/13/99, at 787:5-13 (emphasis added).

(4) Some customers demand browsers and operating systems separately because they want no web browsing capability at all

111. Some consumers demand browsers and operating systems, including Windows and Internet Explorer, separately because they want no web browsing capability at all. Not all PC users want browsers, but all need operating systems.

i. Microsoft's David Cole acknowledged that Microsoft "had feedback from

corporate customers that wanted to prevent access to the Internet, so when . . . they buy a new machine from a PC manufacturer, they want the ability to remove easy access to the Internet so their employees, you know, aren't spending their time out on the Web doing whatever." Cole Dep., 1/13/99, at 395:1-20.

ii. Joseph Kanicki from Dell testified that he believed some of Dell's customers did not want Internet Explorer because "the customer may wish to prevent its employees from accessing or attempting to access the Internet or World Wide Web." Kanicki Dep., 1/13/99, at 333:11-22.

iii. Weadock testified that some organizations "may wish to make it difficult for certain employees to access the public Internet, in order to reduce the amount of unproductive time employees spend 'surfing the Net' on subjects unrelated to their jobs. Without a browser, accessing the Internet's World Wide Web is impractical." Weadock Dir. ¶ 23a.

iv. Sun's Curtis Sasaki testified that "many corporate customers . . . want to restrict their user's access to the web" and that Sun has been told by various customers, including the Florist Trade Bureau and several universities, that "many of them did not want their employees to have access to web browsing." Sasaki Dep. (played 12/16/98pm), at 26:25 - 28:22.

v. Soyring testified that "[some] enterprise customers want to control the applications which can be used by employees in the enterprise, and do not want employees to spend time 'surfing the internet.'" Soyring Dir. ¶ 17.

vi. When asked whether he was "aware of any customers who did not want to install the Web browser because they didn't want their customers surfing the web," IBM's Jeffrey Howard answered that "I am aware that we did have requests coming in from our field personnel that talked to those large customers who reported back to use that they wanted to restrain, you know, what applications customers could get to, and specifically having their employees sitting and surfing the Web on work time was a fear that was sometimes voiced." Howard Dep., 8/31/98, at 115:20 - 116:6 (DX 2572).

vii. Packard Bell/NEC's Mal Ransom testified that "Typically, our corporate customers don't want or don't necessarily want access to the Internet or browser loaded on their employees' machines, so they've got the choice of what they do." Ransom Dep. (played 12/16/98pm), at 74:4-8.

viii. Compaq's John Rose estimated that only 70% of businesses are running a web browser on their desktops. Rose, 2/18/99pm, at 53:22 - 54:3.

ix. Sun's James Gosling testified that for systems without a display, like a server, a customer would have no use for a browser. Gosling, 12/10/98pm, at 60:17 - 61:2.

111.1. Even in organizations that use the Internet regularly, there will usually be at least some employees who do not need browsing functionality.

i. IBM's John Soyring testified, for example, that some of IBM's customers wanted OS/2 without a browser for "systems used by baggage handlers or bank tellers." Soyring Dir. ¶ 17.

ii. Weadock testified that "even when we look at a company that is investing heavily in intranet technology, such as Federal Express, . . . they don't necessarily have browsing software or browsers on all of their PCs. There are just some categories of users who may have no need to access an intranet or the Internet." Weadock, 11/16/98pm, at 15:15-25.

111.2. Although a corporation might restrict an employee's access to the Internet in other ways, such as by removing the modem or ethernet connector from certain PCs or by limiting Internet access to a proxy server, such alternatives are often less efficient than simply using a PC without a browser.

i. Weadock testified that an employee might need a modem installed for dial-up telecommuting, even if the employer wished to restrict his or her access to the Web. Weadock, 11/17/98am, at 41:17 - 42:16.

ii. Weadock also testified that "those methods don't address the resource use issues of having browsers on the . . . PCs. They also don't address the issues of user confusion that might arise from attempting to run software that is there and perhaps accessible, even though I've tried to remove it and couldn't, and then pick up the phone and call the Help desk and say, 'Hey, What's this?' So there are lots of reasons, other than just resource use, that companies may want no browser software on a PC. It's generally accepted practice among IT managers in businesses large and small to put the least amount of software on a computer that will do what their users need to do. You just save all kinds of costs that way, all the way from resource use to support and training." Weadock, 11/17/98am, at 42:3-16.

iii. Jeffrey Howard testified that there are other ways to prevent users from browsing the Web from OS/2, but that "most customers, particularly in the

Warp Version 3 and Warp Connect time frame, usually found hard disk space to be at a premium and tried to have the minimal amount of code that they could installed on the desktop machine itself just from a management standpoint and from a support standpoint, because you needed the space available for swap files and paging, et cetera." Howard Dep., 8/31/98, at 118:21 - 119:4 (DX 2572).

(5) OEMs are surrogates for end users; and thus, for the above reasons, they too demand browsers and operating systems separately

112. Because the personal computer OEM industry is extremely competitive and OEMs must satisfy consumer demand to stay in business, OEMs also demand browsers and operating systems, including Internet Explorer and Windows, separately.

i. Gateway repeatedly asked Microsoft for a version of Windows 98 with web browsing uninstalled, in part because they were "concerned that the installation of the full MS product (including channels) results in a much slower system performance if the customer chooses an alternate browser after full installation on IE4." GX 1073, at MS 98 0204593.

ii. Jon Kies testified that Packard Bell/NEC took advantage of the January 1998 stipulated remedy to offer some of its PC models without Internet Explorer. Kies Dep. (played 12/16/98am), at 6:11-19.

iii. Kanicki testified that because Dell's customers "may wish to install a competitive browser instead of Internet Explorer," Dell's license agreement with Microsoft permits it "to install a competitive browser on a machine that is shipped with Windows 95 or Windows 98." Kanicki Dep., 1/13/99, at 336:4-19.

iv. Mal Ransom testified that because many of Packard-Bell/NEC's "commercial customers don't want access to the Internet or browser loaded on their employees' machines," for the Versa line of notebook computers those customers "get the choice of which browser to pre-install," if any. Ransom Dep. (played 12/16/98pm), at 73:13 - 74:11.

v. Compaq also made efforts to satisfy its customers' demand for browsers other than Internet Explorer. See infra Part V.B.2.c; ¶ 130.1.

c. To satisfy this separate demand, firms — including Microsoft — have found it efficient to supply browsers and operating systems separately

113. To satisfy this separate demand, both operating system vendors and browser vendors supply browsers and operating systems separately.

(1) Internet Explorer and other browsers have been, and continue to be, supplied separately from operating systems

113.1. Browser suppliers have found it efficient to supply browsers separately from operating systems.

i. Netscape's Barksdale testified: "Indeed, Netscape does not sell any operating system products, and was able to sell millions of browser licenses to consumers and enterprises separately from any operating system." Barksdale Dir. ¶ 90.

ii. James Gosling testified: "The HotJava browser is a software application that was released by Sun in 1995. At the time the HotJava browser was developed, Sun contemplated undertaking the revisions and improvements necessary to maintain it as a competitive product for desktop computers such as Windows PCs. However, after Microsoft announced that its Internet Explorer browser would always be given away for free, Sun concluded that it made little business sense at that time to compete vigorously to sell a consumer browser application to compete against a product that was being given away for free." Gosling Dir. ¶ 37; Gosling, 12/3/98pm, at 80:17 - 81:3 (testifying that Sun never sold HotJava "as a commercial browser" because, "given that the market price for browsers, those days, seemed to be zero, it hardly seemed like a sensible thing to do").

iii. Dr. Warren-Boulton noted that "Opera, which has limited presence in some distribution channels, is distributed independently of an operating system product." Warren-Boulton Dir. ¶ 76.

113.2. Microsoft also found, and continues to find, it efficient to supply its browser separate from any of its operating system products in numerous channels.

113.2.1. Microsoft has consistently offered its Internet Explorer browser on a standalone basis at retail, by downloading, and through ISPs, OLSs and ISVs.

i. See supra Part V.B.1.a.(3); ¶ 99.

113.2.2. In response to competition from other browsers, and in order to satisfy demand for a standard browser product to run on multiple operating systems and thereby increase Internet Explorer's market share, Microsoft also created standalone versions of Internet Explorer that run on other operating systems and earlier versions of Windows.

i. A Microsoft focus group study in November 1997 shows that "Win32 browser qualities are reflected on to other platform version in users' minds" and users' desire "is for one 'core browser' with similar UI and same content and feature support across platforms." GX 218, at MS7 006353.

ii. Chris Jones wrote in November 1995: "To compete with netscape, we need to have cross platform (Win3.1,Win32,Mac) clients which support the NT server (log-on, security, etc.)." GX 334, at MS98 0104685.

iii. Barksdale testified: "To compete with Netscape, Microsoft began offering cross-platform versions of Internet Explorer." Barksdale Dir. ¶ 91.

iv. James Allchin stated that Internet Explorer for the Macintosh is an application, and not a part of any operating system. Allchin, 2/2/99pm, at 13:8-12.

v. Dean Schmalensee testified that Internet Explorer for the Macintosh and for Windows 3.x are applications, and not part of the operating system. Schmalensee, 1/20/99am, at 20:14 - 21:9.

113.2.3. Except for minor differences to comply with user interface guidelines for those other systems, and evidencing that they respond to the same separate demand for Internet browsers, the non-Windows versions of Internet Explorer supply the same browsing

functionality and "look and feel" to the end user as Internet Explorer for Windows 95/98.

i. Professor Edward Felten testified: "The Windows 98 and Solaris versions of IE Web browsing offer nearly identical user interfaces, and the MacOS version offers the same user interface modified to meet the user interface guidelines specified by Apple for Macintosh software." Felten Dir. ¶ 75; Felten Dir. ¶ 82 (testifying that a user's web browsing experience with the versions of Internet Explorer running on the Sun Solaris, Apple Macintosh, and Windows 98 is substantially similar).

ii. Joe Belfiore testified that Microsoft makes cross-platform Internet Explorer to appeal to companies with non-Windows operating systems and makes the user interface of the cross-platform versions consistent with the Windows version to decrease training costs. Belfiore Dep., 1/13/99, at 369:13 - 370:21.

iii. Microsoft created the cross-platform versions of Internet Explorer specifically to appeal to organizations that wanted to use the same browser across multiple platforms. See supra Part V.B.1.b.(2); ¶ 110.

(2) Operating system vendors — at least those which, unlike Microsoft, lack market power — supply operating systems separately from browsers

114. Operating systems are efficiently provided separate from browsers, and every operating system vendor other than Microsoft supplies operating systems separately.

(a) Some operating system vendors offer consumers the choice of licensing the operating system without a browser

115. A number of operating system vendors offer consumers the choice of licensing the operating system without a browser.

115.1. Sun does not bundle any browser with its JavaOS operating system.

i. Sasaki testified that Sun licenses its JavaOS product separately from its HotJava browser; "the product Java OS ships to our licensees, our licensees can also license the browser technology [called HotJava], and its

up to them to decide whether or not they include it in their product or not." Sasaki Dep. (played 12/16/98pm), at 21:25 - 23:6. Sasaki also testified that the price of JavaOS does not include a browser (Sasaki Dep. (played 12/16/98pm), at 26:8-16) -- and that only 21 out of Sun's 36 JavaOS licensees also licensed the HotJava browser. Sasaki Dep. (played 12/16/98pm), at 26:17-24.

115.2. Lucent offers an unbundled option.

i. James Frasca testified that Lucent's "view is that the web browser is part of the application suite, not the operating system" and that Lucent has licensed versions of Inferno without a web browser. Frasca Dep., 1/13/99, at 137:15-19; Frasca Dep., 1/13/99, at 141:19-22; Frasca Dep., 1/13/99, at 143:8-9; Frasca Dep., 1/13/99, at 144:16 - 145:9 (Lucent would license to a hardware OEM a version of the Inferno product without the browser if the OEM wanted to distribute a third-party browser).

115.3. Santa Cruz Operation offers an unbundled version of its operating system.

i. With Unixware 7, a multi-user product, SCO bundles only "a single-user license for the administrator to read Online Doc and to manage the web server." Additional browser licenses for additional users must either be purchased from SCO "as an optional product" or acquired elsewhere. Rasmussen Dep. (played 12/15/98am), at 59:23 - 60:15.

115.4. Caldera offers an unbundled version of its operating system.

i. Bryan Sparks testified that Caldera allows OEMs to offer an unbundled version of its operating system. He explained: "It doesn't make sense for us to" require OEMs to include the browser. He continued: "The reseller knows what the customer needs better than we do. He is closer to the customer. We let him decide that. He is buying the boxed product and has the browser, but we don't mandate that he install it or configure it, if he doesn't wish to." Sparks Dep. (played 12/16/98am), at 50:12-23.

(b) Operating system vendors other than Microsoft sometimes bundle one or more browsers with their systems but allow VARs, OEMs, or end users to remove them or not to install them

116. Operating system vendors that lack Microsoft's monopoly power, and hence its incentive to engage in anticompetitive conduct that thwarts consumer demand, do not impose

contractual or technical restrictions on OEMs' or end users' ability to remove a browser.

116.1. No operating system vendor other than Microsoft places restrictions on its customers' ability to remove an unwanted browser.

i. Allchin testified, "as I sit here today, I don't know of any" operating system vendor other than Microsoft that bars its customers from removing any browser. Allchin, 2/3/99am, at 45:11-19.

116.2. Even when other vendors offer a browser with their operating system, they allow OEMs and end users to remove it or not to install it.

116.2.1. Although IBM includes a browser as an application in its OS/2 Warp version 4 operating system package, the installation process allows the user to choose whether or not to install it. IBM also permits any other OEM or value-added reseller (VAR) selling computers with OS/2 to remove the browser before the sale.

116.2.1.1. IBM does not consider the browser to be part of the operating system.

i. John Soyring testified on cross-examination that IBM's Web Explorer "is not part of the OS/2 operating system itself. . . . We did develop it separately as a separate program. It is included in the OS/2 Warp product package. And we set it up as a selectively installable and selectively removable application program that can be either used with or not with OS/2." Soyring, 11/18/98am, at 21:12 - 22:2; see also Soyring Dir. ¶¶ 14-18.

ii. Soyring also testified that OS/2 performs properly as an operating system whether or not any web browser is installed. Soyring, 11/18/98pm, at 78:5-7.

116.2.1.2. IBM permits users to not install or to remove their browsers.

i. Soyring testified that users of IBM's OS/2 operating system have always been free not to install "Web Explorer," to remove that browser after installation, and to install a competing browser if desired. Soyring, 11/18/98pm, at 77:12-17.

ii. IBM's Dana O'Neal testified, "

O'Neal Dep., 8/31/98, at 72:3-7 (DX 2578A) (sealed).

116.2.1.3. IBM makes the browser removable from its operating system because it recognizes that there is a separate demand for browsers and operating systems.

i. Jeffrey Howard testified that he was "aware that we did have requests coming in from our field personnel that talked to those large customers who reported back to us that they wanted to restrain, you know, what applications customers could get to, and specifically having their employees sitting and surfing the Web on work time was a fear that was sometimes voiced." Howard Dep., 8/31/98, at 115:20 - 116:6 (DX 2572).

116.2.1.4. IBM includes a browser in its packaging for OS/2 for the same reason it bundles other applications like a word processor: because it helps convince customers that key applications exist for OS/2, which is necessary in order to overcome the applications barrier to entry.

i. Soyring testified that IBM chose to bundle Netscape Navigator in particular with some later versions of OS/2 "because, at that time, its brand was the most popular brand recognition in the industry. And, again, it goes back to the problemg we were facing before in that not--popular applications just hadn't been buil[t] for OS/2. So we thought by, one, delivering customers earlier, and, secondly, getting a major brand to recognize and adopt the

OS/2 operating system by offering a product would be an additional spur for--or stimulant to sell additional OS/2 copies. So we entered into a licensing agreement. We spent millions of dollars with Netscape to be able to make that happen and we packaged it as part of the next generation of OS/2 Warp, which is OS/2 Warp 4 in the shrink-wrapped product." Soyring, 11/18/98am, at 39:3-19; Soyring, 11/18/98am, at 44:9 - 45:1 (explaining that the same reasoning drove IBM to bundle word processing, spreadsheet, database, and personal information management applets in OS/2); Soyring, 11/18/98pm, at 75:10-21 (discussing users' perceptions that they would have "a difficult time finding applications" for OS/2).

116.2.2. Apple bundles both Internet Explorer and Netscape Navigator with the MacOS but permits both end users and value added resellers to delete either or both.

116.2.2.1. Apple does not consider a browser to be part of the operating system.

i. Tevanian's definition of an operating system says nothing about browsing capability. He defined an operating system as "the primary software that controls a computer. The operating system provides various basic services for a computer such as process management, user interaction, data management for the hard disk, network interfaces and control of peripheral devices such as printers and keyboards." Tevanian Dir. ¶ 8.

116.2.2.2. Apple allows users and resellers to remove either Navigator or Internet Explorer or both if they wish and does not "hard-code" anything in its operating system to require the use of a particular browser.

i. Apple's Tevanian testified: "The Mac OS operating system will continue to function if either or both of these browsers are removed. As noted above, we permit value-added resellers ('VARs') the flexibility to reconfigure our systems to meet their direct customers' needs. We provide VARs the flexibility to remove browsers or other applications, and to reconfigure the Macintosh desktop to address what they

perceive to be their customers' desires." Tevanian Dir. ¶ 26.

ii. After the Court asked Tevanian whether it is "possible for you to extricate your browser from operating system without otherwise impairing the operation of the system," Tevanian replied, "Yes, other than you can't browse the web." Tevanian, 11/5/98pm, at 67:10-15; Tevanian, 11/5/98pm, at 70:9-17 (testifying that the operating system would remain intact).

116.2.2.3. Apple allows users to remove the bundled browsers because it understands that there is separate demand for browsers and operating systems.

i. Upon being asked whether he felt that there was a "separate market" for Internet browsers, Tevanian stated that he thought "it's fair to say there is a market. There are some people who, first, they would select the operating system; then they might select the browser, and not want to make the decision together. So in that sense, it's separate from the desktop computer market in general." Tevanian, 11/4/98pm, at 18:3-22.

116.2.3. Sun bundles its "HotJava" browser with its Solaris operating system but permits end users to remove that application.

116.2.3.1. Sun does not consider a browser to be part of the operating system.

i. Curtis Sasaki's definition of an operating system says nothing about providing browsing capability. He says that an operating system includes "a kernel which controls how things are managed in terms of memory. It also controls the I/O functionality, such as talking to a network, talking to your keyboard, displaying things on the screen. So, that's called device drivers. So all of that is what I would consider an operating system, as well as a set of APIs which are on top, which application developers write to." Sasaki Dep. (played 12/16/98pm), at 17:16-25; Sasaki Dep. (played 12/16/98pm), at 26:8-10 ("Q:: Is the browser part of the operating system? A: No. It's separate. Q: When--

are--does the price of the Java OS product include a browser? A: No. It does not. Q: Are there separate prices for browsers? A: That's correct.").

ii. Sun's James Gosling similarly excludes browsing capability from his defintion of an operating system. He says that an "operating system has two primary functions: (1) to interact with and control the computer's processor and other hardware (monitors, keyboards, disk drives, etc.); and (2) to interact with, and execute instructions from, software applications, generally through a series of applications programming interfaces known as 'APIs.'" Gosling Dir. ¶ 8. Based on this definition, Gosling concludes that "the browser is best understood as a software application, not as part of a computer's operating system." Gosling Dir. ¶ 38; Gosling, 12/9/98pm, at 30:23 - 31:9.

116.2.3.2. Sun permits and makes it easy for end-users, VARs, and OEMs to remove bundled browsers from the operating system if they so desire and does not "hard-code" anything in its operating system to require the use of a particular browser.

i. Gosling testified that Sun included the "HotJava" browser on the CD-ROM with its Solaris operating system, but "it was absolutely a replaceable, repluggable application. We didn't tell anybody that it was nonremovable, like any of the other pieces that happened to be there. Customers can and do use replacements for just about everything." Gosling, 12/9/98am, at 38:16-25.

ii. Brian Croll testified that when an OEM or a VAR licenses Solaris 2.6, it is not required to ship the HotJava browser to its end user customers. Sun provides two means for OEMs and VARs to offer an unbundled version of the operating system: "At one level you can choose not to add that package which has the Java browser as well as other things, if that's the first choice. Then the second choice is, once you have loaded it, you can go through the de-install process to take away." Croll Dep. (played 12/15/98pm), at 66:22 - 68:4.

iii. Moreover, Croll testified that OEMs and VARs are permitted to supply their end user customers with additional browsers or a different browser if they choose to do so because "there is no reason for us to keep them from doing that." Croll Dep. (played 12/15/98pm), at 68:5-13.

v. Curtis Sasaki stated that when the Java OS is in use on a network, "the system administrator . . .can remove the browser and not affect Java OS." Sasaki Dep. (played 12/16/98pm), at 29:3 - 30:7.

116.2.3.3. Sun allows users, VARs, and OEMs to remove bundled browsers because it understands that there is separate demand for browsers and operating systems.

i. James Gosling testified that he could not think of "any plausible technical reason to design Windows 98 in a way that makes it difficult to remove Internet Explorer." By contrast, Gosling proposed several reasons "why it would be desirable to design the operating system so that the browser could be removed," including the facts that users might want to deploy their operating systems without displays (e.g. as a server), they might want to replace their browsers with superior products, or they might want to utilize specialized browsers, such as a browser designed for persons with visual impairments. Gosling, 12/10/98pm, at 60:10 - 62:1.

ii. Croll testified that the Web Start and Answer Book 2 features of the Solaris operating system do not require the use of the HotJava browser that is bundled with the OS in order to function "because we assume that after the operating system is loaded for the first time that customers are going to want to have other browsers." Croll Dep. (played 12/15/98pm), at 64:23 - 65:12.

116.2.4. The Santa Cruz Operation (SCO) bundles Netscape Navigator with its products but permits customers to choose whether to install or remove it.

116.2.4.1. SCO does not consider a browser to be part of the

operating system.

i. When asked whether any browser product is part of the core of any SCO operating system product, Ron Rasmussen answered no. "Our view is that the browser is an application." Rasmussen Dep. (played 12/15/98am), at 64:13-20.

ii. Rasmussen testified that SCO "bundles" Netscape Navigator with its OpenServer and Unixware products, (Rasmussen Dep. (played 12/15/98am), at 54:10 - 56:18) but that "Our view is that the browser is an application." Rasmussen Dep., (played 12/15/98am), at 64:20. Rasmussen also testified that "When SCO says 'we bundle a feature,' it means it's a feature which is not part of the core base operating system functionality. It means that it's something that the user can choose to install or remove, and the operating system, whose primary function it is to serve applications, will still function properly." Rasmussen Dep. (played 12/15/98am), at 55:14-19.

116.2.4.2. SCO permits end users, VARs, and OEMs to remove bundled browsers from the operating system if they so desire and does not "hard-code" anything in its operating system to require the use of a particular browser.

i. Rasmussen testified that there are a number of ways to remove the bundled browser from Unixware 2.1.3: "The first way is during installation of the operating system, the browser can be deselected so it never does get installed on the system -- on the hard disk of the computer." Moreover, "[i]f they chose to install Navigator as part of the operating system installation, they can go back in with a utility to do software removal and they can, again -- they get a point-and-pick list and they can select it for removal." Rasmussen Dep. (played 12/15/98am), at 60:21 - 62:7.

ii. Rasmussen further testified that Navigator is uninstallable and/or removable from Unixware 7 "in the same fashion" as from Unixware 2.1.3. Rasmussen Dep. (played 12/15/98am), at 62:15-24.

iii. Similarly, Rasmussen testified that Navigator is optional on Open Server Release 5 as well: The browser is "removable both at initial system load time so it never gets onto the system, and it's also removable afterwards if you chose during initial system load to install it." Rasmussen Dep. (played 12/15/98am), at 62:25 - 63:6.

116.2.4.3. SCO allows users, VARs, and OEMs to remove bundled browsers because it understands that there is separate demand for browsers and operating systems.

i. Rasmussen testified that the reason SCO gives its users those options with regard to the web browser is that: "Not everybody wants the functionality in the operating system, so we provide them that option to remove it or install it at a later time." Rasmussen Dep. (played 12/15/98am), at 62:25 - 63:18. Rasmussen further explained that "people are buying the operating systems to run applications, and if their application does not require a web browser, then perhaps they don't want the web browser there. So if you're running an accounting application and you don't need the web browser, perhaps you don't want to install it to save space on the disk, or, in some instances, we've had resellers tell us they consider the web browser an unproductivity tool as people surf the web rather than doing their work." Rasmussen Dep. (played 12/15/98am), at 63:19 - 64:6.

116.2.5. Operating system vendor Be, Inc., bundles the only browser currently available with its BeOS but permits users to remove it.

116.2.5.1. Be does not consider a browser to be part of the operating system.

i. Although both Be and Microsoft's James Allchin describe the Net Positive browser as an "integrated browser," Be refers to Net Positive as an application and lists it in the "apps" directory on the computer. Allchin, 2/2/99am, at 14:3-11.

116.2.5.2. Be permits end-users, VARs, and OEMs to remove bundled browsers from the operating system if they so desire and does not "hard-code" anything in its operating system to require the use of a particular browser.

i. The Net Positive browser can be removed from the BeOS. Although Be's help system will not function fully in the absence of a browser, the help system will work if another browser or HTML renderer is installed after Net Positive is removed. Allchin, 2/2/99am, at 10:4 - 21:4.

ii. Allchin acknowledged that removing the Net Positive browser from the applications directory frees up 1.3 megabytes of RAM on the BeOS applications directory. Allchin, 2/2/99am, at 13:5 - 19:20; GX 1771.

116.2.6. Novell bundles a browser with Netware but permits the user to remove it and use a third-party browser.

116.2.6.1. Novell does not consider a browser to be part of the operating system.

i. Novell's Sean Sanders defined "a desktop operating system" in a way that says nothing about browsing capability. He defined it as "a special set computer programs that allows for the management of . . . computing resources that a specific end user would use on their desktop PC. So it allows them to kind of--behind the scenes it does some management of the physical computer such as managing the memory, the disk drive and some of the other technical aspects that are included within the box. But it also provides a--kind of a--generally a friendly front end to the system that the user can manipulate to better use their software programs and the resources that are generally there specific to the desktop." Sanders Dep. (played 1/13/99), at 185:13 - 186:3.

116.2.6.2. Novell permits end-users, VARs, and OEMs to remove

bundled browsers from the operating system if they so desire and does not "hard-code" anything in its operating system to require the use of a particular browser.

i. David Wright testified that the Netware 5.0 operating system will function without the browser. Wright Dep. 9/18/98, at 16:4-12 (DX 2601). Similarly, if the browser is initially installed and then uninstalled, the operating system will still function. Wright Dep., 9/18/98, at 16:13-18 (DX 2601).

ii. When asked how the relationship between browser products and Novell's Netware differed from the relationship between Internet Explorer and Windows 98, Weadock testified: "It differs in several fundamental ways. For example, Netware as an operating system does not depend on any particular browser. The browser that comes on the Netware CD is used, for example, to access the help and documentation for the Netware product. Users — customers that choose not to use that browser with Netware can remove it. Users that choose to use another browser, a different browser, can install a different browser. They can install Internet Explorer if they want. So in those key areas we see differences between how Novell, quote unquote, bundles Netware and a browser -- I mean, it's a very loose bundling and it offers the customer significant choices — with what Microsoft is doing with Windows 98, in which the browser is nonremovable, in which the files associated with the browser do, in fact, disable the operating system if you go out and delete them one by one, and in which case the customer is not completely free to install an alternative browser because of the hardwired methods within the user interface of Windows 98 that still invoke Internet Explorer regardless of the actions that the customer may have taken to reverse or disable that choice." Weadock, 11/17/98am, at 47:1 - 48:1; see also Weadock, 11/16/98am, at 84:13-23.

116.2.6.3. Novell allows users, VARs, and OEMs to remove bundled browsers because it understands that there is separate demand for browsers and operating systems.

i. Sanders testified that, when a user installs the Intra-Netware product, they have a choice of whether or not to install Netscape Navigator. Sanders Dep., 1/13/99, at 186:10-16. Sanders explained that Novell's rationale for giving users this choice is that: "Some users do not have desire to use all of the functionality that comes in the entire bundle that is Intra-Netware, and as such, we provide them with the option to make those decisions as to what they would choose to use and not to use." Sanders Dep., 1/13/99, at 190:18 - 191:2.

116.2.7. Caldera gives users a choice of multiple browsers with its OpenLinux product but makes them easily and fully removable.

i. Caldera bundles the KDE browser on its OpenLinux operating system; in addition, "Netscape is preloaded by default onto those systems." Felten, 6/10/99am, at 26:1-20.

116.2.7.1. Caldera does not consider a browser to be part of the operating system.

i. Sparks testified that he does not consider any browser to be "part of the Linux operating system." Sparks Dep. (played 12/16/98am), at 50:8-11.

116.2.7.2. Caldera permits end-users, VARs, and OEMs to remove bundled browsers from the operating system if they so desire and does not "hard-code" anything in its operating system to require the use of a particular browser.

i. Professor Edward Felten testified that Caldera's KDE browser "is separable and removable and replaceable." Felten, 6/10/99am, at 25:12-17. When asked what his basis was for saying that the browser is separate from the operating system, Professor Felten answered: "Well, there are several reasons for saying that. First of all, the KDE browser is developed by a different organization than the one that develops the Linux operating system. . . . In addition, the Linux operating system works with other browsers. In fact, the OpenLinux works fine with

Netscape, and Netscape is preloaded by default onto those systems. And, in addition, the KDE browser runs on other operating systems, such as Solaris, HP-UX and IRIX." Felten, 6/10/99am, at 26:1-18.

ii. Allchin conceded that the browser bundled by Caldera comes from a different organization, KDE (Allchin, 2/1/99pm, at 73:5-15) and that the operating system will continue to work if it is removed. Allchin, 2/1/99pm, at 73:25 - 74:13.

116.2.7.3. Caldera allows users, VARs, and OEMs to remove bundled browsers because it understands that there is separate demand for browsers and operating systems.

i. Bryan Sparks testified that Caldera allows OEMs to sell a version of OpenLinux without a browser because: "Why wouldn't we? As long as we had a contract. I'm not in a position where I can be picky on customers that I can get. So if they wanted to customize it, they'd be happy to." Sparks Dep. (played 12/16/98am), at 50:24 - 51:8.

(c) Until recently, Microsoft likewise accommodated this separate demand by enabling users to remove Internet Explorer from Windows

117. Although Microsoft required OEMs and users to obtain Internet Explorer in order to obtain Windows, it nonetheless continued, until recently, to recognize separate demand for an operating system without a browser by supplying end users (although not OEMs) with a means of removing or "uninstalling" the browser.

i. See infra Part V.B.2.d.(4).(a); ¶ 139.

2. Microsoft tied Internet Explorer to Windows in order to impede browser rivals and protect its operating system monopoly

118. By contrast to other operating system vendors, Microsoft both refused to license its Windows operating system without a browser and imposed restrictions— first contractual and later technical — on OEMs' and end users' ability to remove its browser from Windows. As its internal contemporaneous documents and licensing practices reveal, Microsoft decided to tie Internet Explorer and Windows together in order to prevent Netscape from developing into a significant threat to Microsoft's operating system monopoly, and not for any pro-competitive purpose.

a. Before it decided to blunt the browser threat, Microsoft did not plan to tie its browser to Windows

119. Microsoft argues that it made the decision to build its own browser and bundle it with Windows 95 at an April 1994 retreat dedicated to Internet issues (Allchin Dir. ¶¶ 225-227). That argument is inconsistent with the evidence, which shows instead that Microsoft had no firm plans at that time to bundle its browser with the operating system.

119.1. Microsoft's internal correspondence and external communications from early to mid-1994 show that Microsoft was planning, at most, to bundle low-level Internet "plumbing" such as a TCP/IP stack, but not applications such as a browser, with Windows 95.

i. In response to a question about how to handle press and OEM inquiries concerning Microsoft's internet plans, Alec Saunders wrote in April 1994: "It's getting very confusing and at the moment a lot of external people are asking if we will be shipping internet apps. The position we have taken so far is that Chicago [Windows 95] contains all the plumbing you need to hook up to the net -- but cool apps like Mosaic are stuff you need to obtain from 3rd parties." GX 124.

ii. A February 1994 email from David Cole to Bill Gates and other senior

executives reporting on “Chicago beta 1 content” provides a detailed description of features of Windows 95 but does not mention integration or bundling of web browsing functionality. Its only mention of Internet support is a reference under the title “Networking” to “Complete TCP/IP support. A fast, protmode stack with no low memory requirements. A full set of TCP utilities. Windows Sockets support for 16 and 32-bit apps. DHCP support for ‘plug and play’ TCP/IP networking." GX 597, at MS98 0010791.

iii. Steven Sinofsky wrote in June 1994: “We do not currently plan on any other client software [in the upcoming release of Windows 95], especially something like Mosaic or Cello.” In fact, Microsoft’s goal at the time was to “get[] as many third parties writing as many internet things on top of WinSock as posible, including as many WWW, Gopher, TN3270, etc clients as they can afford to do.” GX 125.

iv. A November 1994 draft of a “communications story” for marketing Windows 95 made no mention of inclusion of an Internet browser, claiming only that Windows 95 “supports popular Internet applications, such as Mosaic, WinWAIS or WinGopher.” Brad Chase responded that “i don’t think we deliver what you say. I think integration is impt but we don’t really integrate. You still use a phone for example. You have to get some third party program to actually have a UI into the Internet.” GX 601.

119.2. Microsoft publicly stated throughout 1994 that Windows 95 would not include a browser.

i. A November 1994 marketing brochure entitled “Microsoft Windows 95 Questions and Answers” responds to the question “Can Windows 95 connect to the Internet?” as follows: “Yes. Windows 95 includes the networking support you need to connect to the Internet. It includes a fast, robust, 32-bit TCP/IP stack . . . as well as PPP or ‘dial-in’ support. Windows 95 supports the large number of tools used to connect to the Internet, such as Mosaic, WinWAIS, and WinGopher, through the Windows Sockets programming interface. Windows 95 also includes standard Internet support, such as telnet and ftp.” GX 398, at MS98 0107100.

119.3. The testimony of Phillip Barrett, a former Microsoft employee who was responsible for the early development of Internet Explorer, confirms that Microsoft had no

genuine plans to bundle a browser with Windows 95 in 1994.

i. Barrett testified that he attended the April 1994 "offsite" at which the subject matter was "what was Microsoft going to do about the internet." (Barrett Dep., 1/13/99, at 100:3-14) and participated in a "breakout" session led by Bill Gates and also including Brad Silverberg and John Ludwig (Barrett Dep., 1/13/99, at 101:14-18) which focused on "the internet service providers and the necessary plumbing--plumbing being the infrastructure--to allow large numbers of people to get online and use the internet." Barrett Dep., 1/13/99, at 101:21-25.

ii. Barrett testified: "The plans were to put a TCP/IP pack . . . and then dial up modem support" into either Windows 95 or a subsequent service pack. Barrett Dep., 1/13/99, at 106:9-14. Barrett does not "recall any discussions taking place" about building a web browser into Windows 95, (Barrett Dep., 1/13/99, at 107:2-4) and testified that, to the best of his knowledge, no such plans had been made by the conclusion of the retreat. Barrett Dep., 1/13/99, at 107:24. Barrett testified that Bill Gates' assertion that Microsoft decided to integrate a web browser into Windows 95 at the April 1994 retreat "is not consistent with my memory of the retreat." Barrett Dep., 1/13/99, at 111:9-10.

iii. Barrett testified that, after the retreat, he moved into the Windows group "to focus on Internet technology." Barrett Dep., 1/13/99, at 108:2-7. Barrett's new job was to "figure out a strategy" with respect to development of a web browser. Barrett Dep., 1/13/99, at 108:13-16. Barrett testified that he and his group did not develop a web browser and that at the time he left Microsoft in October 1994 he was not aware of any plans to develop a browser for inclusion in Windows 95. Barrett Dep., 1/13/99, at 108:21 - 109:9. Barrett also testified that Microsoft could not have had such formal plans without his knowledge, because they "would have fallen into [his] area of responsibility." Barrett Dep., 1/13/99, at 109:11-21.

120. Even after it became aware of the threat posed by Netscape's browser, and as late as June 1995, Microsoft had no firm plans to bundle its browser with Windows 95. Instead, Microsoft planned to ship its browser in a separate "frosting" package (eventually called Microsoft "Plus"), for which it planned to charge.

i. A January 1995 draft press release announcing the purchase of the Mosaic code

stated: "At the present time there are no plans to ship. . . the Mosaic software in the Windows 95 box when it ships in August of this year. . . . Our plan is to deliver this capability shortly after Windows 95 ships." GX 138, at MS6 600545.

ii. A document entitled "Top 20 Features Microsoft Windows 95" lists "Plumbing for the Internet" as number 13, and states that "Windows 95 . . . has all the necessary 'plumbing' built into the operating system, and provides you with all the necessary 32-bit drivers such as TCP/IP to access the net, dial up protocols such as [PPP and SLIP, and] built in tools and utilities to make the basic connections, such as FTP and telnet. Now you can access the internet directly, through the Microsoft Network, or add WEB browsing capabilities by adding Microsoft Plus! to Windows 95." GX 152.

iii. In an email exchange with Ben Slivka on June 15, 1995, Brad Chase observed that "there is still an effort to throw this [Internet Explorer/O'Hare] into windows 95." Slivka responded that "[the u]pgrade schedule is pretty tight," and that "[i]f we're not in the upgrade, it makes our life easier, and we get more Plus revenue. . . :-)" GX 149.

iv. Ben Slivka suggested to Brad Silverberg in April 1995 that Microsoft might not want to put Internet Explorer in the Windows 95 box because of size constraints. "Putting in the Web browser is possible, but it's 475k (compressed ~ 170k), and it's not useful unless you're already online, and you're already struggling to fit on 12 disks." GX 146.

v. A June 28, 1995, update for Microsoft executives on the testing process for adding O'Hare to the OEM version of Windows 95 states that "we still don't have a firm go-ahead. Each 'Meeting to decide to do/not do this' becomes 'let's keep going and meet in two more days.'" GX 151.

vi. Based on Microsoft's internal contemporaneous documents, and other evidence, Professor Fisher concluded that Microsoft made the decision to bundle Internet Explorer with Windows "no earlier than the middle of 1995." Fisher, 1/6/99pm, at 26:7-8.

b. Microsoft changed its plans, and decided to tie its browser to Windows, in order to impede Netscape

121. In late 1994 and early 1995, however, executives within Microsoft began to realize that the popularity of Netscape's browser posed a serious threat to Microsoft's operating system monopoly.

i. See supra Part III.B.2; ¶ 56.

122. As a result, Microsoft decided that gaining a large share of the Windows 95 browser usage market was the best way to prevent Navigator from developing into a genuinely competitive rival platform.

i. See supra Part V.A.

123. Microsoft considered a variety of strategies for rapidly gaining a large share of the browser market and, as explained, tried to coerce Netscape into abandoning its Windows 95 browser business altogether.

i. See supra Part IV.A.

124. But in early 1995 Microsoft executives also began to consider bundling Internet Explorer with the upcoming release of Windows 95 and forcing OEMs to take it.

i. In an April 1995 email, Brad Silverberg told Ben Slivka and John Ludwig that "I have spoken to Paulma and he is in agreement that we should get our Internet client distributed as broadly as possible as soon as possible. What this means is that I want Ohare in Win95." GX 608.

ii. A June 1995 summary prepared by John Gray of a meeting discussing the issue reports that they "[t]enatively decided to procede on path of putting Ohare and Rome into initial OEM products but NOT in retail." GX 612, at MS98 0122185.

125. Microsoft's motive in tying Internet Explorer to Windows 95 (that is, in refusing to offer OEMs the option of licensing Windows without the browser) was to thwart the platform threat posed by Netscape's browser.

i. On June 23, 1995, John Ludwig wrote to Paul Maritz and others that "obviously netscape does see us as a client competitor. i'm glad you didn't tell them many specifics. we have to work extra hard to get ohare on the oem disks." GX 623.

ii. In April 1995, Rick Rashid of Microsoft wrote to Paul Maritz that "[j]ust as they [Netscape] are a threat to us, we are a threat to them. Our best interest is served

by effectively eliminating the special browser and special server model altogether and making the Windows desktop the 'browser' and Windows NT the 'server.'" GX 521.

iii. Allchin conceded that he believed that including Internet Explorer in the OEM version of Windows 95 would be a way to help increase Internet Explorer's market share. Allchin, 2/3/99am, at 56:7-11. "The sooner we got it to everybody, the better off we would be. That was absolutely believed. And we were going to distribute it through every vehicle we could." Allchin Dep. (played 2/3/99am), at 58:2-5; Allchin, 2/3/99am, at 58:9-22.

iv. Dr. Warren-Boulton testified that "if, indeed, Windows 98 were provided separately and distinctly without browser functionality, that given what I understand to be the costs, incremental costs, of providing it separately and given what I understand to be the potential demand for the product to be provided separately, that it would be profitable to provide that product separately." However, "because of Microsoft's incentive to control the browser market, what would otherwise be profitable to sell as a separate product is not being sold as a separate product." Warren-Boulton, 11/24/98pm, at 37:3 - 38:2. "A monopolist of an operating system has a particular incentive not to allow the market to have, if you like, a level playing field choice." Warren-Boulton, 11/24/98am, at 59:10-12.

v. Based on the contemporaneous internal Microsoft documents, and other evidence, Professor Fisher concluded that "Microsoft made its decision to combine its browser and operating system not to achieve efficiencies but to foreclose competition." Fisher Dir. ¶ 143; Fisher, 1/12/99pm, at 10:21 - 11:3 (testifying that "it's all over the Microsoft documents. They did this in order to thwart the platform threat, in order to prevent the possibility that Netscape and Java would lead to a situation in which the applications barrier to entry into operating systems would be eroded.").

c. Microsoft used its operating system monopoly to compel OEMs licensing Windows 95 also to license Internet Explorer 1 and 2

126. Reflecting Microsoft's very late decision to tie Internet Explorer to Windows to combat the Netscape platform threat, the first version of Windows 95 for the retail channel did not include Internet Explorer. Microsoft offered Internet Explorer only in a separate "plus pack" CD that it distributed entirely separately from Windows 95.

i. James Allchin testified that "Microsoft included Internet Explorer 1.0 in the OEM version of Windows 95, but not in the initial retail version. Rather, in the retail channel Internet Explorer 1.0 was included in the Plus! package, a set of software enhancements that Microsoft offered to customers upgrading to Windows 95. Allchin Dir. ¶ 247.

ii. David Cole acknowledged that subsequent retail versions of Windows 95 came with Internet Explorer 1.0 and 2.0 on a separate disk; the primary disk contained the original version of Windows 95 that was released at retail in July 1995. Cole Dep., 1/13/99, at 401:10 - 402:25.

127. By contrast, Microsoft required OEMs to license a version of Windows 95 that included Internet Explorer 1 and, later, Internet Explorer 2. Microsoft required OEMs to install Internet Explorer on all PCs on which Windows 95 was installed and contractually prohibited those OEMs from removing the browser.

i. Amendment No. 2 to Microsoft OEM License Agreement for Operating Systems wth Dell Computer Corporation,

GX 1121 (sealed).

ii. Compaq's John Rose conceded that Microsoft's contractual provisions required Compaq to include Internet Explorer with the PCs it shipped. Rose, 2/18/99pm, at 8:25 - 10:1.

iii. Microsoft's operating system license agreement with Gateway,

GX 458, at MS98 0009146 (sealed); GX 652 (Gateway response to a CID) (sealed); GX 1129 (Amnd. No. 1 to Packard-Bell's operating

system license with nearly identical provisions in the "Additional Terms," sections (a)(1) and (a)(1)(C)); GX 1183, at MS98 0009095-0009096 (Hewlett-Packard's license with nearly identical provisions in the "Additional Provisions Key," (sections (q)(a) and (q)(a)(iii)) (sealed).

128. Because the OEMs had no commercially viable alternative to Windows 95, Microsoft succeeded in forcing them to agree to its tying arrangement, despite clear demand from OEMs for Windows without Internet Explorer.

128.1. For instance, Compaq removed the Internet Explorer icon in part to feature Netscape; but, when Microsoft threatened to terminate Compaq's Windows license, Compaq quickly capitulated to Microsoft's demands that it restore the icon.

128.1.1. In late 1995, Compaq removed the Internet Explorer (and MSN) icons from the Windows 95 desktop on its Presario line of personal computers in order to feature Netscape.

i. John Rose acknowledged: "I understand that, in early 1996, Compaq did remove, on some consumer products, the Internet Explorer icon (as opposed to Internet Explorer software) from the Windows 95 default desktop on its Presario line of personal computers." Rose Dir. ¶ 25.

ii. Rose also acknowledged that Compaq had a strategy to feature Netscape along with AOL. Rose, 2/19/99am, at 64:14-23.

iii. See also Part V.C.2.a.(1); ¶ 202.2.

128.1.2. Microsoft responded to the removal of the Internet Explorer (and MSN) icons by threatening to terminate Compaq's Windows license.

i. Microsoft's Don Hardwick and Microsoft in-house counsel Peter Miller both sent letters to Compaq stating Microsoft's intent to terminate the Windows 95 license agreement between the companies if Compaq did not restore the icons to their original status. GX 649; GX 650.

ii. See also Part V.2.a.(1); ¶ 202.3.

128.1.3. In response to Microsoft's threat, Compaq restored the icons to the desktop.

i. On June 21, 1996, Compaq gave in to Microsoft's demands. Celeste Dunn sent a letter to Hardwick stating that Compaq has "made the changes you requested to the Windows 95 desktop of the current release of the Compaq Presario systems. We have replaced the Microsoft Network and Internet Explorer icons on the Windows 95 desktop as executable icons so they look and function exactly the same as how we originally received them from Microsoft and have placed Microsoft Network, Internet Explorer icons and Internet Setup Wizard icons in their original locations under the Start button on the Windows 95 desktop." The letter also pointed out that icons for AOL and for Netscape were on the Windows 95 desktop for Presario systems. GX 645.

ii. On June 25, 1996, Microsoft sent Compaq a letter withdrawing the Notice of Intent to Terminate Compaq's Windows operating system license agreement based on Compaq's representations. GX 301.

128.2. Other OEMs recognized that they had no choice but to license Internet Explorer along with Windows.

i. See supra ¶ 129.

d. Microsoft next tied Internet Explorer 3 and 4 to Windows 95

(1) Microsoft concluded that merely tying Internet Explorer to Windows was not sufficient to defeat Netscape and that, to win the browser war, it must make Windows and Internet Explorer difficult to separate

129. Microsoft eventually concluded that its purely contractual tie between Windows 95 and Internet Explorer would not be sufficient to prevent Netscape from developing into a serious

threat to the applications barrier to entry. It decided, therefore, to make Windows and Internet Explorer difficult to separate.

i. In a 1996 marketing plan entitled "How to get to 30% Share in 12 Months," Brad Chase wrote, "Shell Integration. The Internet is a part of Windows. We will bind the shell to the Internet Explorer, so that running any other browser is a jolting experience. Shell/Browser user model becomes the same." GX 684, at MS6 6007119.

ii. A review of marketing plans for Internet Explorer 3 states: "What we can do that Netscape can't -- Building on our Windows assets -- Integration, a customer win, we can do this better -- Other technology assets (direct, active etc.) -- Incentives." GX 488, at MS6 5005758.

iii. A January 1996 Microsoft presentation describes as a Response Summary to cross-platform Java: Increased Internet Explorer share, Integrate with Windows. GX 52, at MS7 003270.

(2) In furtherance of this objective, Microsoft tied Internet Explorer 3 to Windows by commingling the code that supplies web browsing with the code that supplies operating system functions, forcing OEMs to license that product, and refusing to supply an unbundled option

130. In order to aid its effort to win the browser war, Microsoft offered its operating system only as part of a software package (which it calls "Windows 95" or "Windows 98") that also contained Internet Explorer 3 (and eventually Internet Explorer 4) and in which much of the underlying software code that supplies web-browsing and operating system functions is contained in the same files. Microsoft thus not only used its monopoly power to force OEMs (and end users) to take the browser with the operating system, but also made the browser and operating system difficult to separate. Microsoft did so despite the fact that it had, as a matter of software design, significant discretion as to how to package its browser and operating system products. Microsoft made a strategic design decision, rather than a design decision driven by

considerations of demand and cost.

(a) Software routines and files need not be developed or distributed together to achieve seamless integration of their functions

131. Microsoft had significant discretion because whether different software products are delivered by one or multiple groups of code is a matter of packaging rather than engineering.

131.1. Software consists of a series of detailed instructions to the various components of a computer. It is usually written in one of many specialized artificial languages designed to be comprehensible to human programmers and then "compiled" into a form that interacts directly with the hardware.

i. Professor David Farber testified that a "compiler translates instructions (written in a language efficient for programmers) into the language understood by the computer hardware." Farber Dir. ¶ 19.

131.1.1. The software code necessary to supply the functionality of a modern application or operating system can be extremely lengthy and complex.

i. Professor Farber testified: "Applications may be large, often involving a very large number of routines." Farber Dir. ¶ 17.

ii. Microsoft estimates that the set of instructions that it calls Windows 98 consists of approximately 18 million individual lines of code. Allchin, 2/2/99am, at 41:12-17.

131.1.2. To make that complexity manageable, modern software is usually written as a series of individual routines, ranging from a few tens to a few hundreds of lines of code apiece, that perform specific functions. Large programs are created by "knitting together" many such simple routines with higher level routines.

i. Professor Farber testified that routines "typically contain a few tens to a few hundreds of lines of code each." Farber Dir. ¶ 13.

ii. Professor Farber testified that "each software product is built up from simple low level routines that are then called by routines at a higher level of composition. Routines at each level are called by yet higher level routines until the desired functionality of the end product is achieved. In this manner, all software is built up layer by layer through the use of often large numbers of routines, but each with limited complexity." Farber Dir. ¶ 14.

iii. Joe Belfiore testified that "when we do good software architecture, what we're able to do is to break what is a complex and very full set of functionality into meaningful components, each of which sort of can be self-contained and can implement the job that it's supposed to do in a very efficient way. And if you do a really good job of this, then each of those separate components are very useful to other parties that want to take advantage of them." Belfiore Dep., 1/13/99, at 377:2-11.

131.2. As a result of its modular structure, modern software is extremely malleable. Underlying routines can be packaged together in essentially any way that the designer chooses.

i. "As a result of this layering," Professor Farber testified, "software has an inherently malleable and modular structure which gives software developers broad freedom in combining (i.e., bundling) different functions into software products." Farber Dir. ¶ 15.

ii. Glenn Weadock testified that software designers have great flexibility “in how to combine the atomic units of code, called subroutines or functions, to make up files (or “libraries”) on disk . . . . They can create a so-called ‘monolithic’ program that consists of a single, large file; they can create a highly modular program that uses a hundred different library files (called DLLs, for Dynamic Linked Library) to contain a thousand different subroutines; or they can choose any intermediate degree between these two extremes." Weadock Dir. ¶ 29.

iii. Belfiore conceded that the organization of files into various DLLs can be changed or designed with specific goals in mind. Belfiore Dep., 1/13/99, at 153:23 - 154:4.

iv. Hadi Partovi testified that Microsoft has moved functions in one DLL into different DLLs in succeeding versions of the product. Partovi Dep.,

1/13/99, at 659:7-23.

v. Weadock testified: “A software designer with source code access may choose to place an application subroutine into a file that contains operating system subroutines . . . . Microsoft, for example, has chosen to design Internet Explorer so that some of the code that it uses co-resides in the same library files as other code needed for Windows 98 or even Windows 95 to run.” Weadock Dir. ¶ 30.

vi. Professor Edward Felten testified that SHDOCVW.DLL "is a great example of the point I’m trying to make about packaging of functions into files. This SHDOCVW file is really a bundle of separate functions. It contains some functions having to do with displaying the Start menu. It contains some functions that have to do specifically with Web browsing, and it contains some general user interface functions as well. And to talk about this file as doing one thing or being part of one product is really incorrect.” Felten, 12/14/98am, at 60:18 - 61:2.

vii. Professor Felten testified: “Due to the malleable nature of software, functions may be moved from one DLL to another, or a single DLL may be disaggregated into two DLLs.” Felten Dir. ¶ 60.

131.3. Software routines need not reside in the same file to function together in a perfectly seamless fashion. Except at the extremes, therefore, how a software engineer chooses to organize routines into particular files is a matter of packaging as opposed to engineering necessity.

i. Professor Farber testified that "a software developer is free (subject to minimal limitations of no relevance here) to change the partitioning of routines among files at any time without changing their function or correct operation when the files are combined during execution in an end user's computer. Thus, there is generally no technical reason why a particular routine must be included in the same file with another routine so long as the routines are appropriately compiled and linked in the end user's computer." Farber Dir. ¶ 18.

ii. Professor Felten testified that as part of the transition from Internet Explorer 4 to Internet Explorer 5, Microsoft split SHDOCVW.DLL into two parts, SHDOCVW.DLL and a new file called BROWSEUI.DLL. He also testified that Microsoft moved some code from SHDOCVW.DLL into

SHELL32.DLL. Felten, 6/10/99am, at 49:4-15.

iii. William Harris testified that software development "is inherently flexible. There are numerous ways in which to design a program to achieve the same functionality or effect. Similarly, a developer can combine, or separate, any two or more software products or components. It is typically the goal to combine such products or components in such a way as to appear 'seamless' to the user, in other words to make the two products appear like one. A good example of this is what Intuit has done with Quicken and Internet Explorer." Harris Dir. ¶ 82.

131.4. Files of software routines need not be shipped, or even designed, together to achieve seamless integration of their functions. Whether the necessary files are shipped together with the operating system, installed by an OEM prior to selling a computer in the retail channel, or accumulated by the end user through the purchase of separate products from multiple companies, the functionality ultimately delivered to the consumer can be exactly the same.

i. Professor Farber testified: "All the routines that are called directly or indirectly by a program should be available when the program is being used. But whether those routines originate from one particular software program or another is irrelevant to the performance of the functions, so long as the software is written and installed such that the programs work together." Farber Dir. ¶ 18.

ii. Professor Farber also testified that "software has an inherently malleable and modular structure which gives software developers broad freedom in combining (i.e. bundling) different functions into software products. This malleability also gives a software developer two related types of design freedom: (1) to integrate two separate cd-roms because the functions on one particular cd-rom can be integrated by an OEM or retail end user with functions on another cd-rom and (2) to determine which functions to include within software sold as one product and which to separate and sell as a different product, whether produced by the same or a different software developer, for installation and use together by the a retail end user." Farber Dir. ¶ 15.

iii. Professor Felten testified: "The mere fact that two functions are implemented in the same file, or that two products are 'integrated' into a single product, does not imply that they must be implemented in this

fashion; because of the nature of software, functions can be separated into distinct files, or 'integrated' products can be separated into distinct products without any loss of capability." Felten Dir. ¶ 31.

iv. Professor Felten testified: "In some cases in Windows 95 and IE 4, functions used in Web browsing and functions unrelated to Web browsing are implemented in the same program file. That these functions are implemented in the same file does not mean that these functions are inevitably intertwined." Felten Dir. ¶ 31.

v. Professor Felten testified that Windows Explorer is configured to allow other, entirely separate applications to display information in its embedded subwindows. "This 'Active Documents' specification that Microsoft has released allows anyone to write a piece of software that can display anything in an embedded subwindow like this. And so, one of the points to make about this is that the fact that a completely separate application like Microsoft Word or like some ISV application can display something in that embedded subwindow, does not imply that Microsoft Word or that ISV application is part of Windows Explorer. It just says that it can display something inside that window frame that Windows Explorer puts up." Felten, 12/14/98pm, 50:4-14.

vi. Weadock testified that Novell designed "an HTML-based help system that is -- that works with multiple browsers. It works with Navigator. It works with Internet Explorer." Weadock, 11/17/98am, at 48:14 - 49:5.

(b) Although recognizing it could have chosen a different approach, Microsoft made Internet Explorer 3 and Windows difficult to separate and offered only a bundled version to OEMs and end users

132. Although it recognized its ability to choose other approaches, beginning with Internet Explorer 3 Microsoft placed in the same files the routines that supply both operating system functionality and web browsing functionality, and Microsoft refused to give OEMs the option of combining the two products themselves.

132.1. The OSR 2.0 release of Windows 95, released in August 1996, updated DLLs that supplied both web browsing and other functions.

i. Microsoft Vice-President David Cole testified that “Internet Explorer 3.0 is an integral part of the OEM Service Release 2.0 (or ‘OSR 2.0'). . . . OSR 2.0, which was first made available to computer manufacturers in August 1996, includes a wide range of product enhancements in addition to Internet Explorer 3.0, such as support for larger hard drives, improved multimedia support, a variety of networking enhancements, new power management features, and many others.” Cole Decl. ¶¶ 41-42 (DX 2220).

ii. Weadock testified that a software developer "may choose to place an application subroutine into a file that contains operating system subroutines . . . . Microsoft, for example, has chosen to design Internet Explorer so that some of the code that it uses co-resides in the same library files as other code needed for Windows 98 or even Windows 95 to run." Weadock Dir. ¶ 30.

iii. Professor Felten testified that there "is other software code specific to IE web browsing that could be deleted from these shared program libraries." Felten Dir. ¶ 58.

iv. Felten testified that SHDOCVW.DLL "is really a bundle of separate functions. It contains some functions having to do with displaying the Start menu. It contains some functions that have to do specifically with Web browsing, and it contains some general user interface functions as well. And to talk about this file as doing one thing or being part of one product is really incorrect." Felten, 12/14/98am, at 60:15 - 61:2.

132.2. Microsoft did not offer OEMs a version of Windows without web browsing. Microsoft refused to do so despite the fact that it offered Internet Explorer 3 separately to end users in a way that, when combined with an earlier version of Windows 95, supplies precisely the same functions.

i. When asked whether he considered the retail version of Internet Explorer 3 to be “integrated” with Windows 95, once installed by the customer, Carl Stork answered: “Once it’s installed, I consider it to be integrated. . . . It was developed much as we develop our operating system upgrades that the end result would be an integrated whole. And it’s just a question of how it’s delivered.” Stork Dep., 8/11/98, at 53:18 - 54:14 (DX 2594).

133. In addition to offering OEMs Windows only with Internet Explorer already

installed, Microsoft prohibited OEMs by contract from removing any aspect of the browser from the Windows software package.

i. See supra Part V.B.2.c.; ¶ 127.

134. Because OEMs have no viable commercial alternative to Windows, Microsoft's refusal to offer an unbundled option coerced OEMs into licensing the browser as a condition of licensing Windows.

i. See supra Part II.A; ¶ 15; Part V.B.2.c; ¶ 130.

(3) Microsoft similarly tied Internet Explorer 4 to Windows

135. Microsoft also used its monopoly power to force OEMs to license and distribute Internet Explorer 4 as a condition of licensing Windows.

135.1. Microsoft initially offered Internet Explorer 4 to OEMs in September 1997 on a separate disk from Windows 95 and gave OEMs the option of licensing Windows 95 without it. Microsoft recognized that Internet Explorer 4 could be distributed separately from Windows and that, once added to the system by OEMs or end users, it would have the same functionality as if it had been bundled with Windows in the first place.

i. A December 11, 1997 letter from Microsoft to OEMs notes that Microsoft had initially shipped IE 4.0 to the OEMs as part of a "supplemental release of Updated Windows Features" in late September. GX 1064, at MS6 6013683.

ii. When asked whether there were any ways in which installing the version of Internet Explorer 4 available on the web would result in a different experience for the user in any way, as compared with receiving Windows 95 and Internet Explorer 4 "integrated" on a new computer, Stork answered "I'm not aware of any." Stork, 8/11/98, at 48:9 - 52:24 (DX 2594).

135.2. By December 1997, however, Microsoft retracted that option and instead

required OEMs to license and install Internet Explorer 4 as a condition of licensing Windows 95.

i. GX 418 (Microsoft business terms with Toshiba) (sealed); GX 410 (Microsoft business terms with Digital Equipment Corp.) (sealed); GX 538 (Microsoft business terms with Packard Bell NEC, Inc.) (sealed); GX 625 (Microsoft business terms with Micron Electronics, Inc.) (sealed); GX 588 (Microsoft business terms with Gateway 2000 Inc.) (sealed); GX 697 (Microsoft business terms with Sony Corporation) (sealed); GX 1059 (Microsoft business terms with Hitachi LTD) (sealed).

vii. In May 1997, David Cole wrote to Paul Maritz and Moshe Dunie that "The overriding priority is getting market share up. Getting IE4 into memphis is part of that." GX 626.

(4) Microsoft also tied the browser to the operating system by refusing to license OEMs, and refusing to permit OEMs to offer their customers, Windows with Internet Explorer "uninstalled"

136. Although Microsoft designed Internet Explorer and Windows to be difficult to separate and forced OEMs to license the combined product, it nonetheless provided a ready means for users to remove or "uninstall" the browser. But Microsoft denied OEMs the option of licensing Windows 95 with Internet Explorer uninstalled and prohibited OEMs from offering such a version of Windows to their customers.

(a) Microsoft configured Internet Explorer to "uninstall" in response to demand for Windows without Internet Explorer

137. Microsoft configured both Internet Explorer 3 and 4 to "uninstall" from Windows 95 through the "Add/Remove" control panel.

137.1. The "uninstall" feature removes the end-user's ability to browse the web with Internet Explorer but does not adversely affect other software installed on the computer.

i. Professor Felten testified that Internet Explorer 3 can be removed from Windows 95 through Microsoft's "Add/Remove" control panel. Felten

Dir. ¶¶ 23-24 (explaining the process); see also GX 1202 (videotaped demonstration of that process). Professor Felten also testified that that process "has no apparent effect on the non Web browsing functions" of Windows 95. Felten Dir. ¶ 27.

ii. A Microsoft technical support article entitled “Cannot Uninstall Microsoft Internet Products in OSR 2" describes a two-step process for removing IE 3 from OSR 2 using the Add/Remove Programs Control Panel. The article does not describe any adverse effect of the removal of Internet Explorer 3 on any non browsing functionality provided by Windows 95. GX 1367.

iii. Professor Felten testified that Internet Explorer 4 can also be removed from Windows 95 via the "Add/Remove" control panel. That process causes the system to revert to the previous version of Internet Explorer installed on the system (or, in the case of an OEM version of Windows 95 originally shipped with Internet Explorer 4, to Internet Explorer 3). Internet Explorer web browsing can then be entirely removed from the system by following the "remove" procedure for that earlier version. Felten Dir. ¶ 32; GXs 165, 166, and 172 (Microsoft Knowledgebase articles describing that process).

iv. After performing experiments on versions of Windows 95 and IE, Glenn Weadock concluded: “Two practical methods exist of removing Internet Explorer 3.02 from a Windows 95 machine. One can run the Microsoft-supplied deinstallation program to effectively disable the user’s ability to run the web browser program, while leaving enhancements to operating system files in place. (Note that this option is apparently not available to OSR2 users, but its effects can be simulated by reinstalling Internet Explorer 3.02 using the downloadable version from Microsoft’s Web site, and then deinstalling as one would do on an earlier version of Windows 95.) Alternatively, one could revert the system so that it contains the original versions of the DLL files that the Internet Explorer 3.02 installation enhances. Either method results in a fully functioning Windows 95 system, although the second method may result in the removal of enhancements that some application software vendors may use for their convenience in providing Internet-related features to users.” DX 1715, at ATR 22876.

v. Microsoft’s Allchin conceded that there were "a variety of ways" to remove Internet Explorer from Windows 95. Allchin, 2/2/99pm, at 4:21-24.

137.2. Microsoft configured Internet Explorer to “uninstall” in response to demand for an operating system without Internet Explorer. Indeed, Microsoft advertised to end users that the "Add/Remove" control panel could be used to remove Internet Explorer from Windows 95.

i. A Web page from Microsoft’s website entitled “The IE Challenge” encourages customers to install and use Internet Explorer 3.0, and notes “IE Uninstalls Easily if you want to use a newer version, or simply get rid of it (and so does Navigator!).” GX 352.

ii. Microsoft's Web site describes "How to Uninstall Internet Explorer 4.0," and lists situations in which a user might want to take that action. GX 164; see also GX 165 (describing a different method); GX 166 (describing how to "manually" uninstall Internet Explorer 4.0); GX 170 (Microsoft technical article describing how to uninstall Internet Explorer 4.0 in Win95 and WinNT using Add/Remove); GX 172 (describing how to remove Internet Explorer 4.0 from Win95 using IEREMOVE.EXE).

iii. David Cole testified that Microsoft designed Internet Explorer 3 to Add/Remove from Windows 95 because "users have given us feedback that they would like choices about what they see on their desktop and they don’t see on their desktop, and in that particular case we had feedback from corporate customers that wanted to prevent access to the Internet, so when they -- they buy a new machine from a PC manufacturer, they want the ability to remove easy access to the Internet so their employees, you know, aren’t spending their time out on the Web doing whatever.” Cole then testified that having Add/Remove capability addressed that concern by removing “the obvious user-accessible means to run -- to run Internet Explorer.” Cole Dep., 1/13/99, at 395:7 - 396:6.

(b) “Uninstalling” Internet Explorer removes the Internet browser product

138. Software products routinely share code. A single file -- in the case of Windows 95 and 98 called a dynamic linked library -- may be used by many different programs, regardless how the file originally came to be installed on the system.

138.1. An operating system like Windows makes shared code available for use by

all of the applications on the system. Microsoft has designed Windows so that many of the files that perform basic functions, like drawing a window on the monitor, can be used by third-party software applications.

i. Professor Farber testified that software developers "write their programs with the expectation that certain functions can and will be performed by the operating system of the computer on which the software will be used. The application invokes the operating system by calling routines supplied as part of the operating system. The interconnection is referred to as an application-programming interface (API)." Farber Dir. ¶ 20.

ii. Professor Felten testified that "IE Web browsing uses some code that is specific to IE Web browsing, and some code that is shared (that is, it supports other functions in addition to IE Web browsing). There is nothing unique about IE Web browsing in this regard: virtually all PC applications make use of some application-specific code and some shared code that ships with Windows." Felten Dir. ¶ 61.

iii. Professor Felten testified that "it's a mistake to say that because code is invoked in some case, that code is specifics [sic] to what's happening in that case. The code that detects key presses, for example, is used by almost every application. And so if one wanted to conclude that that code was part of the Web browser, I suppose you could, but you would also have to conclude that it's part of the personal finance package, it's part of the multimedia player, it's part of the word processor and everything else. You have to look a little bit more carefully than does this code get used in executing this function or not." Felten, 12/14/98am, at 59:6-18; Felten, 12/14/98pm, at 6:22 - 7:14 ("To use an example different than the one I used this morning, another example, you would look at the code which is able to draw windows in general, draw window on the screen. That code is used by virtually every application. And although it's used by every application, it's not really right to say it's part of every application.").

138.2. Shared code is not, however, the exclusive province of operating systems. Applications programs can, and routinely do, also share code with other applications programs.

i. Professor Felten testified: "When I use the word 'platform,' at least all I mean is that this is software that offers API's -- software that offers services to other software. And whether something is a platform or not says nothing about whether it's part of the operating system, whether it has

to be shipped with the operating system, or anything like that. I described before all the third-party products would serve as platforms on Windows." Professor Felten also testified that the availability of platform-level services saves work for other software developers, "regardless of who offers that platform service and regardless of whether it's packaged with the operating system." Felten, 12/14/98am, at 52:13 - 53:5.

ii. Professor Felten testified that "many or most application programs offer APIs these days and, of course, they are not part of any operating system." Felten, 6/10/99am, at 53:25 - 54:2.

iii. Microsoft's David Cole conceded that "system services," defined as "modules of code that provide function for other modules of code," can be found in any software package, not just operating systems." Cole Dep., 1/13/99, at 390:2-14.

iv. Michael Devlin conceded that Rational's products call upon APIs that are provided by Microsoft applications, such as Microsoft Access, and even by third-party applications, in addition to APIs provided by Windows. Devlin, 2/4/99am, at 41:6 - 42:3.

v. Richard Schell testified that the fact that Internet Explorer contains DLLs did not change his conclusion that it was an application. "Well, there are two issues here. One is: Does the fact that it's made up of DLLs make it not an application? And the answer to that is no. Lots of applications consist of DLLs along with a main program. I mean, you can pick up any application that's out there. There are lots and lots of DLLs that come along with them. You just go down the -- pick up Windows 95, go through the -- you know, using the Explorer, you can find DLLs for every application, so the fact that it has -- that there are DLLs that constitute the application doesn't make it not an application. The fact that they happen to be distributed with the operating system also doesn't make it not an application. Microsoft can, does, has distributed DLLs with the operating system that are helpers for other things, and it's their choice to distribute those -- those things. The unfortunate fact of the matter is that Microsoft as a monopolist chooses what they distribute with the operating system whenever it pleases them, and then they say, well, it's part of the operating system." Schell Dep., 9/15/98, at 252:5 - 254:3 (DX 2587).

138.2.1. The various applications that comprise Microsoft's suite of office productivity software, for example, share a great deal of code.

i. Robert Muglia testified that Microsoft Office is "an integrated package" including distinct applications known as Word and Excel, which were "designed to be integrated" together into Office but that Microsoft nonetheless distributes Word and Excel separately. "The way I might say that is that Office is an integrated package overall. It was designed to be integrated. We produced, because our customers would like us to produce it, a separate word-processing program that we derived from the overall integrated Office package and a separate spreadsheet program." Muglia, 2/26/99pm, at 67:17 - 70:3.

138.2.2. Java virtual machines are shipped in the Java runtime environment with Java "class libraries" that are freely available for the use of anyone programming in Java.

i. James Gosling testified that Java virtual machines include a collection of code called the Java classes, which provide basic building blocks (or “APIs”) that Java developers can use in their programs. Gosling, 12/2/98am, at 47:14 - 49:10.

ii. Gosling testified that Sun and others also make additional Java class libraries freely available to developers, who must then ensure that they are present on the end user’s machine. Gosling, 12/2/98am, at 56:23 - 57:16.

139. Because applications may share code with each other and with the operating system, when an application is added to Windows, the pertinent shared code may or may not be loaded, and when the application is removed, shared code generally is left behind.

139.1. When an application is added to Windows, it routinely checks to make sure that all of the shared program libraries, or DLLs, that the application invokes are present. Typically, if any of those DLLs are missing, or present in an outdated version, the application will install them.

i. Weadock testified that applications that change Windows DLLs are common. Weadock, 11/17/98am, at 25:15 - 26:10.

ii. Boeing's Scott Vesey testified that "many applications do make changes in the Windows system subdirectory." Vesey Dep., 1/13/99, at 153:21-23 (DX 2596).

iii. Carl Bass, Chief Technical Officer and Vice President of Engineering at Autodesk, testified that Autodesk's principal product, AutoCAD, uses the WININET file included with Internet Explorer 3.0 and 4.0 and that, "if the necessary version is not present, or if the version of WININET on the user's PC is older than the version included with AutoCAD, the program will install the version of WININET that is bundled with AutoCAD." Fisher ¶ 165.

139.2. Conversely, it is well-recognized -- including by Microsoft -- that shared DLLs should be left behind when removing software products from a multiproduct system.

i. Professor Felten testified that "leaving in place shared files that perform other functions conforms to the ordinary way in which software application programs are removed." Felten Dir. ¶ 57.

ii. Page 29 of Microsoft's Handbook for Applications suggests: "User data files including the following should remain on the hard disk: Resources that other programs might use, such as sharable DLLs, sharable fonts, and sharable Registry entries. It is better to err on the side of safety regarding other applications. If you are not sure whether removing a DLL might harm other applications, it is better to leave it behind." GX 431, at 29.

140. Accordingly, it is commonplace to describe a product as having been "removed" from a multi-product system even when the shared code that is used and distributed by that product and others remains behind.

i. William Harris testified that "removing an application does not mean removing all components of the application, in other words it does not require deleting components shared by other applications. Quicken, like most applications, utilize shared components of software code, or 'DLLs'. Any time multiple applications share a DLL, and you remove one of the applications and the shared DLL along with it, the other application will no longer work properly. So for example, if Quicken called on a DLL that was used by another application, like Internet Explorer, and an end user removed Quicken and the shared DLL, the other application would not work properly. This is easily avoided, though, by retaining

the shared DLL when removing or uninstalling an application." Harris Dir. ¶ 86.

ii. Professor Felten testified: "The code that detects key presses, for example, is used by almost every application. And so if one wanted to conclude that that code was part of the Web browser, I suppose you could, but you would also have to conclude that it's part of the personal finance package, it's part of the multimedia player, it's part of the word processor and everything else." Felten, 12/14/98am, at 59:6-18; Felten, 12/14/98pm, at 6:22 - 7:14 ("To use an example different than the one I used this morning, an example, you would look at the code which is able to draw windows in general, draw windows on the screen. That code is used by virtually every application. And although it's used by every application, it's not really right to say it's part of every application.").

141. Because they share code with both the operating system and with each other, software products commonly are defined -- including by Microsoft -- according to the functionality they supply to the consumer, rather than by the code they distribute.

i. Glenn Weadock testified that "both industry professionals and computer customers think of a software product more as that which enables a set of related features than as a collection of specific files. For example, when a reviewer evaluates a software product in a computer magazine, the reviewer typically focuses on the product's feature set . . . . The list of files that come in the box, or the list of code units that those files contain, is rarely if ever provided." Weadock Dir. ¶ 15.

ii. Weadock also testified that defining software products "as a particular collection of files is ultimately impossible if code units within the same file are shared, either by multiple applications or by a single application and an operating system. . . . Attempting to define software strictly as a collection of files is a fruitless exercise when some of those files perform double duty in different contexts." Weadock Dir. ¶ 14.

iii. John Rose testified that "consumers want to purchase a personal computer that allows them to view, communicate, or manipulate visual graphics displayed on the personal computer's screen regardless of whether the data or software code that responds to the manipulation resides on the personal computer's hard-disk drive, a CD-ROM, or on a computer that may be continents away. For basic features of the computing experience, it is irrelevant to users whether the feature is incorporated in application or operating system software." Rose Dir. ¶ 22.

iv. Jones described Internet Explorer for the Macintosh as "the thing that will let [our

customers] go and deploy and take advantage of the services on the Internet and computing on the Internet." Jones also testified that the Internet Explorer 5 package "contains a set of features that people can use to browse the Web, that ISVs can target and ICPs can target." Jones Dep., 1/13/99, at 555:18 - 556:7.

v. Carl Stork testified that: “If you were to try to say the browser is just viewing web pages, it really wouldn’t be very interesting for end users because the Internet is so much more than that” including “communications plumbing, things like TCP/IP stacks, dial-up networking, PPP. Proxy Server perhaps. Things like URL resolution, HTML rendering, playing with various formats, whether it’s things like active server pages or ActiveX controls. Java outputs. Media streams. Supportive protocols to send and receive e-mail. The ability -- possibly the ability to transfer through things like FTP. I don’t know if I mentioned the ability to have Java applets. I mean for an Internet experience -- for things to be attractive, things need to work seamlessly, which means you need a broad stream of capabilities.” Stork Dep., 1/13/99, at 759:10 - 760:8.

vi. Professor Felten testified that because there is a long code path necessary to perform almost any function in a modern computer, "it would be a mistake to say that because something is on that code path, it's necessarily part of the application that the user is using." Felten, 12/14/98am, at 57:20 - 58:19.

vii. Weadock pointed out that "Microsoft's word processing software product, Word for Windows, ships with the file COMCTL32.DLL, but that file is also used by Windows 95." Weadock Dir. ¶ 14.

viii. Weadock testified that applications that change shared program libraries, or DLLs, that are shipped with Windows are common. Such applications include Norton Utilities and Microsoft Word. “I don’t know anybody that thinks that Microsoft Word, or Norton Utilities, or Microsoft Golf, or any of these other various products that may include updated DLL’s are part of Windows. They are separate applications. The fact that an application includes Windows DLL’s or DLL updates does not make it therefore part of the operating system.” Weadock, 11/17/98am, at 25:15 - 26:10.

ix. Professor Felten testified that Windows Explorer is configured to allow other, entirely separate applications to display information in its embedded subwindows. But “the fact that a completely separate application like Microsoft Word or like some ISV application can display something in that embedded subwindow, does not imply that Microsoft Word or that ISV application is part of Windows Explorer. It just says that it can display something inside that window frame that Windows Explorer puts up.” Felten, 12/14/98pm, at 49:25 - 50:14; Felten, 12/14/98pm, at 50:15-25 (“Q: And does the fact that other applications like

Microsoft Word or, perhaps, third-party ISV applications can use the embedded window as a viewer to display things say anything about whether or not that application is part of the operating system? A: No. Certainly, if it did, one would have to conclude that from this picture that Microsoft Word is part of the operating system, and we know that's not the case.").

142. As a result, whether a product, including Internet Explorer, is present on a PC from the perspective of end users depends on whether its functionality can readily be accessed, not on whether some of the code that is necessary to supply those functions may be present.

142.1. It is common in the computer industry for the underlying code necessary to employ a software product to be installed on a computer, but in a disabled and unusable form. When the end user actually purchases the product, he or she then receives an "activation key," or password, which enables the dormant functionality.

i. Weadock testified that "it is possible, and sometimes a matter of commercial practice, to have software that exists on a disk or PC in the sense that its code modules are physically present, but does not exist in any practical way from the user's standpoint because the software is hidden, protected, or otherwise disabled." Weadock Dir. ¶ 19 (collecting examples).

ii. Weadock testified that, as a variation on the same theme, software is often promoted by making trial versions freely available for download from the Internet. That software functions for a trial period, but then disables itself unless the user purchases an activation key. "Expired trialware or shareware physically exists on the PC in terms of bits and bytes, but once expired, the program is effectively absent until the user pays for it." Weadock Dir. ¶ 19.

iii. Phillip Barrett testified that the way Real Networks' products "Player and PlayerPlus are related is basically there's one player. PlayerPlus features are activated by a license key that one gets by coming to our web site and going through a secure form and purchasing that license key." Barrett Dep., 1/13/99, at 112:17 - 113:2.

142.2. Accordingly, it is commonly accepted in the industry that a software

product is not present on a particular machine unless the end user has access to the functionality it supplies.

i. Weadock testified: "The existence of a software product on any particular PC -- that is, whether it is effectively present or absent from the customer standpoint-depends on both the presence of the software enabling the product's feature set, and the means to use that feature set." Weadock Dir. ¶ 18.

ii. Weadock testified that corporate technical support managers consider "inhibiting the user-accessible means of access to a software product (e.g., an icon on the 'desktop' screen of the user interface, or entries in menus of program options) has the same effect, from the support cost standpoint, of removing a program in its entirety . . . . Because removing the user-accessible means of using a browser product makes the product disappear from the perspective of the user, support costs are significantly reduced . . . ." Weadock Dir. ¶ 28b.

iii. Barrett testified that, although a user may have the bits of code that implement the Player Plus functionality installed on their machine, “From the user’s perspective, what they have is the standard player” until they pay for an upgrade key, because they are unable to access the Player Plus features. Barrett Dep., 1/13/99, at 113:11 - 114:4 (GX 1450).

142.3. Thus, removing the ability to browse the Web using Internet Explorer effectively removes the Internet Explorer product.

i. Jon Kies testified that “if we provide” Windows 95 “without Internet Explorer in the menu item, the customers feel like there’s no browser installed whether or not the actual code may exist below the surface or the user interface." Kies Dep. (played 12/16/98am), at 27:1-16.

ii. Professor Felten testified: "If you have removed the ability to browse the Web, as far as the user is concerned, Web browsing -- the Web browser is gone." Felten, 12/14/98am, at 33:5-14.

iii. Professor Fisher testified that "a browser consists of the ability to do the things I described. Now, to the extent that removing the visible means of access removes that ability, I suppose one could say that without the visible means of access, there isn’t a browser.” Fisher, 1/6/99am, at 8:19-24. Fisher further testified that Microsoft's tie of Internet Explorer and

Windows 98 would “from an economic perspective” “disappear” if “Microsoft removed all means of accessing Internet Explorer code or software technology within the Windows 98 product as Microsoft designed it." Fisher, 1/6/99am, at 9:21 - 10:4.

iv. Microsoft’s Cole testified that, "at a minimum," a user who invokes Microsoft's Add/Remove procedure to remove a software product "might expect the visible aspects of the program or update or whatever it happens not to be there anymore, so in appearance it might be gone from the end user’s perspective." Cole Dep., 1/13/99, at 394:4-9 (GX 1465).

(c) Microsoft used its operating system monopoly to deny OEMs the ability to license or sell Windows with Internet Explorer uninstalled

143. Although Microsoft provided, through the “uninstall” capability, a ready means for users to remove Internet Explorer from Windows 95, Microsoft refused to permit OEMs to obtain, or license to their customers, Windows with Internet Explorer uninstalled.

143.1. Microsoft denied Gateway’s request for a version of Windows from which Internet Explorer had been uninstalled.

i. In a letter to Gateway addressing Gateway’s earlier statement, “We want IE to have uninstall (for as much of the code as can be removed without disabling the system),” Microsoft responds by saying that “Internet Explorer technologies are an integral part of Windows 98 and cannot be uninstalled . . . . Consequently, the concept of an ‘uninstall’ lacks practical significance in this context.” GX 1073, at MS98 0204593.

143.2. Microsoft prohibited the OEMs from selling PCs with Windows installed and Internet Explorer uninstalled.

i. See supra Part V.B.2.c; ¶¶ 127, 129, 132, 135.

143.3. Microsoft also prevented OEMs from removing the Internet Explorer icon or any other aspect of the browser.

i. See infra Part V.C.1.a; ¶ 177; Part V.C.2.a.(1); ¶ 199.

e. Microsoft also tied Internet Explorer to Windows 98

144. Microsoft determined that it could better exclude Netscape both by continuing its welding of browser and operating system and by making the products further inseparable. It did so with Windows 98.

(1) Microsoft concluded that defeating Netscape required it to tie its browser more tightly to the operating system

145. In late 1996 and early 1997, Microsoft designed and tested, and considered shipping, a version of Windows 98 that, like Windows 95, was merely bundled with Internet Explorer 3 components, rather than more tightly "integrated" with Internet Explorer 4.

i. In December 1996, David Cole and his Internet Explorer development team discussed "de-coupling" the Internet Explorer 4 browser from the Windows shell. According to Cole, "After thinking about this for the past couple of days, it's clear to me (and others) that we must de-couple the Browser from ActiveDesktop and the shell integration features. ActiveDesktop and the new shell UI must be a completely optional component for users and corporations. The default is the IE 4 browser without the shell enhancements. If the user installs the new shell, they will have some things to learn and pay a performance price. By coupling these together, I think the overall effort has suffered. We've got a compromised new shell design that tries to be too Windows 95 shell compatible in my view. We don't have HTML on the desktop because we are worried about performance. But even in compatibility mode, performance will degrade and there will be differences that could stall adoption of the browser platform. . . . What I really want is a browser and ActiveDesktop which do not change shell32 at all, or at most some carefull [sic] hooks are added and we ship it everywhere. I don't understand why most of ActiveDesktop can't be done without any shell changes at all." A member of the development team responded that "It's good to have a decision like this. We need to investigate hard what we will loose [sic] if we don't update shell32.dll even in the full IE 4.0 install -- that's an option we've never considered. It will definitely simplify our testing metrix and is a good way to cut dev/testing cost." GX 46.

ii. In March 1997, Jim Allchin reported to Paul Maritz on the status of Internet Explorer 4 and Memphis and listed options, including "drop IE 4 from Memphis and NT 5. There is a strong push to do this. We are wasting hundreds of people's time on builds that don't work, etc. Frankly, we may have to do this anyway to make progress. If we drop it, then we know we must either go out without IE 4 in

the final or we have to be honest in that both systems will take perhaps a half year slip because we would have to fix the quality/performance/size later and go through beta tests much later." GX 110.

iii. In March 1997, Megan Bliss asked Carl Stork whether "IE 4 and Memphis are joined at the hip." Stork responded, "We do not have closure on the issues below at present . . . IE 4 is not being developed as joined to Memphis at the hip — at present Memphis is an afterthought. It is not one of the four main test platforms for IE4. We are being encouraged by the IE4 team to release a Memphis Beta 1 with the old shell. We need to rethink the plans & make sure we have a plan that makes sense. Today I would not tell anyone that it is possible to ship an integrated IE4/Memphis product in 1997." GX 160.

vi. Bill Veghte conceded that Microsoft considered shipping Windows 98 with Internet Explorer 3 instead of Internet Explorer 4 because there was OEM demand for hardware-related improvements (e.g., USB support) that were ready for inclusion in Memphis prior to the time Internet Explorer 4 was ready. He also testified that they released outside Microsoft a version of Memphis without Internet Explorer 4. Veghte Dep., 1/13/99, at 783:2 - 786:8 (GX 1477).

vii. Chris Jones also testified that Microsoft shipped a pre-beta version of Windows 98 to hardware manufacturers that did not have Internet Explorer 4. Jones Dep., 1/13/99, at 536:8 - 537:3.

viii. Jonathan Roberts wrote to Allchin, Dunie, and Stork in March 97 to discuss options regarding the proposed bundling of Internet Explorer 4 and Windows 98. One of those options was to "De couple Memphis and IE and ship Memphis in July/August and connect with IE in the OEM channel when it ships." Carl Stork responded that "Currently IE4 is so immature (and big & slow & compat-bug prone) that it is impending our self hosting process. We find tons of bugs but so many are in IE components that our test & repro efforts are becoming meaningless on the OS. We are also finding more and more resistance on the team to install the builds because things don't work. I am at the stage where I do not recommend that we release anything with IE4 integrated under the name of a Memphis beta. Customers would experience too many problems and the performance would be unacceptable as well - it would be so bad as to blemish the reputation of Microsoft and of Windows . . . . More importantly, at this point it is getting in the way of valid development testing & repro work for Memphis." Roberts summed up the exchange with the following: "I'm depressed. I wasn't aware things were so bad with IE. This makes the following trade-off very painful, Hardware support for Spring machines and some TCO benefits vs IE penetration." GX 355, at MS7 003001.

146. Microsoft eventually concluded, however, that in order to win the "browser war" it needed to create a stronger tie between Internet Explorer and Windows than its OEM licensing practices achieved with Windows 95. The contemporaneous documents show that Microsoft's decision to further bind Internet Explorer and Windows 98 was driven, not by the technical merits of any such integration, but instead by a strategic desire to drive up Internet Explorer's market share vis-a-vis Netscape Navigator.

i. In December 1996, James Allchin wrote Paul Maritz an e-mail entitled "concerns for our future": "Ensuring that we leverage Windows. I don't understand how IE is going to win. The current path is simply to copy everything that Netscape does packaging and product wise . . . Maybe being free helps us, but once people are used to a product it is hard to change them. . . . My conclusion is that we must leverage Windows more. Treating IE as just an add-on to Windows which is cross-platform losing our biggest advantage -- Windows marketshare. We should dedicate a cross group team to come up with ways to leverage Windows technically more . . . We should think first about an integrated solution -- that is our strength." GX 47; GX 655, at MS7 003375 (one of the “Objectives for Memphis Release” is to “provide ship vehicle for strategic internet components”).

ii. On January 2, 1997, Allchin wrote to Maritz: "You see browser share as job 1. . . . I do not feel we are going to win on our current path. We are not leveraging Windows from a marketing perspective and we are trying to copy Netscape and make IE into a platform. We do not use our strength -- which is that we have an installed base of Windows and we have a strong OEM shipment channel for Windows . . . . I am convinced we have to use Windows. This is the one thing they don't have. . . .We have to be competitive with features, but we need something more: Windows integration. . . . If you agree that Windows is a huge asset, then it follows quickly that we are not investing sufficiently in finding ways to tie IE and Windows together." "Memphis must be a simple upgrade, but most importantly, it must be killer on OEM shipments so that Netscape never gets a chance on these systems." GX 48.

iii. Maritz responded to Allchin's January 2, 1997 email (GX 48) by agreeing “that we have to make Windows integration our basic strategy” and proposing that Microsoft hold the release of Memphis (Windows 98) to “sync” with IE4. GX 49. Allchin agreed to that plan, arguing that instead of “letting people think about whether they should choose Nav/Communicator vs. IE,” Microsoft “should move the argument to Windows (Memphis and NT 5.) and drive it because of ZAW

[Zero Administration Windows], etc. as the reason to use IE." GX 50. Allchin also argued that integration "is the only thing that makes sense, even if OEMs suffer." GX 50.

iv. In a January 1997 internal MS presentation on the "NC and Java Challenge," in a section called "response summary," the first bullet point is "Increase IE share - integrate with Windows." GX 51, at MS7 005536.

v. In an email to Bill Gates and Paul Maritz on February 18, 1997, Allchin wrote that "I am convinced the path we're on is the wrong one. We are playing into Netscape's strengths and against our own. . . . We focus attention on the browser battle where we have little market share instead of focusing the battle at integrating things into Windows where we have market share and a great distribution channel." GX 354.

vi. Christian Wildfeuer, reporting on the result of a focus group study in February 1997 of the upcoming release of Windows 98, observed that most of the study group were "Navigator users. They said they would not switch, would not want to download IE 4 to replace their Navigator browser. However, once everything is in the OS and right there, integrated into the OS, 'in their face' so to speak, then they said they would use it b/c there would be no more need to use something 'separate.' The stunning insight is this: To make them switch away from Netscape, we need to make them upgrade to Memphis. . . . It seems clear that it will be very hard to increase browser market share on the merits of IE 4 alone. It will be more important to leverage the OS asset to make people use IE instead of Navigator." GX 202, at MS7 004343.

vii. Jonathan Roberts wrote to Allchin, Dunie, and Stork in March 1997 to discuss options regarding the proposed bundling of Internet Explorer 4 and Windows 98. Roberts framed the issue as a "trade-off between ensuring we have new device support in the OEM channel for the Spring line of machines and generating twenty or so million more dollars in RUP upgrades versus driving IE 4.0 penetration and a simpler customer proposition. Based on my understanding of the company priorities, we should opt for the plan of record and keep them synced . . . Hold Memphis for IE 4.0 and ship in August-December. Pros: This is absolutely the best way to drive IE 4.0 penetration. Customer feedback, including that from over 200 folks in over 15 focus groups, indicates that people want the two to be tied together. If they are de coupled, then Navigator has a good chance of winning. In a browser battle, victory will go to the incumbent." GX 355, at MS7 003000.

viii. In a January 7, 1997 e-mail to Allchin, Maritz argued that Microsoft should hold Windows 98 for IE 4 even if it pushed the release date back to August or

September. "The major reason for this is to combat Netscape. We have to position the browser as going away, and do deeper integration on Windows. The stronger way to communicate this is to have a new release of Windows and make a big deal out of it. We will thus position Memphis as Windows 98. IE integration will be the most compelling feature of Memphis." GX 53; see also Allchin, 2/3/98pm, at 27:12-17 (agreeing with Maritz's email).

ix. Kumar Mehta reported in March 1997 that "based on all the IE research we have done" his feeling "is that it is a mistake to release memphis without bundling IE with it." Because "IE users are more likely than other browser users to get it with their computers, . . . effectively we would be taking away the distribution channel of almost a quarter of all IE users." Moreover, "80% of those who do not use IE say they have no plans to switch to it. Which means that if we take away IE from the o/s, most nav users will never switch to us. Also from all our research with IS and web professionals we know that they eventually expect us to win the browser war because Ie will be bundled with the operating system and they will have no real reason to purchase navigator." Jonathan Roberts responded that Mehta's report "validates why it is important to keep IE with Memphis." GX 205; GX 736, at MS98 0128504.

x. In an e-mail to Allchin on March 20, 1997, Roberts wrote that "Internet Explorer has a much stronger chance of winning once it is integrated into the operating system. An integrated browser makes Netscape a nonissue -- a superfluous product for all but the most committed Netscape user." GX 355, at MS7 003002.

xi. In June 1997, Chris Jones sent a memo to Bill Gates entitled "How to get to 30% share in 12 months." Among other things, Jones wrote: "We will bind the shell to the Internet Explorer, so that running any other browser is a jolting experience." GX 334, at MS98 0104683.

xii. In July 1997, Microsoft executive Moshe Dunie, commenting on a proposal to stop shipping the Windows 98 shell with Internet Explorer 4 after the release of Windows 98, noted that such a proposal "would certainly increase significantly Win98 upgrade sales. I know there is the browser share counter argument ... But it is an intriguing thought..." He received the following response from Paul Maritz: "It is tempting, but we have to remember that getting browser share up to 50% (ore more) is still the major goal." (ellipses in original). GX 113.

xiii. In December 1997, Allchin wrote to Cole, Dunie and other executives that: "We have several goals from my perspective as a company — no matter where the work is done. That is why this is tough. We have to continue to win against Netscape on the browser. This means that we need to consider downlevel and xplatform solutions. In addition, it is possible (although that is yet to be proven to

me) that we might have to ship more frequently than once per year. And at the same time we need more integration with Windows — both technically and marketing-wise. We need that for business reasons (ignoring the perception issue of the DOJ). I see this as critical. This is a hard balance, but I feel that we need to slant things much more toward Windows while we still accomplish the other goal against Netscape." GX 480.

(2) To accomplish this objective, Microsoft made the browser and the Windows 98 operating system more difficult to separate by, among other things, eliminating the "uninstall" capability and hindering users from making other browsers the default

147. To achieve its objective of further impeding browser rivals, Microsoft made Internet Explorer 4 and Windows 98 more difficult to separate.

147.1. With Windows 98, Microsoft continued to supply Windows and Internet Explorer in a form in which the underlying web browsing routines and other routines have already been combined in the same DLLs.

147.2. The only functional difference between Windows 98, on one hand, and Windows 95 combined with Internet Explorer 4, on the other hand, is a few features that Microsoft easily could separately supply and which can now be obtained by combining Windows 95 and Internet Explorer 5.

i. See infra Part V.B.3.c.(1).(b); ¶¶ 159-161.

147.3. There are, however, other differences between Windows 95 and Windows 98. Among other things, Microsoft eliminated the end user's ability to "uninstall" Internet Explorer from Windows 98, despite retaining the uninstall option for numerous other features.

i. Professor Felten testified that, although the Web browsing experience in Windows 95 OSR 2.5 and Windows 98 is very similar, Microsoft does not

provide a mechanism for removing Internet Explorer Web browsing from Windows 98. Felten Dir. ¶¶ 35-37, 52.

ii. GX 1366 is a series of screen shots of Windows 98's "Add/Remove" function, showing dozens of functions that can be added or removed by the user, including, among other things, internet tools, desktop wallpaper, mouse pointers, dial-up networking, virtual private networking, and hyper terminal. Internet Explorer is not one of them.

iii. James Allchin testified that Microsoft provides a ready means of removing many files and features that Microsoft considers to be "integrated" features of Windows (Allchin, 2/2/99pm, at 5:2-5) such as the TCP/IP stack (Allchin, 2/2/99pm, at 7:12-15) and dial-up networking, Netmeeting, and the personal web server (Allchin, 2/2/99pm, at 10:3 - 11:11).

iv. When asked to estimate "how many of the components of Windows 98 can be readily removed by procedures that Microsoft makes available," Allchin testified that "the number is going to be quite high, if you consider all of the approaches for, you know, which drivers or file systems you're using and everything. So, you know, one of the great things about Windows is it's so configurable . . . ." Allchin, 2/2/99pm, at 11:12-22.

147.4. Microsoft was well aware that its customers wanted the ability to remove web browsing functionality from Windows 98 but nonetheless chose to eliminate that feature in order to force adoption of Internet Explorer.

i. Gateway specifically requested that Microsoft provide a way to uninstall Internet Explorer from Windows 98, in part because it was "concerned that the installation of the full MS product (including channels) results in a much slower system performance if the customer chooses an alternate browser after full installation on IE4." Microsoft refused. GX 1073, at MS98 0204593 (4/24/98 letter from Microsoft to Gateway).

ii. In response to a CID, Gateway stated that:

GX 652, at ATR 30008 (sealed).

iii. Joe Belfiore testified that he was concerned that the omission of an add/remove option for Internet Explorer in Windows 98 would create a

"customer satisfaction issue," in part because some users would have applications that were incompatible with Internet Explorer 4. Belfiore Dep., 1/13/98, at 366:8-11.

iv. OEMs uniformly believed that they had no choice but to license Windows 98. Ransom testified that Packard Bell must "pre-install 100 percent of its consumer machines with Windows 98" because it is "the only viable choice." Ransom Dep. (played 12/16/98pm), at 68:25 - 69:5; see also supra Part II.A; ¶ 15.1 (collecting similar testimony from Compaq, IBM, Gateway, and Hewlett-Packard executives). In addition, Microsoft's licenses for Windows 98 forbid OEMs from removing Internet Explorer or its icon. GX 1190 (sealed); GX 660 (sealed); GX 458 (sealed); see also infra Part V.C.1.a; ¶ 177 (collecting cites to other OEM licenses). Thus, OEMs were forced to distribute Internet Explorer.

147.5. Microsoft also designed Windows 98 to override the user's choice of default browser in certain circumstances.

i. Professor Felten testified: "In all versions of Windows released prior to OSR 2.5, the Default Browser is activated whenever the user asks to initiate Web browsing." Felten Dir. ¶ 50.

ii. Professor Felten also testified, however, that in some cases "Windows 98 uses IE 4 Web browsing even if the user has specified another browser as the Default Browser. There are several situations in which this can occur. First, when the user initiates the Web Help function described in paragraph 36, and chooses the option of clicking on the 'Support Online' link, the system will always initiate IE Web browsing, instead of launching the Default Browser, to go to the Support Online Web site. Second, certain menus in Windows Explorer contain URL Shortcuts created by Microsoft. A user who selects the 'Home Page' or 'Search the Web' URL Shortcut found in the 'Go' menu in Windows Explorer will always initiate IE Web browsing to go to the particular Web site, rather than launching the Default Browser. Third, if a user places a Web page on the Active Desktop, and then clicks on a Web link on that page, this action will again initiate IE Web browsing even if the user has designated another browser as the Default Browser. Finally, Windows Explorer allows a user to type into the Address Bar a command to search the Web. Typing the word "Go" followed by a phrase or word that a user wants to search for on the Web will initiate IE Web browsing to display the response to the search request, regardless of the user's choice of Default Browser. This is an example of what the industry refers to as "hard-coding," in this case,

forcing the use of IE Web browsing." Felten Dir. ¶ 51.

iii. Both Professor Felten and Professor Farber described the significant problems for PC users created by Internet Explorer ignoring or overriding their choice of Navigator as their default browser. For example, Professor Farber testified that "the way Microsoft packages and distributes the Internet Explorer caused real problems. My personal experience, I think, is a good example of that. I tried to use Netscape. I keep trying to use it and, periodically, I install it and I keep seeing IE pop up in funny places and interfere with it. And so as a product, it is very difficult to use. I am not a person that wants to use multiple browsers. I focus on one, like I focus on one word processor. It's just too difficult to use one and then suddenly when error occurs, you're faced with another one." Farber, 12/9/98am, at 53:3-16; Felten, 12/14/98am, at 27:11-19, 29:11-17; Felten, 12/14/98pm, at 14:7-11.

3. There is no technical or economic justification for Microsoft's tying of Internet Explorer and Windows

148. Microsoft contends that its forced licensing of Internet Explorer is justified by numerous benefits that depend either on what it calls its "integrated" design or its contractual restrictions. But contemporaneous evidence shows that Microsoft's conduct was motivated by a desire to thwart rivals and protect its operating system monopoly rather than to benefit consumers, and other evidence demonstrates that Microsoft's justifications are pretextual.

a. Microsoft's "welding" of its browser thwarted the substantial demand for Windows without an Internet browser

149. As an initial matter, Microsoft's refusal to supply either Windows 95 or Windows 98 without web browsing, and its contractual prohibition on OEMs supplying such a product, thwarted consumer demand for a browserless OS.

i. See supra Part V.B.1.b.(4); ¶ 111.

150. This reduced the value of Windows to customers who preferred a browserless operating system. Indeed, as explained in detail below, Microsoft's tying arrangement inflicted

on a number of customers substantial inefficiencies and consumer harm.

i. Dr. Warren-Boulton testified: "Even if Internet Explorer is preferred by some users, it is not preferred by all users. Consumer welfare is maximized when the market is responsive to consumer demand, not when a firm with monopoly power over one product requires purchasers also to take an unwanted product or makes it difficult or costly for them to obtain a related product they desire." Warren-Boulton Dir. ¶ 158.

b. There is no technical reason for Microsoft's refusal to meet demand for Windows without web bowsing

151. There is no reason -- other than its campaign to protect its operating system monopoly through weakening browser rivals -- for Microsoft's steadfast refusal to meet the demand for Windows without Internet Explorer. Microsoft easily could have offered, or permitted OEMs to offer, the option of Windows 95 or 98 without web browsing.

(1) Microsoft easily could have supplied Windows 95 without web browsing

151.1. First, no technical reason can explain Microsoft's refusal to license Windows 95 without Internet Explorer 1 or 2.

151.1.1. The version of Internet Explorer (1.0) that Microsoft included with the "plus pack" and the original OEM version of Windows 95 was a separate, executable program file supplied on a separate disk. Web browsing thus could be installed or removed without affecting the rest of Windows 95's functionality in any way. The same was true of Internet Explorer 2.0.

i. Professor Felten testified, with respect to Windows 95, that he has "determined that removing IE1 from this version of Windows is easily accomplished by removing the IE1 program file (sometimes called an 'executable') and removing any icons on the Windows desktop and Windows Start menu items that refer to IE1. After doing this, a user cannot browse the Web without adding more

software to the system, but the functionality of the operating system is unaffected." Felten Dir. ¶¶ 21, 22 (same for IE2).

ii. In a communication directed to OEMs on July 3, 1995, Microsoft indicated that it had "decided" to include Internet Explorer (among other things) in the OEM release of Windows 95. Microsoft acknowledged that it would have been "possible for the OEM to integrate these tools into their manufacturing process themselves," but Microsoft said that it was pre-installing Explorer to "save each OEM the time and effort" that would require. GX 36.

iii. Glenn Weadock testified: "The operating system doesn't need a browser to work, as Microsoft showed, when it released the original retail version of Windows 95, which, as we discussed earlier, does not contain a browser." Weadock, 11/16/99pm, at 92:16-22.

151.1.2. Microsoft, moreover, created an easy way to remove Internet Explorer 1.0 and 2.0 from Windows 95 after they had been installed, via the "Add/Remove" feature in the Windows 95 "Start Menu." This, too, demonstrates the absence of any technical reason for Microsoft's refusal to supply Windows 95 with web browsing.

i. Professor Fisher testified that "Microsoft has argued that it must force OEMs to take IE because the absence of IE may undermine the quality of the operating system, to the detriment of users. However, several facts contradict this suggestion. For example, Microsoft provided ways to remove IE in Windows 95--a function that would most likely not have been provided if it led to a decrease in the quality of the operating system." Fisher Dir. ¶ 159.

151.2. Second, there is no technical reason for Microsoft's refusal to license Windows 95 to OEMs without web browsing, either by providing a version of Windows 95 with Internet Explorer 3 or 4 uninstalled or by permitting OEMs to uninstall Internet Exlorer 3 or 4.

151.2.1. Microsoft's decision to provide an "uninstall" procedure for Internet Explorer 3 and 4 to end users, and to promote Internet Explorer on the basis of that

feature, shows that there was no technical or quality-related reason for refusing to permit OEMs to use the procedure. Microsoft would not have permitted end users to uninstall Internet Explorer, and consumers would not have demanded such an option, if that process fragmented or degraded the other functionality of the operating system.

i. Professor Fisher testified: "Microsoft provided ways to remove IE in Windows 95 — a function that would most likely not have been provided if it led to a decrease in the quality of the operating system." Fisher Dir. ¶ 159.

ii. Celeste Dunn of Compaq testified that when Compaq was planning to remove the Internet Explorer and MSN icons from the desktop, Microsoft tested Compaq's Windows configuration and had not detected any technical problems. Dunn Dep., 10/23/98, at 187:12-25 (DX 2566).

151.2.2. Microsoft's agreement in January 1998 to provide OEMs an uninstall option also demonstrates that there was never any bona fide technical justification for Microsoft's refusal to license Windows 95 with Internet Explorer "uninstalled."

i. Jon Kies testified that Packard Bell/NEC took advantage of the January 1998 stipulated remedy to offer some of its PC models without Internet Explorer Kies Dep. (played 12/16/99am), at 6:11-19.

ii. Professor Fisher testified that "OEMs would not negotiate to remove IE if the operating system would be adversely affected, since a poorly operating computer would reflect poorly on the OEM and would be likely to increase the number of customer support calls; also, large customers would not request an operating system with IE removed if they felt this system would be adversely affected." Fisher Dir. ¶ 163.

(2) Microsoft easily could have supplied Windows 98 without web browsing and enabled OEMs and users to "uninstall" the browser

152. As with Windows 95, there is no technical justification for Microsoft's refusal to meet demand for a browserless version of Windows 98.

153. As Professor Felten demonstrated, Microsoft could easily supply a version of Windows 98, without the ability to browse the web, to which users could add the browser of their choice. In fact, Professor Felten's prototype removal program, although only a concept program designed in a relatively short period of time and without the benefit of Microsoft's internal expertise, produces precisely that result when run on a computer with Windows 98 installed.

i. Professor Felten testified that his "analysis demonstrates that it is possible for Microsoft to divide Windows 98 into two programs, one that replicates the function of the current version of Windows 98 except that Web browsing is removed, and another that adds IE 4 Web browsing to the first program, such that an OEM or user who installed the two programs in sequence would end up with software functionally identical to today's version of Windows 98. Microsoft, with its intimate knowledge of its own products, would have little difficulty performing this task." Felten Dir. ¶ 66.

ii. Professor Felten also testified that his "prototype removal program removes Internet Explorer. It removes the ability to browse the Web, and it prepares the machine to accept the installation of another web browser. So, if you're in that state where IE Web browsing has been removed and nothing has been put in its place, then all of the Web-browsing functions, features are not there; and, in particular, the ability to display a Web page inside an embedded subwindow is gone . . . ." Felten, 12/14/98pm, at 46:14 - 48:2.

iii. Professor Felten testified that his "programs demonstrate that Microsoft can deliver a version of Windows 98 from which the IE web browser has been removed, and they can deliver that in a way which does not affect the non web-browsing functionality of Windows 98. . . . Microsoft can then produce an IE installation program which puts the system back, in effect, to what it is in today's Windows 98." Felten, 6/10/99am, at 9:4-12.

154. Professor Felten's program does not degrade the performance or stability of

Windows 98 in any way.

154.1. Professor Felten testified repeatedly and credibly that he had been using a Windows 98 computer, on which his program had been run, for more than seven months with no discernible loss in performance or stability.

i. Professor Felten testified that "I should tell you that for seven and a half months now I have been using a PC from which Internet Explorer has been removed and Netscape substituted -- that's since the 23rd of April -- on my primary desktop computer at work. And since I'm a computer scientist, I use that machine pretty intensely. I have see no problems in that time. My primary desktop computer at home I have been using Windows 98 in the same configuration with Web browsing removed and Netscape in place since the midle of August. My testimony in this case was written on that machine, and I have never seen a problem -- other than the Windows Update issue which I described to you before, your honor." Felten, 12/14/98pm, at 42:13 - 43:2; Felten, 12/14/98pm, at 43:15-20 (same); Felten, 12/14/98pm, at 52:1-17 (same).

154.2. Professor Felten also testified that he ran several performance testing programs provided by Microsoft and discovered that removing Internet Explorer from Windows 98 via the prototype removal program actually yielded a modest performance gain.

i. Professor Felten testified that: "Microsoft turned over to us a set of ten performance measurement programs that they use for measuring performance of various Microsoft software, in particular measuring performance related to what Mr. Allchin calls the core IE DLLs." Felten, 6/10/99pm, at 13:17-22.

ii. Professor Felten testified that, "in these performance tests, what we found was on the whole, removing the Internet Explorer browser from Windows makes Windows a little faster." Felten, 6/10/99pm, at 14:17-19.

iii. Professor Felten testified that "there were ten tests, and on one of the tests there was no statistically significant difference between the two systems. On six of the tests there was a performance improvement due to removing Internet Explorer -- the Internet Explorer browser. And on three of the tests there was a slight performance slowdown due to removing the IE web browser. And I want to point out the three slowdowns are considerably

smaller than the six performance improvements on the other test. So, on the whole, what we see is a slight performance improvement due to removing IE." Felten, 6/10/99pm, at 15:2-13.

iv. Professor Felten testified that Windows 98 uses less dynamic memory (RAM) after the prototype removal has been run, which has a positive effect on system performance. Professor Felten testified that "with the browser, the amount of memory allocated after boot was 35.6 megabytes. And in the other scenario, with the IE web browser removed, the amount of allocated memory was 29.8 megabytes. That's a difference of about six megabytes, or about 20 percent, in the memory use of Windows." Felten, 6/10/99pm, at 20:16-21.

154.3. Most of the performance problems that Microsoft alleges about Windows 98 after Professor Felten's program had been run were merely acknowledgments that Professor Felten had, in fact, successfully removed web browsing from the system. For example, Microsoft argues that Professor Felten's program removes the user's ability to type in a web page from the "Start" menu or to place content from a web page on the "Active Desktop." Felten, 12/14/98pm, at 29:1-8; Felten, 12/14/98pm, at 30:19 - 31:7. Such observations demonstrate merely that Professor Felten's program does what it was intended to do.

154.4. Microsoft attempted to demonstrate that Professor Felten's program degrades the general performance of Windows 98 in ways unrelated to web browsing, but the video demonstration that Microsoft offered as evidence did not prove what it purported to prove.

154.4.1. On the video tape, Microsoft employee Yusuf Mehdi led what appeared to be a guided demonstration of a Windows 98 machine connecting to Microsoft's Windows Update web site. DX 2161. Mehdi said that Microsoft had "not made any other changes to this computer or Windows 98 except to run Dr. Felten's program as he describes in his expert report and his written direct testimony." DX 2161 (played 2/1/99pm), at 5:13-20. He also

said that the computer was taking an unusually long time to complete that operation because of "performance degradation that has occurred because of running the Felten program."

i. Mehdi stated that "As you can see, at the bottom of the page here, we're actually connecting out to the Internet and fetching that data. It's taking a very long time, however--unusually long--to access that web site. That's a result of the performance degradation that has occurred because of running the Felten program." DX 2161 (played 2/1/99pm), at 7:12-18.

ii. Mehdi stated that "Dr. Felten chose to let customers access this one web site which is done using the IE code in Windows 98 including MSHTML, URLMON, and WININET among other files. However, Dr. Felten's changes make access very slow." DX 2161 (played 2/1/99pm), at 7:21-25.

iii. Mehdi stated that "as I have already demonstrated in showing how slowly the Windows Update site loaded, the performance of the government version of Windows 98 is much slower." DX 2161 (played 2/1/99pm), at 15:17-20.

154.4.2. In fact, however, almost nothing about the purported demonstration was accurate and truthful.

154.4.2.1. In the first place, Microsoft’s sponsoring witness for the videotape, James Allchin, acknowledged that there were serious discrepancies in the appearance of certain title bar screens on the “demonstration PC” in the video. As a result, it initially appeared to him that, contrary to the claim made in the video, Professor Felten's program had not even been run on that machine though he later produced a different explanation.

i. Compare GX 1688 (screen shot from unmodified Windows 98 machine attempting to access Windows Update, showing ""Microsoft Windows Update - Microsoft Internet Explorer" at top) with GX 1689 (screen shot from a machine on which Professor Felten's program had been run, showing "Microsoft Windows Update - Windows 98" at top), and GX 1692 (screen shot from DX 2161, showing

"Microsoft Windows Update" at top).

ii. Allchin initially stated on cross-examination that it appeared that Professor Felten's program had apparently not been run on the demonstration machine at all. Allchin, 2/2/98am, at 27:8-18 (testifying that "from what I'm seeing here right now, I believe that that was done on a pre-Felten system, although the point still stands. He has performance problems and the Windows Update doesn't work, but I believe, from what I'm seeing here, they filmed the wrong system."); Allchin, 2/2/98am, at 28:23-24 ("In this particular case, . . . I did not think the Felten program had been run.").

154.4.2.2. In addition, as Mr. Allchin conceded on cross-examination, Microsoft's representation that it had "not made any other changes to this computer or Windows 98 except to run Dr. Felten's program as he describes in his expert report and his written direct testimony," was false (DX 2161 (played 2/1/99pm), at 5:13-20). To the contrary, the videotape demonstration was apparently compiled by splicing together footage from several different machines, some of which had both extensive additional software installed and several unexplained manual changes to the Windows Registry.

i. Allchin testified that "I believe some of those machines had Office on it, for example, and some of them had some of the other browsers that were done. Those weren't all the same machine, and they all didn't have exactly the same thing on it." Allchin, 2/2/99am, at 29:24 - 30:5.

ii. When asked whether "some of the machines--at least some of the time somebody had manually changed the registry," Allchin answered: "Yes. There is a part of the film that shows that they had apparently rerun the test a couple of times filming, and they had added--it's very easy to add empty entries to the registry." Allchin, 2/2/99am, at 36:5-23.

iii. Allchin conceded that the registry changes shown on the

tape would not be there if you installed Felten's program on a virgin machine and did nothing else. Allchin Dep. (played 2/2/98am), at 40:16-21.

iv. Allchin conceded that the statement on the tape, that nothing had been done to the machine but Professor Felten's program, was untrue, because "they had been through a rehearsal." Allchin, 2/3/99pm, at 57:5-19.

v. Allchin conceded that even though the videotape narration claims that, other than running Professor Felten's program, "we have not made any other changes to this computer," in fact the number of icons visible on the desktop changes several times during the video, clearly demonstrating that changes had been made or that more than one PC must have been used for the so-called "demonstration." Allchin, 2/3/99pm, at 64:3-19.

154.4.2.3. Allchin also conceded on cross-examination that it would not in any event be technically possible to measure the kinds of alleged performance degradation under the circumstances purportedly depicted on the video. The entire premise of the demonstration was, therefore, inaccurate and misleading.

i. Allchin, 2/2/99am, at 21:17-22 ("The test that we know shows performance has to be done in a controlled circumstance. You cannot prove the performance slowdown when you're connected to the Internet. You can only prove it in a controlled situation, which is how we test the performance degradation.").

c. There is no technical reason for Microsoft not to meet demand for Windows 95 or Windows 98 without web browsing by offering further separation between the browser and the operating system

155. Beyond its plain ability to enable OEMs and users to "uninstall" Internet Explorer, there is no technical reason for Microsoft's refusal to offer OEMs and users the option of further separation between the browser and the operating system.

(1) Microsoft easily could supply versions of Windows 95 and Windows 98 without the routines that provide web browsing and still offer users the same alleged benefits of its "integrated" features and design

156. Although Microsoft contends that removing the routines that supply only web browsing from Windows 95 or Windows 98 will deprive consumers of the benefits of its "integrated" design and features, this contention is deeply flawed. First, such "integration" could never supply any meaningful benefits to consumers who do not wish to browse the web using Internet Explorer. Second, supplying an unbundled version of Windows 98 to those consumers would not prevent Microsoft from offering an "integrated" version to those consumers that desired it. Because of the malleable nature of software, the "integration" necessary to produce any such benefits could be achieved just as effectively by OEMs or end users installing a separately distributed product. Whether Microsoft chooses to call that product a "browser" or an "operating system upgrade" is, from both a technical and an economic perspective, immaterial.

(a) Bundling the browser with the operating system is inefficient for users that do not want the browser

157. Bundling browsing-only routines into large system DLLs is inefficient for users who do not want web-browsing functionality.

157.1. Microsoft has never contended (and could not plausibly contend) that the presence of browsing-only routines in its large DLLs improves system performance even if those routines are never invoked by any code path on the system. Routines that are not executed are simply dead weight and degrade system performance.

i. Professor Felten testified that: "Any code in a DLL that supports only one function of the DLL may be removed without endangering other functions

of the DLL. For example, code that supports only IE Web browsing functions may be removed without endangering any non Web browsing functions of Windows 98." Felten Dir. ¶ 62.

ii. See infra Part V.B.4.c.(1); ¶ 170.

157.2. It can thus be efficient to place routines that are used only for web browsing into large system DLLs only if the system is designed to deliver web browsing functionality. And it is, by the same token, not inefficient for Microsoft to disaggregate browsing-only routines from files like SHDOCVW.DLL in the versions of Windows 98 that it delivers without web-browsing functionality.

i. Professor Felten testified that Microsoft split certain DLLs from Internet Explorer 4 to Internet Explorer 5, which shows "of course, that these DLL files are not indivisible and they are not fixed. And so arguments that say that `A' and `B' are in the same DLL, and, therefore, we cannot separate them, are not correct." Felten, 6/10/99am, at 51:23 - 52:2.

iii. Hadi Partovi testified that Microsoft has moved functions in one DLL into different DLLs in succeeding versions of the product. Partovi Dep., 1/13/99, at 659:7-23.

iv. Professor Felten testified that SHDOCVW.DLL "is a great example of the point I'm trying to make about packaging of functions into files. This SHDOCVW file is really a bundle of separate functions. It contains some functions having to do with displaying the Start menu. It contains some functions that have to do specifically with Web browsing, and it contains some general user interface functions as well. And to talk about this file as doing one thing or being part of one product is really incorrect." Felten, 12/14/98am, at 60:18 - 61:2.

157.3. Bundling routines into large system DLLs in fact creates substantial inefficiencies for users who do not wish to use the functionality that those routines deliver.

157.3.1. Installing software on a system that the end user does not desire and will not use degrades performance by unnecessarily consuming system resources, increasing

the likelihood of software conflicts, and increasing the complexity of the user interface. Those problems are exacerbated when the unwanted software is integrated into the operating system because operating system code is often loaded into the "working set" in dynamic memory, whereas unused applications typically sit dormant on the hard drive.

i. See infra Part V.B.4.c.(1); ¶¶ 164.1-2.

157.3.2. Microsoft understood that its decision to "integrate" Internet Explorer into Windows 98 would in fact substantially degrade the performance of Windows 98 for those users who desired to browse the web with Netscape Navigator, or not at all.

i See supra Part V.B.2.3; ¶¶ 145-47.

157.3.3. As Microsoft recognizes, bundling new functionality into the operating system can also make testing difficult and can slow the rate of innovation.

i. In August 1996, Hank Vigil sent Paul Maritz an e-mail entitled "Gravity or Anti-Gravity" and observed "Once something has been pulled into the OS, the requirements of quality, breadth of compatibility and scale mean that lots of dependencies and trade-offs happen. The net result is that the monolithic code base ships on long cycles after lots of testing. There is also a tendency to meet all needs: be everything to every consumer. Despite the advantages of integrating more and more functionality into the OS, there seem to be areas that can/would benefit by breaking out of the OS so that they can develop richer functionality faster. This allows for groups to discover, re-define and exploit customer needs in ways that are hard when teams believe that OS gravity is the central law." GX 157, at MS98 0167387.

ii. Brad Silverberg, commenting on the e-mail, agreed that "This is a very good and important point. To me, the optimal strategy is something in between: key components evolve and improve and get delivered independently of the OS release cycles, and then synch up when there is an OS release, providing additional integration. Clearly the needs for many components require that they release in much faster cycles than the OS itself can. The most

obvious example is the browser. Yes, it will be integrated into the os, and ie4 integrates deeply enough that it takes over the os's UI; but it is on a much faster release schedule. We would be dead if we had to synch with OS's." GX 157, at MS98 0167387.

iii. Maritz testified that: "There is a cost to integrating things into your operating system. It means more work to be done, more things to be tested, more software to be written." Maritz, 1/27/99pm, 47:6-12.

iv. Jonathan Roberts wrote to James Allchin, Moshe Dunie, and Carl Stork in March 1997 to discuss options regarding the proposed bundling of IE 4 and Windows 98. One of those options was to "De couple Memphis and IE and ship Memphis in July/August and connect with IE in the OEM channel when it ships." Stork responded that "Currently IE4 is so immature (and big & slow & compat-bug prone) that it is impeding our self hosting process. We find tons of bugs but so many are in IE components that our test & repro efforts are becoming meaningless on the OS. We are also finding more and more resistance on the team to install the builds because things don't work. I am at the stage where I do not recommend that we release anything with IE4 integrated under the name of a Memphis beta. Customers would experience too many problems and the performance would be unacceptable as well - it would be so bad as to blemish the reputation of Microsoft and of Windows. . . . More importantly, at this point it is getting in the way of valid development testing & repro work for Memphis." GX 355.

157.3.4. And even Microsoft's own engineers have expressed skepticism about Microsoft's decision to bundle more and more unrelated features into the Internet Explorer DLLs.

i. In an August 1997 e-mail, Christian Fortini wrote: "We have to stop adding non-browsing features into Trident and start taking some of the existing ones out. We should shrink the core Trident code base down to a very compact (and fast) HTML rendering and manipulation engine and hopefully limit the number of people in this code base." GX 1377, at MS7 004591. "Trident" is Microsoft's code name for the file MSHTML.DLL. Felten, 6/10/99am, at 46:23-24.

ii. Commenting on GX 1377, Professor Felten testified that Fortini "appears to think that there are features in there that are not related to browsing, and he's advocating taking them out. . . . And he seems to say that, if that is done, that will cause the HTML rendering engine to be more -- to be faster and more compact. In other words, he seems to think that it's desirable for technical reasons." Felten, 6/10/99am, at 47:4-12.

(b) Tying the browser to the operating system is not necessary to achieve the benefits sought by users who want both the operating system and the Internet Explorer browser

158. Microsoft is entirely free to offer a bundled version of the operating system and the browser to OEMs and users that want it; it does not need to require OEMs and users to take that version in order to offer it to those that want it.

i. See infra Part V.B.3.d.(3); ¶ 165.2.

159. Moreover, even if Microsoft were unable to offer a bundled version, and even if it were most efficient for web browsing routines to be placed in large DLLs, operating system functionality and web browsing functionality can still efficiently be sold or distributed separately. Microsoft could deliver web browsing functionality separately to those that desire it, in the form of updated DLLs.

159.1. As previously explained, the malleable nature of software has two important implications.

159.1.1. First, except at the extremes, software routines need not reside in the same file to function together in a perfectly seamless or "integrated" fashion. The organization of routines into files (including DLLs) is thus largely a matter of design discretion, as opposed to engineering necessity.

i. See supra Part V.B.2.d.(2)(a); ¶ 131.

159.1.2. Second, even if placement of certain routines in the same files has engineering benefits, it is not necessary for those routines to be shipped together to achieve that benefit. Users can be supplied with files containing some of the routines and, should they also desire the others, can obtain a different file containing the additional, related routines.

i. See supra Part V.B.2.d.(2)(a); ¶ 126.4.

159.2. Therefore, there is no technical reason why Microsoft could not ship even fully "integrated" web browsing functionality as a separate product that could be installed on Windows 98.

i. James Gosling testified that "regardless of whether a particular file is installed on a computer with the original operating system, or separately by a computer manufacturer, or by an end user installing a program, the computer will operate in the same manner." Gosling Dir. ¶ 42

ii. Professor Farber testified that: "Microsoft claims in its memoranda filed with this Court that certain 'efficiencies' result from its 'integration' of some of the files (or DLLs) that are included in its Internet Explorer (IE) product as part of Windows 98. . . . The claims that efficiencies exist from this combination of functions are misleading. While the combination may offer certain efficiencies, these same efficiencies can be achieved without bundling of the Web browser software with what Microsoft calls its Windows operating system. This is because there are no technical barriers that prevent Microsoft from developing and selling its Windows operating system as a stand alone product separate from its browser software . . . . Windows 98 (like all other software) necessarily consists of modules which are malleable and separable. There are no technical efficiencies for users achieved by combining Microsoft's browser software with the remainder of the software sold as Windows 98 that could not be achieved by writing two programs in a manner that later could be loaded and 'integrated' either by the retail end user (i.e., just as end users install any other application that runs on Windows) or by an OEM." Farber Dir. ¶ 24.

iii. Professor Felten testified that "the nature of software is such that it is easy to aggregate unrelated functions into the same file, or to 'integrate'

separate products into a single product. The mere fact that two functions are implemented in the same file, or that two products are 'integrated' into a single product, does not imply that they must be implemented in this fashion; because of the nature of software, functions can be separated into distinct files, or 'integrated' products can be separated into distinct products without any loss of capability." Felten Dir. ¶ 31.

159.3. Microsoft concedes that the version of Internet Explorer separately distributed over the Internet accomplishes its "integration" in precisely that way.

i. See infra ¶ 159.4.

ii. Carl Stork testified that Microsoft distributed Internet Explorer 3 separately from the Windows 95 because "Internet Explorer 3 represented significant customer improvements over previous generations of Internet Explorer. And we wanted to provide that to as many of our customers as we could. We have in the past released advances to components that are part of the operating system separately from the operating system as well. Another example to that would be DirectX, which has frequently both been made available on the Web as well as to be shipped with applications. And there are others as well where I could cite the same thing." Stork Dep., 8/11/98, at 40:19 - 41:7 (DX 2594).

159.4. As Microsoft's Jim Allchin conceded, all of the benefits offered by the "integration" of Internet Explorer with Windows 98 can already be achieved by an end user who installs the most recent, separately downloaded version of Internet Explorer onto a version of Windows without Internet Explorer.

159.4.1. Separate delivery of Internet Explorer 4 and the original browerless retail release of Windows 95 provides nearly all the web-related features of Windows 98; as Mr. Allchin conceded when asked about 19 separate features of Windows 98, Microsoft's decision to include the routines that supply those features in Windows, rather than in a separate browser product, is simply a choice about "distribution."

i. When asked whether a user could achieve the "integration of

Internet technologies" accomplished by Windows 98 by "combining a retail version of Windows 95 and a retail version of Internet Explorer 4, both purchased separately," Allchin answered: "Yes. IE is replacing core Windows files, and it becomes a modified Windows system that has this integration in it." Allchin, 2/1/99pm, at 37:15-25.

ii. When asked whether Windows 98 was therefore "just a distribution vehicle" for the technologies that Microsoft also distributed as Windows 95 and Internet Explorer 4, Allchin answered: "It's the same code out of Windows." Counsel for the United States then asked: "It's the same code, and all we're talking about are different distribution vehicles, in your words; correct, sir?" Allchin answered: "Yes, that's what I said, yes." Allchin, 2/1/99pm, at 39:18-25.

iii. When again asked whether "a user who had purchased Windows 95 at retail and who added IE 4 purchased at retail would have exactly the same experience," Allchin again answered: "Yes, for exactly the same reason, i.e., he is replacing core system files, no matter how you got it." Allchin, 2/1/99pm, at 41:9-14.

iv. Allchin agreed "that you can get those benefits either by buying Windows 98 or by having purchased an original retail version of Windows 95 to which you added IE 4 either downloaded or bought from retail or gotten in some other way." Allchin, 2/1/99pm, at 45:9-25.

v. Carl Stork testified that the Internet Explorer 4 team developed its "set of technologies" for several different "ship vehicles," one of which was "a retail upgrade for Windows 95," and another of which was inclusion in Memphis. Stork Dep., 1/13/99, at 772:1-6.

vi. In a February 1997 summary of the results of Internet Explorer 4 and Windows 98 focus groups, Christian Wildfeuer discussed the reaction to the new "WebView" user interface available with both products: "Interestingly, they attributed these new features to Windows and not to Internet Explorer, and this despite the fact that we repeatedly hammered home the message that they would get all that in IE 4 for free, if they downloaded it off the Web." GX 202 (emphasis added).

159.4.2. The remaining features can be obtained by combining a

separately-obtained Internet Explorer 5 and a version of Windows 95 on which Internet Explorer 4 has been installed.

i. Professor Felten testified that Allchin "mentioned three features: HTML Help, Update Windows, and WebTV for Windows" that were available in Windows 98 but not to a Windows 95 user with Internet Explorer 4. Felten, 6/10/99am, at 18:18-19. Professor Felten further testified that the HTML Help and Windows Update functionality are delivered by the version of Internet Explorer 5 that Microsoft is currently making available separate from Windows 98. Felten, 6/10/99am, at 19:10-16.

ii. Professor Felten testified that the separately downloadable version of Internet Explorer 5 does not include the WebTV functionality "but that does not mean that it could not. In fact, if you look at Windows 98, you'll see that WebTV for Windows is an optional feature, which means the user has the option to install it or not. And if the user has installed it, the user can take it away at any time." Felten, 6/10/99am, at 19:20 - 20:2.

159.5. Microsoft's contention that a user cannot get the same benefits from combining Netscape with Windows is beside the point; the important point is that Microsoft does not have to bundle Windows and Internet Explorer in order for those users who want both to get the benefits of both.

i. Professor Felten testified that Allchin's assertion -- that installing Navigator on top of the original retail version of Windows 95 results in losing 19 or 20 different features available on the integrated Windows 98 -- is "not really related" to the issue of whether Internet Explorer has to be included with Windows. Felten continued: "If you want to understand the relationship between Windows 98 and Internet Explorer, you can't do it by looking at the relationship between two different products, Windows 95 and Netscape Navigator. So I don't see the relevance of that to any argument that IE has to be delivered with Windows 98." Felten, 6/10/99am, at 16:13-23.

ii. Instead, Professor Felten testified that "the relevant comparison is what happens when you combine the original retail version of

Windows 95 -- that's the one that came without any browser -- what happens when you combine that with IE 4 distributed separately, or perhaps IE 5 distributed separately." Felten, 6/10/99, at 17:2-6.

159.6. Industry participants, including Microsoft, routinely describe software products as seamlessly "integrated" even when they are not shipped together or even produced by the same company.

159.6.1. Microsoft, for example, describes Office as "integrated" with the operating system and each of its separate components, even though the functionality supplied to the end user is identical whether the components are purchased together or separately.

i. Robert Muglia testified that Microsoft Office is "an integrated package" including distinct applications known as Word and Excel, which were "designed to be integrated" together into Office, but that Microsoft nonetheless distributes Word and Excel separately. "The way I might say that is that Office is an integrated package overall. It was designed to be integrated. We produced, because our customers would like us to produce it, a separate word-processing program that we derived from the overall integrated Office package and a separate spreadsheet program." Muglia, 2/26/99pm, at 67:17 - 70:3.

ii. In response to Muglia's comments about Office, Professor Felten testified: "In this instance, Microsoft makes Word and Excel available separately for those users who want them. Or for those users who want both, Microsoft provides a single box they can buy which gives them a single install. So, in other words, Microsoft can give the user the choices they want . . . The same is true with regard to Internet Explorer and Windows. Microsoft could provide a single install for those users who want both Windows and Internet Explorer, without taking away the other choices such as buying only Internet Explorer." Felten, 6/10/99pm, at 12:1-17.

159.6.2. Intuit describes a browser as "integrated" into Quicken, even though Intuit must obtain a browser from another company.

i. William Harris testified that in early 1995 Intuit was interested in "the possibility of bundling a browser and with some light integration." This meant creating a "mechanism" "by which, within the Quicken product, one could instantiate the browser and instruct the browser as to the URL that should be displayed." Harris, 1/4/99pm, at 8:23 - 9:5.

159.7. Other operating system and browser vendors deliver similar benefits, and describe their products as seamlessly "integrated," even though they can be distributed and installed separately.

159.7.1. For example, the Caldera Open Linux product, which Allchin himself demonstrated, provides "integrated" features yet is completely removable and replaceable, just like any application installed on top of the operating system.

159.7.1.1. Caldera OpenLinux, combined with the "KDE" browser, provides "integrated" features similar to those delivered by the combination of Windows 98 (or, as noted above, the combination of the retail version of Windows 95 and Internet Explorer 4 or 5).

i. Professor Felten testified that the video demonstration produced by Allchin "claimed to show . . . that Caldera OpenLinux shipped a browser, which Mr. Allchin characterized as integrated, and that that browser had some of the features that Mr. Allchin said were benefits of the integration of IE into Windows. In other words, it claimed to show that Caldera was, in some sense, acting like Microsoft in achieving these benefits supposedly by putting in an integrated browser." Felten, 6/10/99am, at 23:7-14.

ii. During James Allchin's cross-examination, the government produced a still screen shot of Microsoft's video presentation that demonstrates that the combination of Caldera OpenLinux and the KDE browser provides integrated features similar to those offered by Windows 98 and IE, including 1) single-window navigation (also known

as unified viewing) between the Web and local files, including the use of back and forward buttons to let the customer manage local files and folders, as well as internet content; 2) unified favorites list; and 3) unified history list. See GX 1707 (still screen shot of Microsoft video demo played in the record at Allchin, 2/1/99am,at 61:1 - 66:21); see also Felten, 6/10/99am, at 23:20 - 24:21 (examining GX 1707).

159.7.1.2. The KDE browser is entirely separate from the OpenLinux operating system; it is produced by a different company; it is easily replaced by another operating system installed on top of OpenLinux; consumers can uninstall it at any time.

i. The KDE browser is produced separately from the OpenLinux operating system, by a different company. Felten, 6/10/99am, at 26:5-14.

ii. The KDE browser can be easily replaced with other browsers installed separately on top of OpenLinux, and will then deliver the same integrated functionality. Felten, 6/10/99am, at 26:15-18.

iii. OpenLinux customers can choose not to install the KDE browser or can uninstall it at any time. Felten, 6/10/99am, at 26:22-25.

iv. The KDE browser provides similar integration when installed separately on top of other operating systems to which it is ported but with which it is not bundled. Felten, 6/10/99am, at 26:19-20 ("KDE browser runs on other operating systems, such as Solaris, HP-UX and IRIX"); Felten, 6/10/99am, at 27:1-11 (KDE browser provides integrated features if installed on top of other operating systems).

v. For all of these reasons, Professor Felten testified, "The Caldera example contradicts" Allchin's testimony (Allchin Dir. ¶ 3) "because the KDE browser is an add-on product and it comes from a third party, and yet it achieves these benefits of integration that Mr. Allchin says can only be achieved by bolting the browser onto the operating system."

Felten, 6/10/99am, at 28:4-8. He continued: "What we see with Caldera is a pair of products, if you will -- the Linux and the KDE browser -- which work well together, and are integrated in that sense, but are not inseparable." Felten, 6/10/99am, at 29:9-12.

159.7.2. The Be OS product also provides integrated features using a removeable, replaceable browser application installed on top of the operating system.

i. During its video demonstration, Microsoft employee Vinod Vallipolil stated: "The demonstration will show that the Be OS includes browsing and multimedia functionality, which are built directly into the operating system, and that no third party code is required in order to exercise this functionality." Allchin, 2/1/99am, at 58:11-15.

ii. GX 1771 (a series of screen shots that shows that the browser on Be, Net Positive, is an application listed under the "apps" directory which can be removed by clicking on it and dragging it to the trash can; removal results in reduction of size taken up by applications from 4.3 megabytes to 3.0 megabytes -- a reduction of 1.3 megabytes); see also Allchin, 2/2/99am, at 13:5 - 19:13 (Boies walks through GX 1771 with Allchin).

iii. The Net Positive browser can be removed from the Be OS. Removing the Net Positive browser from the applications directory frees up 1.3 megabytes of RAM on the Be OS applications directory. Allchin, 2/2/99am, at 13:5 - 19:13; GX 1771.

iv. Although Be's help system will not function fully in the absence of a browser, the help system will work if another browser is installed after Net Positive is removed. Allchin, 2/2/99am, at 20:5 - 21:4.

160. Accordingly, even if Microsoft's design creates benefits for some users, forcing all of its customers to take an "integrated" browser is wholly unnecessary to achieve those benefits; Microsoft's decision to force users to take the browser in order to get the operating system is, as Mr. Allchin put it, simply a choice about "distribution."

i. Professor Fisher testified regarding the two senses of "integrated": "One of them is to call two software items integrated if they run seamlessly together. . . The second is integration in the sense that it is impossible or very difficult to split it apart. Now, as to whether that is anticompetitive, I think for that one has to think about some more. The consumer benefit doesn't come from . . . the fact that code is designed in that form. The consumer benefit comes from seamless operation. Microsoft, in Windows 95, designed Internet Explorer, particularly Internet Explorer 4.0, and Windows 95 to work seamlessly togther and be integrated in that form. And there is, you know, evidence that they could have perfectly well designed Windows 98 and Internet Explorer to also work seamlessly without having the what I have referred to the other day as the welded feature, the difficulty of taking it apart feature. If that is so, then I think yes, it probably was anticompetitive . . . because they could have done it in a way that is less restrictive." Fisher, 1/12/99pm, at 4:5 - 6:20.

ii. Professor Fisher testified: "there is substantial testimony from Microsoft witnesses . . . that the advantages to consumers from the combination of Windows 98 and IE . . . could be achieved just as substantially as in having Windows 95 and IE separately without the two of them being, so to speak, so tightly welded as they are in Windows 98." Fisher, 6/1/99am, at 42:17-23. That testimony, Professor Fisher explained, led him to conclude that "there are no particular consumer benefits from getting the things together as opposed to getting them separately, but there are no particular advantages -- I mean economic cost advantages to Microsoft from delivering them together, as opposed to just delivering them separately." Fisher, 6/1/99am, at 44:23 - 45:3.

(2) Microsoft's forced licensing of its browser is not necessary to provide OEMs and users with other benefits, such as new file formats and data protocols

161. There is also no technical reason to force users to take the browser with the operating system in order to supply them with the other consumer benefits Microsoft identifies. Each of those benefits can be supplied separately by the browser and the operating system.

161.1. Non-browsing features. Microsoft points out that Windows 98 includes non-web browsing features such as DVD and USB support (Allchin Dir. ¶¶ 119-120). But there is no reason to force users to take routines that supply web browsing to obtain these features.

i. Professor Felten testified that there are "plenty of things in Windows 98,

unrelated to browsing, that are not in Windows 95. Plenty of Features. For example, support for new kinds of hardware devices." Felten, 6/10/99am, at 34:7-10. Professor Felten further testified that there is no technical reason to require users to take Internet Explorer to obtain these features. Felten, 6/10/99am, at 39:11-15.

161.2. Support for new Internet protocols and data formats. Nor does providing support for new data formats and Internet protocols provide, as Microsoft suggests (Allchin Dir. ¶¶ 212-213), a justification for forcing users and OEMs to take Microsoft's browser.

161.2.1. File formats are commonly supplied separately. For instance, Adobe Acrobat Reader, a third-party application provided entirely separately from Windows, provides support for the popular "PDF" file format commonly used for viewing text retrieved over the Web.

i. Professor Felten testified: "One example is the Adobe PDF viewer. `PDF' stands for portable document format. And it's a very commonly-used format for describing documents so that you can move them from computer to computer, print the, view them on your screen and so on. And Adobe makes available some programs with names like PDF reader or PDF viewer that are widely used for viewing and printing PDF documents. . . . It may be provided with some OEM's, but I don't know of any instance in which an OEM is forced to take it or a user is forced to take it." Felten, 6/10/99am, at 42:11-23.

ii. Professor Felten testified: "again, in general, there's really no connection between offering users the ability to support a new protocol or a new format -- there's no connection between that and forcing them to take any particular software product." Felten, 6/10/99am, at 43:3-6.

161.2.2. Similarly, Microsoft need not force customers to take its web browser to supply support for HTML.

161.2.2.1. Including only an HTML rendering engine in its

operating system -- an option Microsoft specifically considered but rejected -- would suffice.

i. Microsoft has a file which, among other things, contains an HTML rendering machine; that file is MSHTML.DLL. Felten, 6/10/99am, at 44:20-22. When asked whether there were any inherent reason to put different functions -- HTML rendering and other functions -- together in the same DLL, Professor Felten testified: "there are many ways in which functions can be grouped into DLL's. . . . You might make a decision based on whether things fit in a certain way," like you would with organizing grocery bags, "but fact that the ice cream and the carrots are in the same bag doesn't necessarily mean that they are related in some way. . . . It's possible to put unrelated functions into the same DLL." Felten, 6/10/99am, at 45:6-19.

ii. Specifically regarding MSHTML.DLL, Professor Felten testified: "You have the function of an HTML rendering engine in there, and you have other things as well. Those things could be separated, but they are not." He further explained that the rendering engine could be taken out of the DLL, or alternative the other stuff could be taken out. Felten, 6/10/99am, at 45:21 - 46:4.

iii. In a March 1997 e-mail, similarly, Allchin discussed the idea of separating the "shell" from the "browser" (IE 4). In doing so, he presented some development options, including the following: "Move the shell -- but not the browser -- to the OS team. This was my recommendation before as you know. It may not be the thing you want to do for other reasons, but it is the right thing to do for the OS (both Memphis and NT). IE 4 would just plug into the environment." GX 616 (emphasis added).

iv. See also supra Part V.B.3.c(1)(c); ¶ 161.

161.2.2.2. Indeed, other operating system vendors -- which lack Microsoft's monopoly power -- include a separate HTML rendering engine, even when they bundle a removable browser.

i. Apple's Avadis Tevanian testified that in the Mac OS

"there are multiple HTML renderers," including "one independent of the Netscape Navigator and Internet Explorer technologies." Tevanian, 11/5/98pm, at 67:20 - 68:4.

d. The post hoc economic justifications Microsoft's witnesses have advanced for tying Internet Explorer to Windows are contrary to the evidence

162. Microsoft's economic justifications for forcing users to take the browser with the operating system, and for making the two difficult to separate, cannot be squared with the evidence.

(1) Microsoft's conduct was not plausibly designed or intended to increase demand for Windows

163. Microsoft's tying of Internet Explorer to Windows, and the decision to make it non-removable, was not intended to increase demand for Windows.

163.1. Although creation of an appealing new complement can increase demand for a product, the value of a product is maximized by helping consumers use the complement of their choice, including complements (like browsers) produced by other firms.

i. Professor Fisher testified that "if browsers are a complement to operating systems such that the sale of browsers that can be used with Windows will increase demand for Windows, it should not matter who makes the complement." Fisher Dir. ¶ 129(b).

ii. Professor Fisher testified that if Microsoft were genuinely trying to maximize demand for Windows, "I don't know that Microsoft would have an interest in promoting the Netscape browser, but Microsoft would surely have no interest in restricting its distribution, since people who wanted to use the Netscape browser with Windows would be happier people with Windows. To some extent, it would increase the sale of Windows." Fisher, 6/1/99am, at 66:3-8.

163.2. Microsoft did not, however, seek to aid consumers who wanted a non-

Microsoft browser. To the contrary, it took deliberate, active, and costly steps to impair the distribution and usage of Netscape Navigator, including raising the costs to both OEMs and consumers of supporting and using Navigator through its tying arrangement and related contractual restrictions.

i. The tying of Internet Explorer to Windows itself made it more difficult for users to obtain other browsers. See infra ¶¶ 169-171.

ii. Professor Fisher testified that "if browsers are complements to operating systems such that the sale of browsers that can be used with Windows will increase demand for Windows, it should not matter who makes the complement. But Microsoft cared greatly who made the browsers used with Windows." Fisher Dir. ¶ 129(b)

iii. Professor Fisher testified that "Microsoft even tried to discourage Netscape from offering Netscape's browser for use with Windows - an action inconsistent with browsers being a complement to Windows, whose distribution Microsoft wanted to maximize." Fisher Dir. ¶ 129(c).

iv. Professor Fisher testified that "Microsoft was preoccupied not with increasing total sales of browsers but with Microsoft's *share* of browser sales. Indeed, Microsoft studied, and tried to implement, ways to disable Netscpe and reduce total browser sales. That conduct doesn't 'make sense from a business standpoint' if browsers are viewed as a means of increasing sales of Windows. But this conduct makes good sense if browsers are viewed as a competitive threat to Microsoft's Windows monopoly." Fisher Dir. ¶ 129(e).

v. When asked whether Microsoft did, in fact, attempt to restrict distribution of the Netscape browser, Fisher testified: "Oh, you bet you. To take a particular example, in its contracts with ISPs, Microsoft doesn't merely require that the ISP ship some minimum number -- I think it's usually around 85% -- of Internet Explorers to the ISP subscribers. That requirement alone would have permitted the ISP to ship both IE and Netscape Navigator. The contracts, in fact, require that the ISP not ship more than, in this example, 15 percent of other browsers to the ISPs. That's a restriction on Netscape. If Microsoft were really interested in selling Windows, it wouldn't have any interest in doing that. And it can't have any interest in doing that to protect its, quote, sales of IE, end quote, because it doesn't have any, quote, sales of IE, end quote. It's a no-

revenue product." Fisher, 6/1/99am, at 66:12-25.

vi. Dr. Warren-Boulton testified that "Microsoft's . . . efforts to increase IE's share by excluding Netscape and making it more difficult for users to obtain Netscape's browser could only reduce the value of its operating system to consumers." Warren-Boulton Dir. ¶ 187.

(2) Microsoft's tie-in and related restrictions were not reasonably necessary to preserve the integrity of the Windows platform

164. Microsoft's argument that tying the browser to the operating system is reasonably necessary to preserve the "integrity" of the Windows platform (Allchin Dir. ¶ 85; Kempin Dir. ¶ 29) is pretextual.

164.1. First, concern with the "integrity" of the platform cannot explain Microsoft's original decision to tie Internet Explorer to Windows 95 because Internet Explorer 1 and 2 did not contain APIs.

i. See infra Part V.G.6.a; ¶ 312.1.

164.2. Second, concern with integrity of the platform cannot explain Microsoft's refusal to offer OEMs the option of Windows 95 or 98 with Internet Explorer uninstalled or its equivalent because APIs, like all other shared files, are left on the system when Internet Explorer is uninstalled.

i. Professor Felten testified that "I have implemented the prototype removal program to continue to support the ability of ISVs to use all of the shared program libraries shipped with Windows 98. Such shared program libraries are left substantially unchanged, though they are no longer used in the course of Web browsing without the addition of another software program such as AOL's access software or Intuit's Quicken personal finance software. Microsoft could have produced a version of Windows 98 without Web browsing in a way that did not adversely affect the functionality of ISV applications." Felten Dir. ¶ 56.

ii. Professor Felten testified that leaving shared files in place "conforms to the ordinary way in which software application programs are removed," as well as to the instructions that Microsoft itself gives to application developers. See Felten Dir. ¶ 57 (citing GX 431, Microsoft's Handbook for Applications, p. 29).

iii. Dr. Warren-Boulton testified that "Microsoft's objective of supplying ISVs with a consistent platform does not provide an economic justification for biasing OEMs' choice of which browser to feature" because "Microsoft's design decision was arbitrary; Microsoft could have put 'platform files' [such as shared files] entirely in the operating system and not included any such files in its browser product." Warren-Boulton Dir. ¶ 165; id. ¶¶ 166-167.

164.3. Third, Microsoft's concern that offering OEMs the choice as to whether to install certain browser-related APIs would fragment the Windows platform (Kempin Dir. ¶ 29) is insubstantial because OEMs, which operate in a competitive market, have ample incentives to include APIs (including non-Microsoft APIs) for applications their customers demand.

i. Professor Fisher testified that Microsoft's concern with offering developers a stable, up-to-date platform is insubstantial because "it's not obvious that those APis have to be Microsoft's API's for there to be a stable set of API's offered to developers." Fisher, 6/3/99am, at 21:21 - 22:20.

164.4. Fourth, even if there were some potential benefit from forced licensing of a single set of APIs to all OEMs, any such justification could not apply in this case because Microsoft itself perpetuates fragmentation of the platform.

i. Dr. Warren-Boulton testified: "There are millions of PCs running earlier versions of Windows releases that lack the latest versions of Windows 95 or Windows 98. To ensure that the software they develop runs no matter which version of Windows a PC contains, ISVs commonly redistribute necessary shared program libraries with their software. In short, Microsoft's own practice of continually updating its platform means that application developers must repliate part of the platform with the software they distribute and, therefore, that the effect on an OEM removing certain parts of the 'platform' is likely to be small." Warren-Boulton Dir. ¶ 170.

164.4.1. Because Microsoft frequently releases new APIs with its updated versions of Internet Explorer and Windows, the installed base of Windows PCs has very different sets of APIs. Microsoft's practice of continually updating those APIs perpetuates this fragmentation.

i. Professor Fisher testified that "the Microsoft APIs are not, in fact, stable. They change. And ISVs have to keep embedding pieces of the appropriate APIs into their own software and shipping it out." Fisher, 6/3/99am, at 22:11-14. He also testified that "ISVs have to redistribute IE code anyway because Microsoft has put so many different releases out there." Fisher Dir. ¶ 165.

ii. Dr. Warren-Boulton testified: "There are millions of PCs running earlier versions of Windows releases that lack the latest versions of Windows 95 or Windows 98. To ensure that the software they develop runs no matter which version of Windows a PC contains, ISVs commonly redistribute necessary shared program libraries with their software. In short, Microsoft's own practice of continually updating its platform means that application developers must replicate part of the platform with the software they distribute. . . ." Warren-Boulton Dir. ¶ 170.

iii. John Gailey, Director of Engineering for Novell, declared that: "Because Microsoft is constantly changing and updating the system services provided by Windows 95, Novell bundles some of those operating system services with GroupWise in order to ensure that all users have available to them the latest version of the system service GroupWise is calling upon." Fisher Dir. ¶ 165 (quoting Gailey Decl. 11/17/97).

164.4.2. ISVs have adapted to this reality by redistributing needed APIs with their applications in order to ensure that the APIs get installed on the user's PC; to facilitate this, Microsoft makes the APIs it ships with Internet Explorer available to third party developers for distribution with their products.

i. Microsoft's David Cole testified that many ISVs redistribute Internet Explorer in order to "upgrade the operating system to the

level they need to run their application. . . . That's a very common practice." Cole Dep., 1/13/99, at 390:20-24.

ii. James Allchin testified that "Microsoft does license developers whose products rely on Internet Explorer technologies to ship them with their products so that older versions of Windows can be upgraded to the necessary level of functionality." Allchin Dir. ¶ 135. Allchin testified that "we do this for graphics and everything else. We take the system to the installed base, provide pieces of software that upgrade it. Games that run easily on Windows 95 wouldn't operate correctly on Windows 95 without additional software . . . called DirectX. So, we either have updated Windows 95, we put it on the web site or even let people, ISVs, vendors, ship that software. So it's all about how far we take it about adding new functionality to the system for the installed base." Allchin, 2/1/99pm, 47:10-19; see also Maritz Direct ¶ 171; Jones Dep., 1/13/99, at 535:6 - 536:6.

iii. William Harris testified that: "The combination, or separation, of software products or components will almost always have some potential advantages and some potential disadvantages. For Intuit, in particular, distributing a browser with our products, rather than as part of the operating system, has some real advantages. The fact that Intuit currently distributes a version of Internet Explorer with Quicken is illustrative of this point. Intuit has exerted hundreds of hours testing and verifying that Quicken will operate with the specific version of Internet Explorer that comes with Quicken. If a Quicken customer does not already have a compatible version of Internet Explorer, Quicken will install the version of Internet Explorer that comes with Quicken. This ensures that Quicken will work the way it was intended and tested." Harris Dir. ¶ 85.

iv. Professor Fisher testified that "ISVs have to redistribute IE code anyway because MS has put so many different releases out there." Fisher Dir. ¶ 165; see also Felten, 6/10/99am, at 61:10-14.

v. Glenn Weadock testified that applications that update Windows DLLs are common. Weadock, 11/17/98am, at 25:15 - 26:10.

vi. Robert Muglia testified that, because of differences in implementations of Java, ISVs similarly redistribute Java virtual machines with their Java programs to ensure that those programs will function properly. Muglia Dir. ¶¶ 87, 104, 107.

164.4.3. This is equally true of Microsoft, which distributes APIs -- including those distributed with Internet Explorer -- with a number of Microsoft applications.

i. Muglia testified that Microsoft will distribute Internet Explorer with Office 2000: "There is updated Windows functionality that we need to take advantage of. So, to make sure that functionality is on the user's computer, we are distributing it with Office 2000, just like other ISVs have the option to do." Muglia, 2/26/99pm, at 67:3-11; see also GX 727 (Microsoft Office 97 redistributes all of Internet Explorer 3, and installs certain Internet Explorer components that it needs to function properly).

ii. Professor Felten testified that Microsoft itself redistributes various Internet Explorer components with its application products Office 97, Money 98, Money 99, Frontpage 98, Visual Studio 6.0, MSN, and Plus 98. Felten, 6/10/99am, at 62:13-15.

iii. GX 2220 (series of screen shots captured from the beginning of the installation process for Visual Studio) ("Visual Studio comes with the latest version of Internet Explorer 4.01. The updated version of Internet Explorer 4.01 is an essential component of Visual Studio 6.0 Enterprise Edition and installation is required."); see also Felten, 6/10/99am, at 67:12 - 71:4.

164.5. Although Gordon Eubanks testified that redistributing software components was inefficient for ISVs, he admitted that Symantec, in fact, routinely redistributed Internet Explorer components in its ordinary business.

i. Eubanks testified that, until recently, Symantec “shipped a rendering engine with Norton Utilities so we could display HTML because we couldn’t count on every customer having a browser.” Eubanks, 6/16/99pm, at 76:25 - 77:3.

ii. Eubanks testified that **“**in the past, we did distribute this HTML rendering DLL, and it was used by components of Norton Utilities.” Eubanks, 6/16/99pm, at 74:5-8.

(3) Microsoft's quality-related justifications are pretextual

165. Microsoft's quality-related justifications are similarly pretextual.

165.1. As explained, Microsoft's design of Windows 98 delivers to end users no technical benefit (aside from the ability to browse the web) that could not be achieved in a version without web browsing.

i. See infra Part V.B.2.e.(3)(b); ¶¶ 151-154.

165.2. Microsoft's concern that meeting demand for Windows without Internet browsing will degrade product quality or its reputation is insubstantial in any event because, if consumers genuinely prefer the version of Windows bundled with Internet Explorer, they would choose it in the market.

i. Professor Fisher testified that "if consumers prefer seamless operation, they would chose it in a competitive market," and that "competition leads to a consumer-driven arrangement of . . . what gets produced, what gets distributed and so on. If welding it together actually provided benefits, then consumers would choose the welded version as opposed to a separate version, and they would be willing to pay more." Fisher, 1/12/99pm, at 6:3 - 7:7.

ii. Professor Fisher testified that: "The consumer gets the same benefits if it . . . acquires those two things separately. In that event, there is no reason why Microsoft shouldn't offer them typically separately throughout and let consumers decide, if those are really good benefits, that they want to acquire them." Fisher, 6/1/99am, at 44:6-12.

iii. Dr. Warren-Boulton testified that if removing Internet Explorer from Windows 98 "would affect the way in which Windows 98 would operate either by itself without a browser or with Netscape, then that would mean in the market people would look at that product and say 'I don't like that product very much.' And what would happen is people wouldn't choose it, and so the outcome of the test would be, in fact, that people would say I don't want to have the two products separately." Warren-Boulton, 11/24/98pm, at 22:25 - 23:7.

iv. Dr. Warren-Boulton testified that "I don't think that Microsoft -- there is any reason why Microsoft cannot inform the customers that this is a Windows 98 product that does not have IE." Warren-Boulton, 11/24/98pm, at 23:15-20.

165.3. Ensuring ease of preinstallation and configuring the product similarly cannot justify Microsoft's tie-in.

165.3.1. OEMs can provide the benefit of preinstalling and configuring to end users just as effectively as Microsoft, and those OEMs that want Microsoft to perform that service can obtain a bundled version from Microsoft.

i. When asked whether "some customers might like to open up a new PC, plug it in, and get connected to the Internet easily," Professor Felten testified: "Absolutely. I think also that those customers would prefer to have the browser of their choice pre-installed on the system. And I'm not saying that OEM's should not be free to do that. The whole point that I'm trying to make in my testimony and the whole point of the prototype removal program is trying to make is that that choice could be provided to end users, to OEM's and all along the supply chain so that users can have what they want." Felten, 12/14/98pm, at 28:2-13.

ii. Professor Farber testified that none of his testimony "denies the possible convenience or preference of some users for 'one stop shopping' for bundled products such as the current version of Windows 98 sold as one product by Microsoft. Those OEMs and retail end users who may find this convenience outweighs any technical inefficiencies described here can certainly still choose to buy Windows 98 in the form it now exists." Farber Dir. ¶ 28.

iii. Muglia conceded that the inconvenience of multiple setup procedures for customers is no reason not to offer an unbundled version of Microsoft Office; "Sure, of course not. Again, we're just providing choices for customers. We're saying if people want to buy just a word processor or spreadsheet, they have the option to do so." Muglia Dep. (played 6/10/99pm), at 11:17-21.

iv. IBM's John Soyring testified that PC suppliers "generally have ample ability to include applications such as a browser with an

operating system and load this combined set of products on their machines." Soyring Dir. ¶ 21; see also id. ¶ 22 ("[PC suppliers] can install browsers on the operating system on machines they ship, so long as they are given appropriate information by the browser supplier and are given any information specific to the particular operating system involved by the browser supplier or the operating system supplier.").

v. When asked whether the convenience of a single installation procedure was "a compelling rationale requiring users to take Internet Explorer along with Windows," Professor Felten answered: "No, it's not. If a user wants both Windows and Internet Explorer, they -- Microsoft can offer them that option with the single install. But a user who only wants Windows without Internet Explorer can get that in a single install." Felten, 6/10/99pm, at 5:19 - 6:1.

vi. Professor Felten testified that "Microsoft could provide a single install for those users who want both Windows and Internet Explorer, without taking away the other choices such as buying only Windows or only Internet Explorer." Felten, 6/10/99pm, at 12:14-17.

165.3.2. Microsoft gives users the option of installing or uninstalling other programs that it distributes with Windows or with other software bundles.

i. A series of screen shots from Windows 98 shows that the operating system has menus from which various software programs, unlike IE, can be installed or uninstalled from Windows. GX 1700.

ii. WebTV for Windows can be optionally installed or removed from Windows 98 despite the fact that it is delivered along with the integrated Internet Explorer 5. Felten, 6/10/99, at 19:24 - 20:20 (WebTV falls under "add/remove" control panel on Windows 98).

iii. Microsoft provides single installation with "no assembly required" optionally in the case of Microsoft Office, allowing users to choose whether to obtain all the programs bundled together in Office at the same time or separately. See supra ¶ 165.3.1; Felten, 6/10/99pm, at 11:22 - 12:17.

4. Microsoft's tying of Internet Explorer to Windows has caused significant exclusionary effects and consumer harm

166. Microsoft's coercive binding of Internet Explorer to Windows raised the costs of using other browsers, facilitated Microsoft's objective of preventing Netscape from developing into a viable threat to the applications barrier to entry, and thereby harmed consumers and aided Microsoft in its objective of preserving its operating system monopoly.

a. Installing a second product in a software category imposes costs on OEMs

167. Microsoft's conduct raised the costs to OEMs of carrying Netscape or other browser products.

(1) Increased technical support costs

167.1. OEMs bear essentially all the customer support costs for the computers they sell, including those related to Windows, even though Windows is Microsoft's product.

i. Microsoft's licensing agreements with PC OEMs require them to

GX 418 (Toshiba) (sealed); see also GX 410 (DEC), at MS98 0008841 (sealed).

ii. Joseph Kanicki testified that Dell bears support costs for the computers it sells. Kanicki Dep., 1/13/99pm, at 342:5-7.

iii. Gayle McClain testified that Gateway provides customer support for the machines they sell, and that "a new user could call regarding almost anything," including being confused by clutter on the desktop. McClain also testified that there is no mechanism for Microsoft to reimburse them for any of those support costs. McClain Dep., 1/13/99pm, at 616:15 - 617:12.

iv. John Rose testified that Compaq bears customer support costs for both the

hardware and software on the PCs it sells. Rose, 2/18/99pm, at 41:23 - 42:11; see also Rose Dir. ¶ 15 ("Many of our consumer customers do not care to know the constituent components (or even the components' brand names). Rather, they are buying the 'out of the box' experience. They want their computers to be simple and easy to use right out of the box, and they look to the Compaq brand to make that experience a good one.").

v. Soyring testified: "Software suppliers often provide better pricing to PC suppliers if the PC supplier responds to the support calls from customers and handles the initial analysis of potential problems. This activity can range from simple to very complex and can even involve review and analysis of the source code for the software involved." Soyring Dir. ¶ 20.

167.2. Adding a second product in a given category, including a browser or the visible means of accessing the browser, can significantly increase those support costs.

i. When asked whether Compaq's support costs would go up if they installed more than one browser on a PC, Rose testified that "I would expect that as the number of multiple things go up, the support costs would go up." Rose, 2/18/99pm, at 42:12-22. Rose testified that Compaq had evaluated the relative costs and benefits of preinstalling more than one product in any particular software category, and reached the following conclusions: "'That, one, it's expensive; puts a greater cost burden on Compaq; adds more complexity; causes confusion to the customers, particularly consumer customers, that don't have any personal computing experience.'" Rose Dep. (read 2/18/99pm), at 45:25 - 47:13; see also Rose, 2/18/99pm, at 47:25 - 48:14.

ii. Soyring testified that, "even if there is customer demand for another browser, the PC supplier has to consider the cost of the second browser. Even if the other browser supplier offers it to the PC supplier for free, the PC supplier will incur substantial additional costs, including additional testing, distribution and support costs." Soyring Dir. ¶ 27.

iii. Soyring also testified: "Whenever manufacturers install an additional program, there usually is incremental cost, not just the fee for the license, but training their staff to build the image that's preloaded on the hard disk, or whatever media they choose, to train their support staff, because typically contracts with software manufacturers require that the first two levels of customer contact, if there's a support problem, is with the P.C. manufacturer; therefore, there is additional training cost. There's costs that go into their marketing programs to explain the various products that

they've installed and the value to their customer. So yes, there are additional costs." Soyring, 11/18/98am, at 70:15 - 71:1.

iv. Microsoft's Gayle McClain testified that multiple icons, or "redundancy of function in various places," is confusing to end users (McClain Dep., 1/13/99pm, at 623:6 - 624:11), and that Gateway wanted to remove icons from Windows 98 because of concern about clutter on the screen. McClain Dep., 1/13/99pm, at 614:5 - 615:9.

v. According to John Kies, Senior Product Manager for the Packard-Bell/NEC Versa Notebook product line, Packard-Bell/NEC would not preinstall Navigator if Internet Explorer is already preinstalled because "It wouldn't make sense to have two very large programs installed using up the hard disk drive and it might be confusing to the end user as to why two of the same applications were included." Kies Dep. (played 11/17/98am), at 68:13-21.

vi. Based on this testimony and other evidence, Professor Fisher concluded that "some OEMs preferred to load only one browser to avoid user confusion and the resulting consumer support costs, and to avoid increased testing costs." Fisher Dir. ¶ 150.

vii. Dr. Warren-Boulton explicated OEM testimony that having Internet Explorer increases the costs, and reduces the benefits, of a second browser (Warren-Boulton 11/24/98pm, at 59:18 - 59:25); further, he testified that Internet Explorer support costs are significant costs to OEMs. Warren-Boulton, 11/24/98pm, at 26:19 - 27:10.

(2) Additional testing costs

167.3. Preinstalling a second product in a given software category can also increase the OEM's testing costs.

i. Dr. Warren-Boulton testified that if OEMs purchase Windows "already with IE on it, then you've got to test to make sure that your system is compatible with the Windows IE bundle. If it didn't come with IE on it, then you just would have to test it with Netscape. So the point is that, I think as Mr. Kempin has pointed out, if you use IE, you only need to test it once. If you want to use Netscape, you've got to test it twice." Warren-Boulton, 11/30/98am, at 14:16 - 24.

ii. Professor Fisher testified that "some OEMs preferred to load only one

browser to avoid user confusion and the resulting consumer support costs, and to avoid increased testing costs." Fisher Dir. ¶ 150.

iii. Weadock testified: "It is certainly also important that we avoid the testing costs associated with supporting a dual browser end-user environment or an environment in which users click one place and run one browser and click somewhere else and run another browser. That increases an organization's testing costs, because now they have to -- they can't rely on Navigator being the only browser that users will activate." Weadock 11/17/98am, at 74:3-11.

(3) Opportunity costs

167.4. Preinstalling a second application in a given software category also takes up scarce and valuable space on the computer's hard drive and desktop.

i. According to John Kies, Senior Product Manager for the Packard-Bell/NEC Versa Notebook product line, Packard-Bell/NEC would not preinstall Navigator if Internet Explorer is already preinstalled because "It wouldn't make sense to have two very large programs installed using up the hard disk drive and it might be confusing to the end user as to why two of the same applications were included." Kies Dep. (read 11/17/98am), at 68:13-21.

ii. Stephen Decker testified that Compaq stopped preinstalling Netscape on the computers it sells because "with the inclusion of Internet Explorer from Microsoft, that category is already filled because of the inclusion of that product as part of the operating system, and then also to actually license the additional browser that would involve both time by Compaq to put that particular agreement in place, we would have another product that would take up real estate on our hard drive and, you know, there potentially would be some additional licensing fees, and we would have to pay for that technology. . . ." Decker Dep. (read 2/18/99am), at 61:8-21.

iii. Professor Fisher testified that "some OEMs viewed the desktop and/or disk space as scarce real estate and were generally reluctant to preinstall more than one software title in each functional category." Fisher ¶ 151.

b. Microsoft's tie-in and associated contractual restrictions raised the costs to OEMs of, and thus deterred OEMs from, preinstalling Netscape and other non-Microsoft browsers

168. Microsoft's conduct has deterred OEMs from loading Netscape (and other browser rivals) and thus significantly contributed to Microsoft scheme to raise rivals' costs and gain browser usage share.

i. A Microsoft OEM sales manager, Candace Grisdale, responded as follows to a May 1998 news article suggesting that Hewlett-Packard might bundle Navigator on all its PC lines: "HP we've known was close to NSCP but each time we've asked them of their plans, they have said they do not want to carry the burden of two browsers, unless the customer segment demands it." GX 323.

ii. Mal Ransom testified that Netscape approached Packard Bell about preinstalling Navigator. Packard Bell seriously considered do so, but decided not to because Packard Bell did not want to carry the burden of two browsers on its machines. Ransom Dep. (played 12/16/98pm), at 74:12 - 75:6.

iii. Compaq removed Netscape once it was compelled by Microsoft to restore the Internet Explorer icon to the desktop because of the increased costs of supporting a second browser. See infra Part V.C.1.b.(2); ¶ 179.

iv. Professor Fisher testified that, "since Microsoft's tying arrangement ensures that IE is on every Windows PC, the result is a significant exclusionary effect that ensures that IE is the only browser on most PCs shipped by OEMs." Fisher Dir. ¶ 152; see also Fisher, 1/6/99pm, at 12:21 - 13:2 (OEMs don't find it profitable to install Navigator because Internet Explorer is already there).

v. Dr. Warren-Boulton testified that a significant exclusionary effect can be inferred from the fact that IE users are more likely than Netscape users to have gotten their browser through the OEM channel. Warren-Boulton, 11/24/98pm, at 58:16 - 59:12.

vi. See generally infra Part VII.A (describing both the raising of rivals' costs and its impact on OEM carriage of Navigator).

c. Microsoft's conduct similarly raised the costs to end users of employing non-Microsoft browsers

169. Microsoft's conduct similarly raises the costs to end users of employing non-

Microsoft browsers.

(1) It is undesirable for a consumer who wants one type of browser to have a different browser pre-loaded on his PC

170. For a consumer who desires to use a particular browser, the existence of a different browser pre-loaded on the PC is not only superfluous but also, for several reasons, undesirable.

i. Professor Felten testified: "Providing code that people actually use is efficient, but providing code that is not being used, or packaging code that is not being used, or code that the user does not want along with code the user does want, as Microsoft has done in this case, is not efficient and makes things worse for the users." Felten, 12/14/98am, at 51:14-21.

ii. Professor Felten also testified that "in general if you know that the user does not want something, it can only be inefficient to force them to take it. And you will note that with respect to Internet Explorer in Windows 98, we are talking about forcing the user to install software that they don't want onto their hard disk. When they boot Windows, that software they don't want is loaded into the memory. And as Professor Farber explained, in some cases that software is even run, and Internet Explorer pops up even though the user doesn't want it. It's certainly inefficient to do that. I also want to point out that when I talk about efficiency, as a computer scientist, I'm using it in the broadest sense. That is, I'm including -- I'm including inefficiencies that develop, for example, because of user confusion because of unwanted behavior. Mr. Weadock talked about the cost in support calls and lost productivity because of those cases, and those also apply in the case of Windows 98 and IE." Felten, 12/14/98pm, at 11:16 - 12:9.

iii. Weadock testified: "If an organization wants to standardize on a specific browser for reasons of cross-platform access, then they may want to choose a browser like Navigator, as opposed to a browser like Internet Explorer, in which case they don't want Internet Explorer on the machine." Weadock, 11/17/98am, at 43:5-10.

170.1. Unused software on a PC, particularly a program as large as a modern browser, takes up scarce and valuable space on the user's hard drive and may therefore increase hardware resource requirements.

i. Professor Felten testified: "Forcing some users or OEMs to take software they do not want is inefficient, since the unwanted software needlessly

uses resources such as disk space and memory, and increases the complexity of the user interface by cluttering it with unwanted icons, menu items, and programs." Felten Dir. ¶ 67.

ii. Weadock testified that “if a user wants Windows 98, doesn’t want Internet Explorer and wants Netscape, then the commingling of code between Windows 98 and IE may result in a total package that uses more memory and more disk space than if Microsoft had not commingled Internet Explorer and Windows 98. So, it’s not a benefit for everybody.” Weadock, 11/16/98pm, at 44:16-23.

iii. Weadock testified: “The required hardware resources can increase significantly when an operating system integrates application software," and that "Windows 98 requires a great deal more disk space and significantly more memory than Windows 95, largely due to Internet Explorer software." Weadock Dir. ¶ 32d.

170.2. The drain placed on a system by additional, undesired software increases when that software is "integrated" in some fashion with the computer's operating system because code used by the operating system is more likely to consume critical dynamic memory, or RAM, in addition to storage space on the hard drive. For this reason, “integrating” certain additional software into the operating system is also more likely to cause stability problems.

i. Weadock testified: “The likelihood of an application failure affecting the operating system may increase when code is shared between the two." For example, "I have noticed in my own experiments with Windows 98 that the failure of an Internet Explorer Window can cause the entire desktop to malfunction." Weadock Dir. ¶ 32a.

ii. Weadock testified: “An application that modifies operating system files could create (and, in the case of Internet Explorer, has been documented in some cases to create) conflicts with other applications and with company-developed applications." Weadock Dir. ¶ 32b.

iii. Finally, Weadock testified: “It may become more difficult to enforce security when an operating system integrates application software." For example, "[s]ecuring the system against users running programs that management doesn't want them to run becomes more difficult as application software is folded into the operating system." Weadock Dir. ¶

32e.

iv. John Soyring testified that “integration could be inefficient and disadvantageous to customers" because, for example, "integration generally increases the size of the operating system, and therefore, the size of the hardware required to run it effectively. In addition, it may slow the use of other applications, and may provide function which certain customers do not want.” Soyring Dir. ¶ 25.

v. James Gosling testified that, "in Windows 98, . . . Microsoft apparently loads some browser-related files into memory even when the user may never need that functionality . . . . In essence, Microsoft simply shifts the time required to load the browser code from when it is first needed by the user to every time the computer boots up." Gosling Dir. ¶ 37.

vi. Felten testified that, “as more memory gets used up, the system starts having to do complicated things to keep all the programs running, and so use of more memory generally translates into reduced performance.” Felten, 6/10/99pm, at 18:16-20.

vii. In an email from Jonathan Roberts to Bill Gates and others in July 1997, Roberts points out that a 16 MB Navigator user "will have a much slower experience with 98 than 95," because "if they access help or an HTML page while in Explorer or in My Computer they will be loading the IE HTML rendering engine and significantly increasing the working set.” GX 725.

viii. In December 1996, David Cole and his Internet Explorer development team discussed "decoupling" IE4 from the Windows shell, in part because “if the user installs the new shell, they will have some things to learn and pay a performance price. By coupling these together, I think the overall effort has suffered. We’ve got a compromised new shell design that tries to be too Windows 95 shell compatible in my view. We don’t have HTML on the desktop because we are worried about performance. But even in compatibility mode, performance will degrade and there will be differences that could stall adoption of the browser platform." GX 46.

ix. Professor Felten also testified: “There are two costs that come from loading unnecessary code into memory. First of all, it takes time to read that code off the disk, and that means that the response time of some operation is slower because you spend extra time loading this data into memory. Also, the unwanted code takes up space in memory, and memory space is a limited resource. Something else may have to get

moved out of memory or something else may not be able to work because the system has run out of memory. The user ultimately might be forced to run out and buy more memory or upgrade their PC in order to get enough memory to loaded the unwanted code along with the code they actually want." Felten, 12/14/98pm, at 57:10-22.

x. AOL's Barry Schuler testified that

Schuler Dep., 5/5/99, at 136:21 - 137:6 (DX 2810A) (sealed).

170.3. Unused software can also increase consumer confusion and support costs by needlessly increasing the complexity of the user interface.

i. Professor Felten testified that "in general if you know that the user does not want something, it can only be inefficient to force them to take it. . . . I also want to point out that when I talk about efficiency, as a computer scientist, I'm using it in the broadest sense. That is, I'm including -- I'm including inefficiencies that develop, for example, because of user confusion because of unwanted behavior. Mr. Weadock talked about the cost in support calls and lost productivity because of those cases, and those also apply in the case of Windows 98 and IE." Felten, 12/14/98pm, at 11:15 - 12:9.

ii. Weadock testified that it is "generally accepted practice among IT managers in businesses large and small to put the least amount of software on a computer that will do what their users need to do. You just save all kinds of costs that way, all the way from resource use to support and training." Weadock, 11/17/98am, at 41:17 - 42:16.

iii. Weadock testified that commingling operating system and application code can create user confusion. For example, Microsoft's fusion of Windows Explorer and Internet Explorer may confuse consumers as to whether they are viewing local or remote data. Weadock Dir. ¶ 32c.

(2) The hard-coding of Internet Explorer makes users less likely to use Netscape with Windows 98

170.4. Microsoft's decision to frustrate the user's choice of default browser in Windows 98 by forcing the use of Internet Explorer in certain situations decreases the value of other browsers to end users.

i. Professor Felten testified that a user can install Netscape Navigator on Windows 98, "but there is a problem using it. And Professor Farber described this the other day. He talked about what happened when he tried to install Navigator on his Windows 98 PC. And Internet Explorer kept popping up in his face, as he put it. That's the sort of phenomenon that I refer to in my testimony as hardcoding access to Internet Explorer 4. And so that hardcoding does prevent the user from using Netscape Navigator in all the cases where they would like to." Felten, 12/14/98am, at 27:8-19; see also Felten 12/14/98am, at 29:6-17 ("there are also situations where IE pops up when a user does not want it"); Felten, 12/14/98am, at 44:12-17 (although "Windows 98 gives the user more choices than Windows 95 did, . . . there's one area in which it gives the user less choice, which is web browsing").

ii. Dr. Warren-Boulton testified that he personally bought a Windows 98 machine, but "never had the intention of using IE, and I wound up installing Windows Navigator." Nonetheless, "IE keeps popping back up again. It is, perhaps, people more technically adept would be able to avoid it, but I can't seem to avoid running into IE." Warren-Boulton, 11/24/98pm, at 30:22 - 31:4.

iii. Dean Schmalensee conceded that, if the integration of a software product into the operating system degrades the performance of a different product or makes it less convenient for users to use that product, that would be a harm to consumers. Schmalensee, 1/19/99am, at 39:21 - 40:3.

170.5. Microsoft's "hard-coding" of Internet Explorer to Windows 98 is particularly burdensome for organizations that want to standardize on a non-Microsoft browser.

i. When asked whether organizations remain "free to standardize on Netscape Navigator if they want," Weadock answered: "Not in the case of Windows 98. They are not free to fully standardize on Navigator because

Windows 98 enforces certain user actions to bring up Internet Explorer, so I would say no, they were completely free to standardize on a product if the operating system imposes requirements to use an alternative nonpreferred product in some cases." Weadock, 11/17/98pm, at 7:17 - 8:2.

ii. When asked how the fact that Windows 98 comes with Internet Explorer affects a corporation that has standardized on Navigator, John Kies of Packard Bell/NEC stated that "it would require the end user to uninstall Internet Explorer 4.0 or install next to it Netscape Communicator. And this -- then they would have two browsers on it, where most companies would just prefer to support one browser and, once again, go back into the training issue. And most corporations would not -- would prefer not to have any items in the user interface that they're not ready to support." Kies Dep. (played 11/17/98am), at 72:8-19; see also Kies Dep. (played 11/17/98am), at 72:8 - 73:7.

iii. In a presentation entitled "Why Internet Explorer 5.0?" Scott Vesey of Boeing wrote, "We do not have a choice. Internet Explorer will be installed as a component of our next generation desktop operating system. The extent to which we might be able to disengage it needs to be determined. Operating System integration. Microsoft is unlikely to back away from their commitment to integrating the Web browser into the operating system." Under "Risks," Vesey noted, "Two browsers on all Wintel mahcines. IE comes in the operating system and is available for use as a browser. Netscape would have to be separately installed. Not able to fully disengage browser. May be able to remove IE icon from the desktop (to be determined). Windows Explorer can still be used to access internet protocols: (ex. http and ftp). Difficult to enforce Netscape as 'The Browser' on the Wintel environment." GX 638, at TBC 000412.

iv. A "Win98 Browser choice matrix" prepared by Vesey included the following option (among others): "Accept Win98 as is with full Internet Explorer integration. Use IE as the 'Standard' browser. Install Netscape Communicator as 'Alternate' browser." Under "Impact/Risk" of this option, Vesey wrote "Possible DLL and registry contention issues. User confusion about what browser should be used. Developers will develop sites that require one or the other browser requiring users to switch browser depending on what site is being accessed." Another option presented is "Remove Internet Explorer Desktop icon, disable browser function for Web served documents" and "Install Netscape Communicator as 'Standard' browser." The Impact/Risk of this option is "The extent to which it will be possible to disable Internet Explorer." GX 633.

v. In that same document, Vesey suggests that: “Installing Netscape as an alternative browser may lead to user confusion about what browser to use. Some sites may require a specific browser. We have been working to minimize this possibility but this risk still exists. --- Removing Explorer (or disabling the web access capabilities) will likely prove to be impractical or impossible. This will leave us with 3 likely alternatives: Install both browser, allow user to select which browser to use. -- Install only Explorer, require all web sites to be completely neutral. -- Remove Explorer (or disable all web access capabilities) and install Communicator for web access.” GX 633.

vi. An internal Boeing document describing Boeing’s “Browser Decision History” discusses planning for 1999, and notes, “Internet Explorer v5 will be so deeply embedded in NTW 5, Office 2000, & Outlook 2000 that we will not be able to extricate it -- Therefore both Netscape and Internet Explorer browsers will be installed on Windows desktops -- Netscape will continue to be the standard web browser, next step will be to determine how to constrain use of Internet Explorer as the browser -- Continue to evaluate 1999 browser direction.” GX 631.

vii. An internal Boeing presentation entitled “Enterprise-wide Web Browsers for the Desktop” by Scott Vesey in March 1998, stated: “Installing both web browsers may: Confuse users about which browser to use. Increase end user support costs.” GX 635, at 11; see also GX 637.

170.6. Because of these costs, many firms will have to choose between a preferred non-Microsoft browser like Netscape and Windows 98.

170.6.1. Many customers feel strong pressure to use Windows 98 as their operating system for various reasons, including a desire to remain compatible with other users and a desire to use new hardware or peripherals that Windows 95 does not support. Many of these customers are likely to forgo installing Netscape Navigator (or other browsers) on their computers.

i. Weadock testified that "many customers (depending on their size or profile) feel strong pressure to use Windows 98 for various reasons, including the following: (a) The organization's customers, suppliers, or

clients are likely to use it, and business reasons exist to use the same software that customers, suppliers, or clients use. (b) Windows 98 brings new technological benefits, such as a more efficient file system; support for new types of hardware, such as high-capacity optical disks; support for new hardware devices, such as printers and network cards; better control of power-saving features on both desktop and portable PCs; Year 2000 compliance; and a number of new and enhanced housekeeping utilities that Microsoft claims (and I concur) can reduce support costs. . . . (c) The organization relies on hardware that is being discontinued by the manufacturer and replaced by hardware that doesn't work with Windows 95 but that does work with Windows 98. . . . At some point in the life cycle of an outdated operating system, computer hardware manufacturers tend not to devote resources towards making their newest products compatible with that outdated operating system." Weadock Dir. ¶ 42.

ii. Boeing's Scott Vesey testified that, "in the long term," Boeing could not continue to use Windows 95 but would eventually "have to move forward in a new operating system version as hardware is not supported by Windows 95." Vesey, 1/13/99, at 280:13-16.

iii. Vesey wrote that "The main reasons for moving to Internet Explorer 5.0 in Q2/3 of 1999 of the 18-month tactical plan are: We do not have a choice. . . . The integration between Internet Explorer and the desktop operating system cannot be fully disabled. . . . Our only choice is whether we will install two browsers or just install Internet Explorer." GX 637 (emphasis in original).

170.6.2. A number of corporations have chosen instead the costly option of forgoing Windows 98 and the non-browser related benefits it provides in order to use the browser of their choice and have reverted to the original retail release of Windows 95 (which does not include Internet Explorer).

i. Glenn Weadock testified that "some companies are resisting, or electing not to use, Windows 98 largely or in part because it would force them to have a two-browser desktop (for example, Chrysler, where the Manager of Performance and Cost Management stated that two browsers would increase support costs)." Weadock Dir. ¶ 41.

ii. Weadock testified that many organizations have gone back to the retail version of Windows 95, even though doing so entails various costs,

because "they have the greatest control over what applications they can install onto it, because it is the cleanest version of Windows 95. It doesn't contain software that they don't want. And, in particular, it doesn't contain Internet Explorer, which they may not want." Weadock, 11/17/98am, at 62:12-20; see also Weadock, 11/17/98am, at 27:9-20 ("Boeing went back to the original retail version of Windows 95")

iii. A survey conducted by Compaq in February 1998 of 283 PC decision makers at US companies found that "About 80% of companies wipe or reformat the hard drives of new desktops. . . . The operating system re-installed most often are OSR2 and the retail version of Windows 95. Large businesses lean more toward the retail version of Windows 95." GX 1242, at 34.

d. Microsoft's conduct has caused other significant inefficiencies and consumer harm

(1) Microsoft's commingling of the browser and operating system reduces system performance

171. Microsoft's commingling of the code that supplies browsing and other operating system functionality reduces system performance for customers that do not desire to browse the web using Internet Explorer.

i. See supra Part V.B.4.c(1); ¶ 169.

ii. Professor Felten testified that Windows 98 uses approximately 20% less dynamic memory after the prototype removal program has removed Internet Explorer web browsing, measurably improving performance. See supra Part V.B.3.b(2); ¶ 154.2; see also Felten, 12/14/98pm, at 56:3-13.

iii. In an e-mail from Jonathan Roberts to Bill Gates and others in July 1997, Roberts states "Even with the option to turn off the default loading of Active Desktop, Windows 98 is inescapably most appealing to the Internet Explorer user. Of course, the plan is Win 98 with Web integration converts a huge base, but a die hard 16MB Nav user is hard to move. If they access help or an HTML page while in Explorer or in My Computer they will be loading the IE HTML rendering engine and significantly increasing the working set. This means, that in many scenarios, the 16 MB nav user will have a much slower experience with 98 than 95." GX 725.

iv. Paul Maritz conceded that "in certain circumstances, applications in general, not just Netscape's browser, can run slower on Windows 98 versus 95 in memory-constrained situations; in other words, running a machine with smaller amounts of memory." Maritz, 1/27/99pm, at 4:7-16; see also Maritz, 1/27/99pm, 4:17-23.

v. Chris Jones's notes from a November 1997 offsite meeting among Internet Explorer project team members report that "Performance overall, in particular with integrated shell, is a problem. The IE 4 browser, while fast, is simply too big for customers to install and adopt, both in terms of memory usage (working set), and also in terms of disk footprint (install size). The integrated shell adds additional requirements, and customers are not deploying on 32 MB NT systems." GX 364, at MS7 004719.

vi. Gateway expressed concern to Microsoft in April 1998 that "the installation of the full MS product (including channels) results in a much slower system performance if the customer chooses an alternate browser after full installation on IE4." GX 320.

vii. Weadock testified that if "we look at Windows 98, we see a situation where Internet Explorer can't be removed, it takes up memory resources; it takes up disk space. If a company can't remove that and then obtains -- to use your word -- Netscape Navigator, because there is so much RAM and disk and processor overhead already associated with the nonremovable Internet Explorer in Windows 98, they can't obtain Navigator and put it to work on their system without a substantial performance penalty, as I think one of the Microsoft employees in one of the e-mails that I've seen expressed concern about." Weadock, 11/16/98am, at 63:1-11.

viii. Professor Farber testified that "combining applications with an operating system into a single product available with all functions combined imposes technical inefficiencies for OEMS, other software developers and retail end users, including redundancy, performance degradation of unused software and increased risk of 'bugs;' and . . . any function provided by an operating system (as distinct from higher level files) that does not satisfy the criteria of simplicity, general applicablitiy and accessibility reduces the efficiency of the operating system environment and the applications that use it." Farber Dir. ¶ 27.

(2) Microsoft's commingling of the browser and operating system causes undesirable system complexity, incompatibilities and security concerns

172. Microsoft's commingling of the browser and operating system also introduces

undesirable system complexity and incompatibilities with other software.

i. A November 1997 internal Microsoft memo from Brian Hall quotes participants from Internet Explorer user focus groups as saying: "why do we need to see local files through our web browser? It's like a whole other version of windows explorer in a web browser. Need one or the other, don't need both." GX 218.

ii. One of the recommendations of an ISP focus group consulted by Microsoft was: "Turn off the Active Desktop. Didn't like that a browser introduced UI changes -- they didn't want to be in the business of training poepl [sic] how to use the UI when it is really a part of the OS." GX 375.

iii. Weadock testified that: "User confusion can result from combining application code and operating system code, for example, as Microsoft has done with Windows 98 and the "single Explorer." Weadock Dir ¶ 32c. "An application that modifies operating system files could create (and, in the case of Internet Explorer, has been documented in some cases to create) conflicts with other applications and with company-developed applications." Weadock Dir. ¶ 32b; see also Weadock 11/17/98am, 37:24 - 38:13.

iv. Professor Felten testified that "in general if you know that the user does not want something, it can only be inefficient to force them to take it. And you will note that with respect to Internet Explorer in Windows 98, we are talking about forcing the user to install software that they don't want onto their hard disk. When they boot Windows, that software they don't want is loaded into the memory. And as Professor Farber explained, in some cases that software is even run, and Internet Explorer pops up even though the user doesn't want it. It's certainly inefficient to do that. I also want to point out that when I talk about efficiency, as a computer scientist, I'm using it in the broadest sense. That is, I'm including -- I'm including inefficiencies that develop, for example, because of user confusion because of unwanted behavior. Mr. Weadock talked about the cost in support calls and lost productivity because of those cases, and those also apply in the case of Windows 98 and IE." Felten, 12/14/98pm, at 11:15 - 12:9.

v. Professor Farber testified that "combining applications with an operating system into a single product available with all functions combined imposes technical inefficiencies for OEMS, other software developers and retail end users, including redundancy, performance degradation of unused software and increased risk of 'bugs'; and . . . any function provided by an operating system (as distinct from higher level files) that does not satisfy the criteria of simplicity, general applicablitiy and accessibility reduces the efficiency of the operating system environment and the applications that use it." Farber Dir. ¶ 27.

vi. In a Boeing planning document written in July 1998 on deployment of 5.0 level browsers starting in 1999, Scott Vesey noted the following about IE4: "The problem for Internet Explorer 4.0 is that it modified the Windows 95 operating system DLL's. Several conflicts were identified with commercial software packages. All known conflicts have been resolved, ether by the software vendor or by a Microsoft patch. However, concern exists for conflics with Boeing custom written applications. Due to these concerns and because there was not a compelling tecnology reason to change the standard web browser vendor, the Netscape browser was selected as the browser standard." GX 637; see also GX 632; GX 634; GX 635; Vesey Dep. (played 11/17/98am), at 90:6-14.

vii. Professor Felten testified that "giving users or OEMs the choice of what Web browsing software, if any, to have on their systems is technically efficient. Although some users or OEMs may benefit from bundling together separate software products desired by those users or OEMs, significant inefficiencies may also arise for others. Forcing some users or OEMs to take software they do not want is inefficient, since the unwanted software needlessly uses resources such as disk space and memory, and increases the complexity of the user interface by cluttering it with unwanted icons, menu items, and programs. Had Microsoft originally designed a version of Windows 98 without Web browsing, this version would have been significantly smaller than the version Microsoft actually released." Felten Dir. ¶ 67.

173. The bundling of a browser or other application software with an operating system increases the vulnerability of the system to viruses or unauthorized usage.

i. The following colloquy took place between the Court and Professor Felten: "THE COURT: . . . Are there any security issues involved in a choice of a browser or whether to get a browser at all? . . . It seems self-evident to me, but maybe it's not, that the presence of a browser increases the risks of penetration by a virus or something like that. THE WITNESS: Certainly. If you are in the position of, say, a computer systems administrator in a large organization and you're concerned that you less-trained users might accidentally introduce a virus or something like that -- you might well choose to not have browsers on your users' computers in order to prevent that means of spread of virus." Felten, 6/10/99am, at 39:18 - 40:7.

ii. Weadock testified: "It may become more difficult to enforce security when an operating system integrates application software." For example, "[s]ecuring the system against users running programs that management doesn't want them to run becomes more difficult as application software is folded into the operating system." Weadock Dir. ¶ 32e.

e. Dean Schmalenseee's testimony that Microsoft's conduct did not result in significant competitive and consumer harm is unreliable

174. Microsoft's testimony that consumers benefitted from its tying arrangement and associated contractual restrictions (E.g., Schmalensee, 6/21/99am, at 10:5 - 11:5, 36:18 - 37:11), rests on faulty assumptions.

174.1. First, Dean Schmalensee conceded that he did not investigate whether Internet Explorer could be removed from Windows 98 or why Microsoft made it non-removable.

i. When asked whether he investigated what functions of Windows 98 were removable, Schmalensee answered, "Absolutely not. It seemed to me that the key issue was whether users had a choice as to which software they employed, and whether it had to be removed or just not used seemed to me completely immaterial." Schmalensee, 1/20/99am, at 5:24 - 6:5; see also Schmalensee, 1/20/99am, at 10:5-9 (same).

ii. When asked whether he looked at "any internal Microsoft documents to determine why Microsoft decided not to make Internet Explorer removable from Windows 98," Schmalensee said: "No. I did not. I inquired what they did, not -- as we've said several times, not what they said about what they were doing." Schmalensee, 1/20/99am, at 14:19-24.

174.2. Second, Dean Schmalensee also conceded that he did not investigate the consequences of commingling software code in the same files.

i. Schmalensee conceded that he has no "quantitative answer" to the question of how much shared code there is between Windows 95 and Internet Explorer, and Windows 98 and Internet Explorer. Schmalensee, 1/19/99pm, at 31:4-8. See generally Schmalensee, 1/19/99pm, at 32:10-18 (similarly conceding that he does not know how many DLLs contained shared code in Windows 95 and Windows 98).

ii. When asked what percentage of the Internet Explorer code in Windows 98 is shared by other operating system functions, Schmalensee testified that "I don't have that breakdown. I don't know." Schmalensee, 1/20/99am, at 11:11-14; see also Schmalensee, 1/20/99am, at 12:9-14 ("I can't answer

that question. And I didn't investigate it, because it's not important for the reasons I've given you several times.").

174.3. Third, Dean Schmalensee implicitly assumes (Schmalensee Dir. ¶ 232), contrary to the evidence, that a user can consistently enforce his or her choice of default browser in Windows 98.

i. See supra Part V.B.2.e(2); ¶ 147.5.

174.4. Fourth, Dean Schmalensee's and other Microsoft witnesses' contention that Microsoft has merely offered an additional choice of browsers (Schmalensee, 1/21/99pm, at 37:24 - 38:8, Schmalensee, 6/21/99am, at 37:4-7) is wrong. While the development of Internet Explorer itself provided additional options to users, its tying of the browser to the operating system denied users the option of forgoing Internet Explorer and increased their costs of using other browsers.

i. See supra Part V.B.4; ¶¶ 166-175.