

UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF COLUMBIA

STATE OF NEW YORK, et al	.	
	.	CA No. 98-1233(CKK)
Plaintiff,	.	
	.	Washington, D.C.
v.	.	April 9, 2002
	.	2:10 p.m.
MICROSOFT CORPORATION,	.	
	.	
Defendant.	.	Volume 14
. . . . .	.	

AFTERNOON SESSION  
TRANSCRIPT OF TRIAL RECORD  
BEFORE THE HONORABLE COLLEEN KOLLAR-KOTELLY  
UNITED STATES DISTRICT JUDGE

APPEARANCES:

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Scott L. Wallace, RDR, CRR  
Official Court Reporter

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1 Q. And in particular, with regard to identity systems, you  
2 intended to participate in them by providing single part  
3 numbers that enterprises could use to build out network  
4 identity systems which would be comprised of Sun hardware,  
5 Sun operating systems, Sun server applications, and Sun  
6 consulting services; is that right?  
7 A. Yes.  
8 Q. And Sun, on March 12th of this year, introduced two  
9 such part numbers; is that correct?  
10 A. Yes.  
11 Q. One of those part numbers is a version of a network  
12 identity system for use inside corporate intranets; is that  
13 right?  
14 A. Yes.  
15 Q. And that version costs \$150,000; is that right?  
16 A. Yes. And I believe it supports -- I don't have the  
17 numbers in front of me, if you are reading from a press  
18 release -- I think 10,000 users.  
19 Q. You have a very good memory, Mr. Schwartz.  
20 And the Internet version of Sun's network identity  
21 platform costs at a price that only Kmart could love,  
22 \$999,995, right?  
23 A. Yes.  
24 Q. Okay. So, roughly a million dollars it costs?  
25 A. Just under, actually.

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1 PROCEEDINGS  
2 THE COURT: Good afternoon, everybody.  
3 THE COURTROOM: Good afternoon.  
4 THE COURT: We are picking up with the  
5 cross-examination of Mr. Schwartz by Mr. Holley.  
6 MR. HOLLEY: Thank you, Your Honor.  
7 CROSS-EXAMINATION OF LARRY SCHWARTZ  
8 BY MR. HOLLEY:  
9 Q. Good afternoon, Mr. Schwartz.  
10 A. Good afternoon, Mr. Holley.  
11 Q. Sun believes that it has a significant head start over  
12 Microsoft, IBM and other competitors in building out  
13 network identity systems, correct?  
14 A. I think we have a head start in thinking through what's  
15 needed in the next generation of Internet applications  
16 surrounding the network identity, yes.  
17 Q. And you told the analysts on February 7th that the way  
18 that Sun intended to monetize the Liberty Alliance was to  
19 create network identity systems that used Sun's data center  
20 systems, Sun's business logic, Sun's Web tier devices, as  
21 well as Sun's secure identity technology?  
22 A. As I pointed out -- yes. As I pointed out earlier in  
23 my presentation to the analysts, I viewed the Internet as  
24 being comprised of a number of different market segments,  
25 and we intended on participating in all of them.

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1 Q. Makes it very attractive.  
2 And how many users can that network identity system  
3 support?  
4 A. I may fail the quiz. I think if you have the release  
5 ahead of you, I think it will say. I think it's a quarter  
6 of a million, half a million, somewhere in there.  
7 Q. Quarter of a million is what this says.  
8 A. Yes.  
9 Q. And does that comport with your recollection?  
10 A. I believe so, yes.  
11 Q. Now, looking, sir, if you would, at Paragraph 117 of  
12 your written direct testimony, and tell me when you're  
13 there.  
14 A. I'm there.  
15 Q. You say here that Microsoft's proprietary extensions to  
16 Kerberos ensure that PCs and other client devices running  
17 non-Microsoft versions of Kerberos could not interoperate  
18 securely with non -- with Microsoft's servers. Excuse me.  
19 And do you continue to believe that that is so, sir?  
20 A. Yes.  
21 Q. Now, Sun has an implementation of Kerberos called the  
22 Sun Enterprise Authentication Mechanism or SEAM; is that  
23 right?  
24 A. I believe so, yes.  
25 Q. And Sun is a leading sponsor of an industry consortium

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1 called Connectathon that Sun founded in 1996; is that  
2 right?  
3 A. Yes.  
4 Q. And one of the things that Connectathon does is permit  
5 different vendors to come to a particular site and test to  
6 see whether their implementations of various industry  
7 standards are interoperable, correct?  
8 A. Yes.  
9 Q. And at the 2000 Connectathon which Sun sponsored, one  
10 of the things that was looked at was whether a Solaris  
11 workstation running SEAM could interoperate with a Windows  
12 2000 server?  
13 A. For a specific function, which I believe was  
14 authentication.  
15 Q. I'd like to show you what's been marked as Defendant's  
16 Exhibit 932.  
17 MR. HOLLEY: May I approach the witness, Your  
18 Honor?  
19 THE COURT: Yes.  
20 THE WITNESS: Thank you.  
21 Q. Defendant's Exhibit 932 is a report from Sun  
22 Microsystems concerning Connectathon 2000, correct?  
23 A. Yes.  
24 MR. HOLLEY: Your Honor, I move for the admission  
25 of Defendant's Exhibit 932.

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1 MS. FULTON: No objection.  
2 THE COURT: All right, then, I'll admit it.  
3 (Defendant's Exhibit 932 admitted into evidence.)  
4 BY MR. HOLLEY:  
5 Q. Now, if you look at the second page of this document,  
6 up at the top it says: "Presentation Objective," and it  
7 says: "To present the actual testing configurations and  
8 the test results of the interoperability between SEAM 1.0  
9 and Windows 2000 Kerberos Version 5."  
10 Do you see that, sir?  
11 A. Yes, I do.  
12 Q. And on the next page of the document, it shows a  
13 configuration that was tested of a single Kerberos realm  
14 with a Windows 2000 key distribution center. Do you know  
15 what a key distribution center is in Kerberos, sir?  
16 A. No, I do not.  
17 Q. And in this test, a Windows 2000 key distribution  
18 center was tested with SEAM clients, and is it your  
19 understanding that a SEAM client here is a client running  
20 Sun's version of Kerberos?  
21 A. Actually, I'm not very familiar with SEAM, so --  
22 THE COURT: I'm sorry?  
23 THE WITNESS: I'm not very familiar with SEAM, so  
24 I'm probably not the best person to talk to about this.  
25 BY MR. HOLLEY:

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1 Q. Well, you did testify, sir, to this Court about  
2 Kerberos interoperability, did you not?  
3 A. Yes.  
4 Q. Do you see at the bottom of the page the line that  
5 says: "Test results. All scenarios worked"?  
6 A. Yes.  
7 Q. And do you know what that means in the context of SEAM  
8 clients interoperating using Kerberos with a Windows 2000  
9 server?  
10 A. I don't, but I presume that for the scenarios it used  
11 -- or for the scenarios it tested, it worked. But that's  
12 not to suggest that all the scenarios were tested.  
13 Q. But as you sit here today, you don't know which  
14 scenarios the Sun engineers who prepared Defendant's  
15 Exhibit 932 did test, do you?  
16 A. I'm sorry, that I know which scenarios that tested?  
17 Q. Do you know which scenarios the Sun engineers who  
18 prepared Defendant's Exhibit 932 tested?  
19 A. I do not.  
20 Q. Now, in Paragraph 129, Mr. Schwartz -- and tell me when  
21 you're there -- of your written direct testimony, sir.  
22 A. Yes.  
23 Q. Before we go there, Mr. Schwartz, if you look back at  
24 Defendant's Exhibit 932, and flip through from Page 3 to  
25 the end of the document, do you see any indication that the

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1 result of any of the tests that were conducted by the Sun  
2 engineers were that scenarios failed?  
3 A. Well, again, this is the first time I've seen this  
4 document. This document is now two years old, and it  
5 addresses the interoperability of a set of scenarios with  
6 which I'm unfamiliar, and moreover addresses Win 2K and not  
7 either Passport or Win XP. So I'm heartened to see that  
8 there are scenarios identified here that worked. But I  
9 have no way of knowing if this is all the scenarios or if  
10 that interoperability extends to today.  
11 Q. Well, Mr. Schwartz, if you look back, sir, at Paragraph  
12 117, what you told the Court was that Microsoft's  
13 proprietary extensions to Kerberos ensured that PCs and  
14 other client devices running non-Microsoft versions of  
15 Kerberos, for example a SEAM client, could not interoperate  
16 securely with Windows servers.  
17 Now, when you made that statement, Mr. Schwartz,  
18 don't you think it was important to know what Sun engineers  
19 had learned in tests about precisely the scenario you just  
20 described?  
21 A. The engineers with whom I spoke were working on today's  
22 technology with today's products and were not necessarily  
23 involved in March of 2000 in a potentially limited  
24 interoperability testing between a set of technologies that  
25 existed then. And as best I understand from my

<p style="text-align: right;">Page 2925</p> <p>1 interactions with Sun's teams that are involved in the 2 development of our directory and security technologies, 3 that interoperability doesn't exist today. 4 Q. Well, you're entirely reliant on what you are told by 5 other people on this subject, are you not, because you are 6 not up to speed on Kerberos? 7 A. I am up to speed on the business issues and the use of 8 Kerberos in, you know, providing identity systems today. 9 I'm not a developer necessarily who can construct an 10 identity system from whole cloth. 11 Q. And, in fact, when you wanted to know about the 12 authorization data field in Microsoft's Kerberos tickets, 13 you went to one of your colleagues, Mark Terranova, to ask 14 him because you couldn't figure it out yourself; isn't that 15 right, sir? 16 A. I went to Peter Yared, who is the chief technology 17 officer for our Liberty internal project; to Stephen 18 Borcich, who is the director of our identity and directory 19 business unit. I went to Larry Abrahams, who has been 20 overseeing the technology developed to enable Liberty 21 interoperability, and I got a uniformed set of perspectives 22 from them. 23 Q. Now, let's go back to the question I asked you three 24 minutes ago, which was, if you look at Defendant's Exhibit 25 932, sir, do you see any indication here, as of the date of</p>	<p style="text-align: right;">Page 2927</p> <p>1 A. I believe so, and other technologies and products. 2 Q. And contrary to what you say here in Paragraph 129, Sun 3 tells customers that it offers interoperability solutions 4 that permit everything in the heterogeneous network to work 5 together, including Windows clients and non-Windows 6 servers, right? 7 A. I'm sorry, what are -- 8 Q. My question is -- you say here in Paragraph 129 that 9 Microsoft's presence in the server software market allows 10 it to exert control over servers hosting or running Web 11 servers in ways that will protect the position of Windows. 12 By that do you mean to suggest that there is no 13 interoperability between Windows operating systems and 14 other operating systems? 15 A. No. There is certainly some level of interoperability; 16 it just is not complete interoperability. 17 Q. Well, is that what Sun tells customers? Does Sun say 18 to customers: We offer some interoperability, but it isn't 19 very good? 20 A. We certainly would not advertise incompatibilities; we 21 would do our best to provide the interoperability that we 22 could possibly provide. 23 Q. Well, let's look at what's been marked as Defendant's 24 Exhibit 929. 25 MR. HOLLEY: May I approach the witness, Your</p>
<p style="text-align: right;">Page 2926</p> <p>1 this document, which is in 2000, that any scenario 2 involving Windows 2000 implementation of Kerberos and the 3 Sun implementation of Kerberos resulted in a test that 4 failed? 5 A. I would like to point out again that in March of 2000, 6 and for the scenarios that were defined here, that for the 7 tests that were identified, they appear to have worked, but 8 I have no way of knowing whether that is all of the tests 9 or if that involved anything more than the simplest 10 authentication. 11 Q. Now, let's go back, if you would, sir, to your written 12 direct testimony, Paragraph 129. 13 You say here that, "Microsoft's presence in the 14 server software market allows it to exert control over 15 servers hosting or running Web services in ways that will 16 protect the position of Windows." 17 Do you know what the relative share is of Apache 18 Web serves running on Linux relative to Microsoft servers? 19 A. I'm sorry, the relative share of -- 20 Q. The relative share of Apache Web servers running on 21 Linux versus Windows servers as hosts for Web sites? 22 A. I believe I recently saw a Stat Market survey, or maybe 23 was a Net Craft survey, that suggested Microsoft had 24 something like half of those Web servers. 25 Q. And Apache the other half?</p>	<p style="text-align: right;">Page 2928</p> <p>1 Honor? 2 THE COURT: Yes. 3 THE WITNESS: Thank you. 4 BY MR. HOLLEY: 5 Q. Now, in this brochure from Sun Microsystems, the cover 6 says: "With Sun interoperability solutions, everything 7 works together." 8 That's what it says, right? 9 A. Yes, it does. 10 Q. And it doesn't qualify that statement in any way, does 11 it, sir? 12 A. No, it does not. 13 Q. And if you look at the penultimate page of this 14 document, which has been marked as Defendant's Exhibit 929, 15 Sun tells the world that -- and I'm looking on the 16 left-hand column in the second paragraph -- that "Sun PCI 17 cards permit you to run Windows and DOS applications in a 18 Solaris environment," right? 19 A. Yes. 20 Q. And on the right-hand column of this document, Sun 21 tells the world that "You can run a product called PC 22 Netlink and provide Windows NT network services, including 23 authentication to your PCs." 24 Do you see that, sir? 25 A. Yes. And I would question, first of all, the date of</p>

<p style="text-align: right;">Page 2929</p> <p>1 this document, which I don't see. And when, in fact, this 2 was produced, it may have been in the duration when we had 3 licensed technology from AT&amp;T to enable that NT 4 interoperability. 5 But shortly after that license was made, I believe 6 that Microsoft severed a relationship with AT&amp;T that 7 provided us with the necessary interoperability. So I 8 don't know when this document was produced or to what 9 technology it refers. 10 Q. Have you seen this document at any time within the last 11 72 hours? 12 A. No, I have not. 13 Q. Do you know whether you could walk over to a computer 14 right now and get a copy of this document from Sun's Web 15 site? 16 A. I do not. But once again, it is PC Netlink for an 17 unspecified version of Windows NT; not Win 2000 or Win XP. 18 It is for an unspecified version, and it is for an 19 unspecified level of interoperability. 20 Q. Okay. Well, assume with me for the purposes of this 21 question that if you went to the Internet right now to 22 www.sun.com, you could get a full color version of the 23 document that appears as Defendant's Exhibit 929. Does 24 that affect -- would that affect your testimony about what 25 this means to say that Sun PC Netlink provides Windows NT</p>	<p style="text-align: right;">Page 2931</p> <p>1 produced copy. Sun delivers a standard set of APIs, and 2 multiple competing companies produce implementations of 3 those APIs. They don't have to peek at one another's 4 source codes to do so. 5 Q. That's a business model that Sun has chosen, correct? 6 A. Yes. And that was, I thought, as well, the intent of 7 the disclosure obligations. 8 Q. That's your understanding of what the non-Settling 9 States are seeking to achieve through Section 4? 10 A. Among them the capacity for multiple participants to 11 produce competing implementation and for consumers to 12 choose, yes. 13 Q. Now, look at Paragraph 158, if you would, sir, of your 14 written direct testimony which appears at Page 45. 15 A. 158? 16 Q. Yes, sir. It's the second complete paragraph on Page 17 45. 18 A. Yes. 19 Q. Now, in the last sentence of this paragraph, which is 20 referring to Section 1 of the non-Settling States' proposed 21 remedy, you say that this remedy contemplates removal of 22 the underlying code. Do you see that, sir? 23 A. Yes. 24 Q. And that's your understanding of what Section 1 would 25 require, correct; that Microsoft actually permit the</p>
<p style="text-align: right;">Page 2930</p> <p>1 services, including authentication to PCs attached to a 2 Solaris server? 3 A. What would be interesting to me is to find out what 4 version of NT and to what degree each of these levels of 5 interoperability was actually provided. And given the 6 current information, I can't determine that. 7 And I guess that at a more fundamental level, it 8 seems like what we're talking about is the level of 9 disclosure required to interoperate. And if the assertion 10 is that Sun has all of the information it needs to 11 interoperate, then it seems like the States' remedy for 12 disclosure would be entirely consistent with what you've 13 suggested we need. 14 Q. Well, doesn't that all depend on what the word 15 "interoperate" means, sir? 16 A. Absolutely. 17 Q. Correct. And if the word "interoperate" means what it 18 means in the non-Settling States' remedy proposal, then 19 Microsoft has to disclose sufficient information to permit 20 Sun or anyone else to create an exact functional equivalent 21 for a Windows 2000 server; do you agree with that? 22 A. I believe that it is designed to enable the creation of 23 substitutes. So to the extent that we will create an 24 implementation that supports the same APIs, to me that 25 doesn't mean a clone or in some other way an illicitly</p>	<p style="text-align: right;">Page 2932</p> <p>1 removal of software code from things that it ships 2 currently as Windows operating systems? 3 A. Yes. 4 Q. Now, you've never seen the source code for any 5 Microsoft operating system; is that right? 6 A. No, I have not. 7 Q. And you have no knowledge whatsoever about the internal 8 architecture of Windows operating systems; is that right? 9 A. Yes, that is correct. 10 Q. You, nonetheless, you believe, do you not, 11 Mr. Schwartz, that OEMs, computer manufacturers, should be 12 permitted to remove pieces of Windows that expose APIs to 13 software developers because that would lead to competition 14 to deliver the richest platform that delivers the best 15 operating environment for Web services? 16 A. Yes. 17 Q. And you acknowledge, do you not, Mr. Schwartz, that in 18 that world in which OEMs were free to delete whatever 19 portions of the Windows API they liked, software developers 20 would have to choose between Compaq's platform version of 21 Windows against the Dell platform version of Windows 22 against the Fujitsu version of Windows against the IBM 23 platform version of Windows? 24 A. In much the same way they originally had the 25 opportunity to choose the Netscape browser or the Internet</p>

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1 Explorer browser or the Java delivered by Microsoft or the  
2 Java delivered by another licensee, yes.  
3 Q. And I just want to be clear, when you say yes at the  
4 end of that answer, you mean yes in the world created by  
5 Section 1, there would be multiple versions of Windows  
6 created by different OEMs, and software developers would  
7 have to choose which of those platforms they wanted to  
8 target?  
9 A. I believe there would be multiple configurations of  
10 Windows and that would put OEMs in a position to decide  
11 which configuration was optimal for them to deliver into a  
12 competitive marketplace. Developers would similarly have  
13 the choice to determine which configuration and which set  
14 of middleware was appropriate for their intended purpose.  
15 Q. Look, if you would, sir, at Paragraph 164 of your  
16 written direct testimony in which you're commenting on  
17 Section 3(d) and Section 3(e) of what's come to be known as  
18 the SRPFJ, and tell me when you're there, sir.  
19 A. I am there.  
20 Q. Now, you criticize the SRPFJ in those two sections  
21 because it does not cover, first of all, server-to-server  
22 interactions, and that is a criticism that you have, is it  
23 not, sir?  
24 A. Yes.  
25 Q. And are you aware of any discussion, either in the

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1 Court of Appeals opinion in this case or the District Court  
2 opinion in this case of one server interacting with  
3 another?  
4 A. I believe when you talk about Web services, and the  
5 example I used, whether it's The New York Times home page  
6 or the Amazon.com home page, there are multiple  
7 interactions that are presented to a user through a  
8 browser, all of which are contemplated by a browser.  
9 Q. Okay. But I asked you a slightly different question,  
10 sir, which is: Are you aware of any portion of either the  
11 District Court opinion or the Court of Appeals opinion in  
12 this case that discusses the interaction of one server to  
13 another?  
14 A. I am not a lawyer, and I have not read those opinions.  
15 Q. Okay. And I take it that if I asked you that same  
16 question with regard to B, C and D, you would give me the  
17 same answer, which is that you are not a lawyer and you  
18 have not read either the District Court opinion or the  
19 Court of Appeals opinion, and therefore you do not know; is  
20 that correct?  
21 A. Yes, that is correct.  
22 Q. Now, you say in Paragraph 177, Mr. Schwartz, that the  
23 desktop, what you refer to as the desktop flexibility  
24 provisions in the SRPFJ in Paragraphs 3(c) and 3(h) are too  
25 restrictive. Do you see that, sir?

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1 A. Yes.  
2 Q. You believe, do you not, that computer manufacturers or  
3 OEMs should be free to place icons on the Windows desktop  
4 that are so large that the icons obscure the start menu?  
5 A. I believe that OEMs should be given the choice to  
6 configure their products as they see fit in the  
7 marketplaces, and any that would choose to put the power  
8 button on the back of the computer instead of on the front,  
9 I would suggest, would face market forces that would either  
10 correct their behavior or put them out of business.  
11 Q. But, sir, can you answer the question that I asked you,  
12 which is, if -- you believe that OEMs should be given the  
13 right to place icons on the Windows desktop that are so  
14 large that they obscure the start menu?  
15 A. That would be the OEM's choice, yes.  
16 Q. And you believe that's a choice they should be able to  
17 make?  
18 A. Absolutely.  
19 Q. You also believe that OEMs should be in a position to  
20 put an icon for Web browsing software in the control panel  
21 of the operating system, correct?  
22 A. If they chose to do so for whatever irrational reason,  
23 that would be their choice, yes.  
24 Q. But you believe that they should have that choice, do  
25 you not, sir?

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1 A. I absolutely do.  
2 Q. And you believe that OEMs should have the right to  
3 place an icon for Web browsing software smack on top of the  
4 start button of the operating system, do you not, sir?  
5 A. I absolutely do. That would be their choice.  
6 Q. And you believe that this Court should ensure that they  
7 have the choice to do exactly that; which is to take an  
8 icon for Web browsing software and put it right on top of  
9 the start button of the operating system so that you can no  
10 longer see the start button?  
11 A. Yes. And I believe that I could probably paint an even  
12 more absurd series of choices that an OEM might make, but  
13 the point is the OEMs would be in a competitive marketplace  
14 where users and consumers would be free to choose those  
15 that were configured as they saw fit.  
16 Q. You also believe, do you not, Mr. Schwartz, that  
17 Microsoft should be prohibited from automatically invoking  
18 Internet Explorer to perform functions like providing  
19 HTML-based help to users?  
20 A. I believe that Microsoft should -- or that OEMs should  
21 have the flexibility to determine which products they use  
22 for Web browsing, yes. And to the extent that that  
23 removes, you know, functionality, that again is the OEM's  
24 choice.  
25 Q. And is your view in this regard informed at all by what

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1 the Court of Appeals for this Circuit said about the  
 2 automatic invocation of Internet Explorer to provide HTML-  
 3 based help to end-users?  
 4 A. I'm sorry, is it based on what who said?  
 5 Q. Is it informed at all, your view, about what the Court  
 6 of Appeals in this case said about the automatic invocation  
 7 of Internet Explorer to provide HTML help to end-users?  
 8 A. I have not read that document.  
 9 Q. Now, you say in Paragraph 178 of your written direct  
 10 testimony that "The SRPFJ does not permit the inclusion by  
 11 OEMs of any competing identity authentication authorization  
 12 systems as a rival to .NET Passport."  
 13 Do you see that, sir?  
 14 A. Yes, I do.  
 15 Q. Now, under Microsoft's license agreements for Windows  
 16 operating systems, OEMs have precisely that right, do they  
 17 not?  
 18 A. I'm uncertain as to Microsoft's current licensing  
 19 practice on that.  
 20 Q. So you don't know one way or the other whether OEMs can  
 21 do that, do what you are suggesting under their current  
 22 license agreements?  
 23 A. I do not.  
 24 Q. Now, Sun lobbied the Department of Justice prior to the  
 25 filing of this lawsuit in May of 1998; is that right?

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1 A. I would disagree with that characterization. We were  
 2 approached by the Department of Justice for clarification  
 3 on certain technical elements of the marketplace.  
 4 Q. And you personally participated in at least one meeting  
 5 with representatives of the Department of Justice to  
 6 discuss Microsoft; is that right?  
 7 A. Yes. I believe at their invitation.  
 8 Q. I would like to show you what's been marked for  
 9 identification as Defendant's Exhibit 841.  
 10 MR. HOLLEY: May I approach the witness, Your  
 11 Honor?  
 12 THE COURT: Yes.  
 13 BY MR. HOLLEY:  
 14 Q. This is a document that, as you can see from the  
 15 production numbers, was produced from the files of Sun  
 16 Microsystems, a letter addressed to Charles A. James,  
 17 Assistant Attorney General, United States Department of  
 18 Justice, sent by a Christopher Hankin, Director of Federal  
 19 Affairs, Sun Microsystems, Inc. And attached to it is a  
 20 document entitled "Sun's Position Paper on Behavioral  
 21 Remedies in the United States versus Microsoft" dated  
 22 January -- well, I think this date doesn't make any sense,  
 23 but the footer on the second page says 1-18-2002.  
 24 A. Yes.  
 25 Q. Were you aware that in the fall of 2001 Sun

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1 representatives were communicating with the Department of  
 2 Justice about this case and the remedies that should be  
 3 awarded by the Court?  
 4 A. The government approached us, and we responded in kind,  
 5 seems completely understandable, and that those discussions  
 6 continued for as long as the Department of Justice saw fit  
 7 doesn't surprise me.  
 8 MR. HOLLEY: Your Honor, I move the admission of  
 9 Defendant's Exhibit 841.  
 10 THE COURT: Any objection?  
 11 MS. FULTON: No objection, Your Honor.  
 12 THE COURT: All right, then, I'll admit 841.  
 13 (Defendant's Exhibit 841 admitted into evidence.)  
 14 BY MR. HOLLEY:  
 15 Q. Now, in this letter on the first page from Mr. Hankin,  
 16 the Director of Federal Affairs of Sun Microsystems, he  
 17 says: "Pursuant to the suggestion you made in your letter  
 18 of October 17, I enclose herewith a paper setting out Sun  
 19 Microsystems' position on remedies in the Microsoft case."  
 20 And is it your understanding, Mr. Schwartz, that  
 21 the paper that he refers to in that paragraph is, in fact,  
 22 the one that appears starting at page -- the second page of  
 23 this document?  
 24 A. I have no way of knowing, but I would assume, given  
 25 that they are stapled together.

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1 Q. Now, look at this document starting at Page 19.  
 2 There's a section entitled VI, Roman VI: Remedies to  
 3 Redress Microsoft'S Monopoly Power. And I'd like to turn  
 4 first -- to the first of those proposed remedies from Sun  
 5 Microsystems which appears at Page 20. It's entitled  
 6 "Open Nondiscriminatory Licensing of Internet Explorer  
 7 Source Code." Do you see that?  
 8 A. I do.  
 9 Q. And do you have up there with you, sir, a copy of the  
 10 non-Settling States' proposed remedy?  
 11 A. Yes, I do.  
 12 Q. Can you look, sir, at Paragraph 12 of the non-Settling  
 13 States' proposed remedy and tell me what that one is about?  
 14 A. I'm sorry, Paragraph 12 or Section 12?  
 15 Q. Section 12, I think, sir.  
 16 A. It's about the open source license for Internet  
 17 Explorer.  
 18 Q. So Sun's first proposed remedy, which is the open  
 19 source licensing of Internet Explorer source code, showed  
 20 up in the non-Settling States' proposed remedy, correct?  
 21 A. Yes. But again, I'd like to flip back, if we could, to  
 22 the front page of that letter, which begins: "Dear  
 23 Mr. James."  
 24 Q. Um-hmm.  
 25 A. And in the second paragraph -- actually third paragraph

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1 after "thank you," you'll note it says: "Pursuant to the  
2 suggestion you made in your letter of October 17th." So my  
3 understanding is this was at the invitation of Mr. James.  
4 Q. Okay. And I have no quarrel with that. I'm just  
5 asking you a different question, which is: Is the proposal  
6 contained in Paragraph A starting on Page 20 of Defendant's  
7 Exhibit 841 reflected in the non-Settling States' proposed  
8 remedy?  
9 A. Clearly, yes.  
10 Q. And it's not in the SRPFJ, is it?  
11 A. No, I do not believe so.  
12 Q. So presumably Mr. James didn't think it was a very good  
13 idea?  
14 A. Or Microsoft didn't, yes.  
15 MS. FULTON: Objection, Your Honor.  
16 Q. Okay. Let's look at the remedy labeled B that starts  
17 on Page 22. It's entitled "Mandatory Distribution of Java  
18 Run-time in Microsoft Platform Software."  
19 Now, this proposal from Sun appears at Paragraph 13  
20 of the non-Settling States' proposed remedy, does it not?  
21 A. Yes, it does.  
22 Q. Let's look at Sun's next suggestion.  
23 A. And actually -- let me qualify that.  
24 Not having read this letter, I don't know if it is  
25 exactly reflected, but given that they both say "Java

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1 distribution," I'm assuming that they're at least similar.  
2 Q. They both relate to the mandatory distribution of Java  
3 run-times in Microsoft platform software, correct, sir?  
4 A. Yes.  
5 Q. Now let's look at Proposal C from Sun Microsystems. It  
6 talks about use of industry-standard platform interfaces  
7 and security protocols.  
8 Now, this is a subject that is addressed by the  
9 non-Settling States in Paragraph 16 of their proposed  
10 remedy; is that correct?  
11 A. Again, not having read this before, I'm assuming that  
12 reference to industry-standard and security protocols would  
13 be covered under Section 16 as well as the disclosures.  
14 Q. By the disclosures, you mean under Section 4 of the  
15 non-Settling States' proposed remedy?  
16 A. Yes.  
17 Q. Now, in this particular instance, the non-Settling  
18 States didn't go quite as far as Sun wanted, right? Sun  
19 asked that for a period of ten years from the date of entry  
20 of final judgment -- and I'm on Page 25 of Defendant's  
21 Exhibit 841 -- "Microsoft shall be enjoined from  
22 introducing any new Microsoft platform interface in its  
23 platform software, modifying any existing Microsoft  
24 platform interface in its platform software, or subsetting  
25 or supersetting any industry-standard platform interface,"

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1 and the non-Settling States didn't go that far. They just  
2 said that if Microsoft subsets or superset standards, it  
3 has to say that it's done so. Is that your understanding,  
4 sir?  
5 A. Yes, to the extent that they claim that they are  
6 supporting those standards.  
7 Q. Now let's look at Sun's Proposal D, which appears at  
8 the top of Page 27 entitled "Nondiscriminatory Disclosure  
9 and Licensing of Platform Interfaces."  
10 Is it your understanding that the substance of this  
11 Proposal D appears in Section 4A of the non-Settling  
12 States' proposed remedy?  
13 A. Again, without reading it, I wouldn't know exactly.  
14 Q. Well, in this particular instance, Sun asked the  
15 Justice Department to get a consent decree which forced  
16 "Microsoft to disclose in whatever form and media Microsoft  
17 disseminates such information to its own personnel, all  
18 platform interfaces and technical information that  
19 Microsoft employs to enable Microsoft platform software  
20 installed on a personal computer to interoperate  
21 effectively with applications and/or Microsoft platform  
22 software installed on that or any other device," and then  
23 it goes on.  
24 There is an uncanny similarity in that language to  
25 the language in Section 4A, is there not, sir?

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1 A. Again, without having read this letter, you know, I  
2 would not be surprised.  
3 Q. You wouldn't be surprised?  
4 A. Given what you have just indicated, no.  
5 Q. Now, Sun's Proposal E in its White Paper says that  
6 Microsoft should be required to port Microsoft Office to  
7 other platforms. Do you see that, sir?  
8 A. Yes.  
9 Q. And the non-Settling States changed that a little bit.  
10 They decided that Microsoft shouldn't have to do the  
11 porting itself, but rather Microsoft should have to auction  
12 Office to three people and let them do the porting. Is  
13 that your understanding of what Section 14 of the  
14 non-Settling States' proposed remedy does?  
15 A. I wasn't prepared to testify about it, but I will take  
16 you at your word.  
17 Q. Well, I don't want to put words in your mouth, sir. If  
18 you look at Paragraph 14 of the non-Settling States'  
19 proposed remedy, it says: "Mandatory continued provision  
20 of Office to Macintosh and mandatory licensing of Office  
21 for the purpose of making Office available on other  
22 operating systems."  
23 A. Yes.  
24 Q. Okay.  
25 MS. FULTON: It's outside of the scope of direct,



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1 Your Honor.  
 2 MR. HOLLEY: Your Honor, it goes directly to the  
 3 bias of this witness.  
 4 THE COURT: I'll allow it  
 5 BY MR. HOLLEY:  
 6 Q. Section F of Sun's proposed remedy is entitled  
 7 "Knowing Interference with Non-Microsoft Middleware  
 8 Performance," and that appears at Paragraph 5 of the  
 9 non-Settling States' proposed remedy, does it not, which is  
 10 entitled: Knowing -- excuse me -- Notification of Knowing  
 11 Interference With Performance.  
 12 A. I'm sorry. It goes to or is similar to?  
 13 Q. Well, at a minimum it's similar to it, isn't it?  
 14 A. Yes.  
 15 Q. Okay. And then in Section G of Sun's position paper  
 16 entitled "Compliance," they encourage the creation of a  
 17 so-called secure facility where third parties can come to  
 18 study, interrogate and interact with the source code and  
 19 any related documentation for Microsoft platform software.  
 20 And that language almost inhaec verba appears in Section  
 21 4C?  
 22 A. What was that term?  
 23 Q. That means in those same words, in Latin. In the  
 24 section entitled "Compliance," 4C of the non-Settling  
 25 States' proposed remedy, correct?

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1 A. Yes, he addresses creating a secure facility.  
 2 Q. And then Paragraph H of Sun's proposal is that  
 3 Microsoft be restricted from investing in additional lines  
 4 of business, and this concept is picked up in Paragraph 20  
 5 of the non-Settling States' proposed remedy where various  
 6 standard industry classifications are listed, and Microsoft  
 7 is supposed to give 60 days' prior notice before it makes  
 8 any acquisitions in those SIC code areas. Do you see that,  
 9 sir?  
 10 A. I'm sorry. Let me turn to that.  
 11 Section 20 addresses investments in specific types  
 12 of companies, yes.  
 13 Q. And then in a section of this White Paper entitled  
 14 "Procedure" under the heading Roman 7, one of the things  
 15 that Sun suggests is that there be a Special Master  
 16 appointed to determine that Microsoft is complying with the  
 17 consent decree. Do you see that, sir?  
 18 A. Yes, I do.  
 19 Q. And that suggestion is picked up in Paragraph 18 of the  
 20 non-Settling States' proposed remedy, which says that there  
 21 should be a Special Master to determine whether Microsoft  
 22 is complying with the consent decree?  
 23 A. Yes, that is the case.  
 24 Q. And then Sun suggests that there be, in Section 7C,  
 25 what is referred to as a crown jewel provision, where if

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1 Microsoft fails to comply with the consent decree, in this  
 2 particular case the company would be broken up. Do you see  
 3 that? That's the Sun proposal.  
 4 A. Yes, I do.  
 5 Q. And then the non-Settling States adopted a slightly  
 6 less draconian view of that. They say in Paragraphs 19B  
 7 and C that "If Microsoft engages in knowing acts of  
 8 noncompliance, then the Court may consider an order  
 9 requiring Microsoft to license the source code for the  
 10 Microsoft software products implicated in the acts of  
 11 material noncompliance." Do you see that, sir, in  
 12 paragraph 19C?  
 13 A. I do.  
 14 Q. Is there any suggestion that Sun made in its White  
 15 Paper to Mr. James that appears in the SRPFJ?  
 16 A. I wouldn't know. I haven't read the document.  
 17 Q. Okay. And is there any suggestion that Sun made in its  
 18 White Paper that does not appear in one form or another in  
 19 the non-Settling States' proposed remedy?  
 20 A. Once again, I haven't read the document.  
 21 THE COURT: Which document do you keep saying you  
 22 haven't read?  
 23 THE WITNESS: I have not read the Sun letter to  
 24 Charles James.  
 25 THE COURT: 841, the attachment?

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1 THE WITNESS: Yes, I'm sorry, the White Paper.  
 2 MR. HOLLEY: I have no further questions, Your  
 3 Honor.  
 4 THE COURT: All right. Redirect.  
 5 REDIRECT EXAMINATION OF LARRY SCHWARTZ  
 6 BY MS. FULTON:  
 7 Q. Mr. Schwartz, I'd like to draw your attention to  
 8 Paragraph 63 of your written testimony.  
 9 A. Go ahead.  
 10 Q. In the second sentence in that paragraph, you testify  
 11 that it's your understanding that Netscape Navigator's  
 12 share is about 7 percent today, while Microsoft's Internet  
 13 Explorer share has risen to approximately 90 percent.  
 14 A. Yes.  
 15 Q. Is that your testimony?  
 16 A. That is my testimony.  
 17 Q. And can you please tell us what the basis is for that  
 18 testimony?  
 19 A. Sure. It's Stat Market, which is a service that  
 20 provides a vendor neutral analysis of the marketplace  
 21 similar to the survey that Mr. Holley alluded to provided  
 22 by Net Craft to look at Web servers. This one focuses on  
 23 the Web browser marketplace.  
 24 Q. And is Stat Market a market data service that you rely  
 25 on in the course of your business?

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1 A. Sure. I mean, it's relied upon for various, you know,  
2 and different market analyses, and the browser is one of  
3 them.  
4 Q. Is it relied upon by other individuals and executives  
5 in your industry?  
6 A. Absolutely.  
7 MS. FULTON: No further questions, Your Honor.  
8 MR. HOLLEY: Your Honor, I move to strike that  
9 testimony on the grounds that those documents that he says  
10 he relied on are hearsay. They're not before the Court.  
11 THE COURT: Well, I would agree with that.  
12 MS. FULTON: Your Honor, there is an exception in  
13 Federal Evidence 80317 for market reports that are relied  
14 upon by people in the industry.  
15 MR. HOLLEY: Your Honor, I could accept  
16 Ms. Fulton's statement if she had bothered to bring them to  
17 present them to Your Honor, but we don't have them, and  
18 we're depending on Mr. Schwartz's memory about what they  
19 say. So I continue to suggest that they're hearsay, Your  
20 Honor.  
21 THE COURT: I will look at it. It does seem to me  
22 that for me to make this decision, you haven't given me  
23 what it is that he's relied on. So I just have his views  
24 that that's what it's in. But I'll take a look at it in  
25 terms of the rule and see how its considered.

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1 MS. FULTON: Thank you, Your Honor. I have no  
2 further questions.  
3 MR. HOLLEY: Your Honor, could I address two small  
4 housekeeping matters? I misspoke earlier when I said that  
5 Defendant's Exhibit 952 had been admitted into evidence.  
6 It has not. But I would move for its admission now.  
7 THE COURT: Okay. Let me just find out. Do you  
8 want to indicate to her which one it is?  
9 MR. HOLLEY: I think she has it, Your Honor.  
10 MS. FULTON: I have it, Your Honor, and I'm going  
11 to object. It's hearsay.  
12 THE COURT: What is it?  
13 MS. FULTON: It is titled "Comparing Microsoft.net  
14 with Sun One."  
15 THE COURT: Where is the document from?  
16 MR. HOLLEY: Your Honor, it's produced from Sun.  
17 It says at the bottom, "Sun, confidential, for internal use  
18 only." It's dated January 16th of this year.  
19 I think it plainly falls within the business  
20 records exception, and I would just note that the  
21 non-Settling States did not object to the admission of this  
22 document in the pretrial submissions.  
23 THE COURT: Is that correct? If you didn't object  
24 to it, then I'm not sure what position -- and if it's one  
25 of Sun's documents themselves --

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1 MS. FULTON: Your Honor, I objected because the  
2 witness said he had not seen the document before. There is  
3 no clear author. It says, "Sun, confidential, for internal  
4 use only," but it doesn't even say it's written by anyone  
5 at Sun.  
6 THE COURT: You didn't -- the first question I have  
7 is did you object originally to it?  
8 MS. FULTON: I just checked with my colleagues, and  
9 they have told me we did not.  
10 THE COURT: Then it seems to me that the question  
11 that you have raised -- I would be inclined to admit it.  
12 And the question that you have raised and the issues really  
13 go to the weight that the Court should accord it, and I  
14 would handle it in that way if there was not an original  
15 objection, and I'll look at the document in light of what  
16 you've indicated --  
17 MS. FULTON: Thank you.  
18 THE COURT: -- in terms of what weight I accord it.  
19 MR. HOLLEY: Thank you, Your Honor. And one last  
20 point.  
21 In light of Mr. Schwartz's testimony on  
22 cross-examination that the basis for his statement in the  
23 last phrase of Paragraph 110 was exclusively statements  
24 made by Mr. Muglia at Forum 2000 and statements made to him  
25 by members of the Liberate Alliance about what Microsoft

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1 had said to them, I now move to strike that phrase as  
2 hearsay.  
3 MS. FULTON: Your Honor, statements by Mr. Muglia  
4 were clearly statements by a party. They're admitted under  
5 that exception.  
6 THE COURT: Do you want to answer in terms of  
7 Mr. Muglia? I would agree with you in terms of his  
8 discussing it with various engineers at Sun that aren't  
9 going to testify as hearsay; however, Mr. Muglia is not.  
10 MR. HOLLEY: Well, but we're relying on  
11 Mr. Schwartz's recollection of what Mr. Muglia said. It  
12 would be one thing to have a written record of Mr. Muglia's  
13 comments at Forum 2000, which I happen to know are  
14 available on the Microsoft Web site, but the normal sort of  
15 reliability that results from having something come in as  
16 an admission depends on the idea that the substance of the  
17 admission is known.  
18 Here we don't have any of those indicators of  
19 reliability. We're depending entirely on what Mr. Schwartz  
20 remembers what Mr. Muglia said. I don't know if the  
21 hearsay exception that Ms. Fulton is relying on applies  
22 here.  
23 THE COURT: Do you want to respond to that?  
24 MS. FULTON: I think that's the clear purpose of  
25 the hearsay exception, Your Honor.

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1 THE COURT: What I will do is -- in terms of -- I  
2 will strike the comments by participants -- various other  
3 people that he -- I think these were comments by -- not  
4 engineers, I got it mixed up with something else -- this is  
5 comments by participants at the Liberty Alliance that said  
6 that they repeated to Mr. Schwartz what Microsoft  
7 supposedly said to them, and I think that that clearly is  
8 hearsay within hearsay.  
9 In terms of Mr. Muglia, what I will do is go back,  
10 take a look at his exact testimony to make a decision as to  
11 whether it fits as a statement of a party opponent. If it  
12 does, then the issue will go to how much weight to give it.  
13 But I need to look more carefully at his testimony in order  
14 to make a decision about that in terms of how he described  
15 it, but I will do that as part of my finding now that  
16 there's a record of it.  
17 MS. FULTON: Thank you, Your Honor.  
18 THE COURT: Okay. One thing that could be done in  
19 terms of the earlier document, which was the document that  
20 Sun provided, which was 952, is if you've taken a portion  
21 out of it, if it has a cover page, it probably would be  
22 helpful, unless they didn't give it to you that way. I  
23 mean, if it had a cover page that went with the document --  
24 I'll leave it up to you how you wish to do it in terms of  
25 the weight to be given, but it would certainly be helpful

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1 if it came with some cover as to what it was connected to.  
2 It probably would be helpful to the Court.  
3 MR. HOLLEY: I appreciate that suggestion, and I  
4 will look into it, and if there is such a cover page, I  
5 will bring it to the Court's attention.  
6 THE COURT: And opposing counsel as well,  
7 obviously.  
8 You're excused, sir.  
9 We'll be moving to the next witness presumably.  
10 Why don't we take just a short break at this point. This  
11 clock says 10 after; my watch says 5 after. But let's go  
12 by mine, which says 5 after. We'll take an afternoon break  
13 and then begin so we don't interrupt the next witness's  
14 testimony. It's a 15-minute break.  
15 We'll be going until 5 today.  
16 (Break taken from 3:10 to 3:25 p.m.)  
17 THE COURT: All right. Good afternoon. We have  
18 one -- wait one second.  
19 We have one preliminary matter that's unrelated to  
20 the next witness. I've received a phone call from  
21 Mr. Brown representing the media about wanting access --  
22 about wanting copies of four depositions. As I understand  
23 it, two of them were from the depositions that the  
24 plaintiffs took which have been provided, I believe -- we  
25 just got a message on the phone -- and two, I believe, from

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1 Microsoft, and you have not provided it saying you needed a  
2 court order.  
3 And I guess the question I first have first is, am  
4 I accurate that you all have given them two so that issue  
5 is gone? Yes? No?  
6 MR. SULLIVAN: Which two, Your Honor?  
7 THE COURT: I don't know. I don't know who it is.  
8 MR. KUNEY: I would have to talk to --  
9 THE COURT: Somebody is putting their hand up.  
10 Yes, sir.  
11 MR. WARDEN: I can respond for both of us, I think.  
12 Mr. KuneY advised me that they were going to, after making  
13 redactions, give the two that were requested, which were  
14 Assistant Attorney General Greene and -- I can't remember  
15 the other one. Borthwick, who has, of course, already  
16 been --  
17 THE COURT: So Greene and Borthwick, and --  
18 presumably we'll be taking out the confidential, highly  
19 confidential, which is the way we had done it for the  
20 earlier ones we gave out, and then what's left?  
21 MR. WARDEN: What's left is Mr. Gates and  
22 Ms. Brock, and I advised Mr. Brown that we would not  
23 consent to give them access to those transcripts, and I  
24 told him that he'd had his bite at the apple. I did not  
25 say, quote, "we need a court order," closed quote. I said

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1 no. I said, you had your bite at the apple, and we can't  
2 have this going on while we're on trial, and that's it;  
3 enough is enough.  
4 THE COURT: Okay. Well, it does seem to me -- I  
5 think it's a fair inference on their part, then, that if  
6 you are not going to give them out, to come to the Court.  
7 So, in terms of -- is the reason strictly going to  
8 be that it is burdensome, or are there other reasons, or do  
9 you wish to brief it for me to make a decision? How do you  
10 wish to handle it?  
11 MR. WARDEN: Your Honor, we would be happy to  
12 follow whatever procedure that Your Honor wishes, including  
13 briefing.  
14 There are several grounds, one of which has already  
15 been briefed, which is the distinction between actual  
16 judicial proceedings, as to which the standards for sealing  
17 are relatively rigorous, and Your Honor has been following  
18 them faithfully, and deposition material that's never  
19 introduced into evidence, which, as the Supreme Court has  
20 observed is A, not the basis for any judicial action, and  
21 B, customarily private.  
22 The second is -- they had their chance. They  
23 should have asked for whatever it was they wanted. They  
24 didn't. We're in the middle of a trial. We have to go  
25 through these things and redact them before they can be

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1 turned over. That's burdensome. We have plenty of other  
2 things to do.  
3 THE COURT: Okay. So it's the original arguments  
4 that were made about the difference between judicial  
5 procedures and depositions, which I addressed.  
6 MR. WARDEN: And other discovery materials, right.  
7 THE COURT: Which I addressed in my last order.  
8 They didn't ask at the time, and they need --  
9 burdensomeness, which is probably your principle argument  
10 in terms of -- is there somebody here from the media,  
11 counsel from the media that's in a position to make an  
12 argument?  
13 Are these requests for these individuals, were  
14 these additional people within the -- you know, we had sort  
15 of two rounds of this -- we had the original grouping of  
16 witnesses, and then there were some additional witnesses,  
17 18 witnesses. Are they out of that group, or are they back  
18 to --  
19 MR. WARDEN: No, no, no, they're not.  
20 THE COURT: They're not the newest depositions,  
21 they're the old group, the original group?  
22 MR. WARDEN: They are the original group of  
23 witnesses. There is a waiver here.  
24 THE COURT: I'm sorry?  
25 MR. WARDEN: They can't just be coming in, you

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1 know, every other day saying we want something more that  
2 they didn't ask for the last time.  
3 And these -- you know, Mr. Gates is scheduled to be  
4 a witness. Ms. Brock is also scheduled to be a witness.  
5 They can come to court and listen to their testimony. So  
6 the public interest they claim to be representing will be  
7 served by the public record that will be made here.  
8 THE COURT: All right. I'm not quite sure -- I  
9 guess the one issue in terms of responding is I don't know  
10 why they didn't ask. They asked for all of them, which I  
11 did not give them.  
12 MR. WARDEN: Yes.  
13 THE COURT: And they focused on five specific ones.  
14 MR. WARDEN: And these weren't among them.  
15 THE COURT: Which I'm not sure why they are coming  
16 in at this point. So I'll get back to you on this one.  
17 MR. WARDEN: Thank you, Your Honor.  
18 THE COURT: All right. Let's get to the next  
19 witness.  
20 (ANDREW W. APPEL, PLAINTIFF'S WITNESS, SWORN)  
21 DIRECT EXAMINATION OF ANDREW W. APPEL  
22 BY MR. HODGES:  
23 MR. HODGES: Hello, Your Honor. Kevin Hodges on  
24 behalf of the plaintiff litigating states.  
25 Good afternoon, Dr. Appel. How are you?

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1 THE WITNESS: Fine, thank you.  
2 THE COURT: Dr. Appel, if I could just give you a  
3 few directions before I forget.  
4 Make sure you speak in a large, clear voice. We  
5 have the fan on. We need to have you speak up so we can  
6 make sure we all hear you.  
7 I'd ask that you not speak too quickly so I can  
8 absorb the information and we get a record.  
9 Allow counsel to finish their questions before you  
10 start to answer, even though you know what they are going  
11 to ask you, just so you are not interrupting each other.  
12 They should wait for you, of course, as well, to finish  
13 your answer.  
14 In terms of objections, if you see counsel at  
15 either of the tables start to stand up, or you hear the  
16 word "objection," if you haven't started to answer, please  
17 don't; if you are in the middle, please stop. Let me hear  
18 what their objections are, and then I'll make a ruling and  
19 tell you whether to go forward. Okay?  
20 THE WITNESS: All right.  
21 BY MR. HODGES:  
22 Q. Please state your full name for the record.  
23 A. Andrew W. Appel.  
24 MR. HODGES: Your Honor, may I approach the  
25 witness?

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1 THE COURT: Yes.  
2 Q. Dr. Appel, I've shown you what's been marked as  
3 Plaintiffs' Exhibit 1833. Do you recognize this as your  
4 direct testimony in this case?  
5 A. Yes.  
6 Q. And do you affirm the testimony contained in  
7 Plaintiffs' Exhibit 1833?  
8 A. Yes.  
9 MR. HODGES: Your Honor, at Pages 4 through 7 of  
10 Dr. Appel's written testimony is a statement of his  
11 background and qualifications. No objection has been made  
12 to Dr. Appel's written direct testimony, and I would offer  
13 Dr. Appel as an expert in the field of computer science and  
14 software engineering.  
15 THE COURT: There was no objection?  
16 MR. HOLLEY: No objection.  
17 THE COURT: Presumably, then, I will go ahead and  
18 qualify him, then, as such an expert.  
19 MR. HODGES: Thank you, Your Honor.  
20 One more preliminary matter. We have not  
21 designated Dr. Appel's direct testimony as confidential.  
22 However, as an expert witness, he's in an unusual situation  
23 of having based some of his opinions on information that  
24 Microsoft may consider to be confidential. So I would  
25 invite Microsoft to -- we've heard nothing from Microsoft

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1 on confidentiality, but I invite them to be heard if they  
2 would consider anything in there requiring to be filed  
3 under seal or a redaction or anything in that nature.  
4 MR. HOLLEY: Your Honor, if we had thought there  
5 was something, we would have made a motion. And Mr. Hodges  
6 is correct; we have not.  
7 THE COURT: All right.  
8 MR. HODGES: Thank you.  
9 THE COURT: All right. Then I will go ahead and  
10 admit 1833, which is the direct testimony of Dr. Appel, and  
11 we can proceed.  
12 (Plaintiff's Exhibit 1833 admitted into evidence.)  
13 CROSS-EXAMINATION OF ANDREW W. APPEL  
14 BY MR. HOLLEY:  
15 Q. Good afternoon, Dr. Appel. How you are?  
16 A. Fine. Good afternoon.  
17 Q. Now, if you look, sir, at your written direct  
18 testimony, which you have in front of you; is that correct?  
19 A. Yes.  
20 Q. It says on the cover in a parenthetical: Remedies 1,  
21 4, and 16. Do you see that, sir?  
22 A. Yes.  
23 Q. And am I correct in interpreting that to mean that you  
24 are only offering your expert opinions with regard to those  
25 three sections of the non-Settling States' proposed remedy?

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1 A. Yes. In the written direct testimony, I've only  
2 addressed those points.  
3 Q. You were not expressing any opinion about the technical  
4 feasibility of any other sections of the non-Settling  
5 States' proposed remedy, correct?  
6 A. I believe in the written direct testimony I have  
7 expressed no opinions about those other sections.  
8 Q. And you're not expressing any view as to the technical  
9 accuracy of various complaints that have been leveled at  
10 Microsoft by representatives of a number of competitors who  
11 testified as fact witnesses at this hearing?  
12 A. I'm not sure whether I've addressed that in my written  
13 testimony.  
14 Q. Well, as you sit here today, do you have in mind any  
15 particular complaints leveled at Microsoft by competitors  
16 who appeared as fact witnesses that you do intend to  
17 address in your testimony?  
18 A. I'm not sure. I think at this point what I address in  
19 my testimony will be responsive to the questions you ask  
20 me.  
21 Q. Okay. And in your written direct testimony, you don't  
22 recall, as you sit here, addressing the technical accuracy  
23 of any complaints leveled at Microsoft by competitors who  
24 have appeared as witnesses in this hearing?  
25 A. I have at points in my direct testimony cited testimony

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1 of other witnesses in this case. I can't remember if it's  
2 both plaintiffs' witnesses and defense witnesses. And I  
3 only cited testimony of plaintiffs' witnesses to the extent  
4 I thought that there was anything substantive to cite.  
5 Q. Okay. As a housekeeping matter, I'd like to show you  
6 now your two deposition transcripts in this case as well as  
7 a copy of the non-Settling States' proposed remedy so you  
8 have them up there with you.  
9 MR. HOLLEY: May I approach the witness, Your  
10 Honor?  
11 THE COURT: Yes.  
12 BY MR. HOLLEY:  
13 Q. Looking first at the first provision on the  
14 non-Settling States' proposed remedy which you address in  
15 your testimony, Section 1, you agree, do you not, sir, that  
16 one purpose of Section 1 is to facilitate the creation of  
17 substitutes for all or part of Windows operating systems?  
18 A. Yes.  
19 Q. The obligation imposed by Section 1 on Microsoft is to  
20 ensure that no matter what components of Windows a  
21 third-party licensee elects to remove, the remainder of the  
22 operating system will continue to function effectively and  
23 without degradation other than the elimination of the  
24 functionality that was provided by the component that has  
25 been removed?

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1 A. Not exactly. The provision 1 requires Microsoft to  
2 make it possible for OEMs to remove individual Microsoft  
3 middleware products. So it's not the case that any  
4 individual component of the operating system must be  
5 removable according to the provisions of this paragraph,  
6 but only the individual Microsoft middleware products.  
7 Q. Well, take a look, if you would, sir, at your second  
8 deposition, which occurred on March 13th, 2002, and I call  
9 your attention to Page 264, Line 8, and tell me when you're  
10 there, sir.  
11 A. I'm there.  
12 Q. Do you recall being asked the question: "And the  
13 obligation imposed by Section 1 on Microsoft is to ensure  
14 that no matter what component or components the licensee  
15 elects to remove, the remainder of the operating system  
16 will continue to function without degradation?"  
17 And you answered: "Other than the elimination of  
18 the functionality that's been removed."  
19 And then I asked you the question: "Okay. But  
20 with that caveat that obviously functionality removed  
21 doesn't magically stay, the operating system is supposed to  
22 continue to function effectively and without degradation  
23 despite the removal of these components by the licensee?"  
24 And you answered that: "That's right."  
25 Do you remember being asked those questions and

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1 giving those answers, sir?  
2 A. Yes.  
3 Q. Section 1 applies to five different Microsoft operating  
4 systems; is that right, sir?  
5 A. I believe that may be right. I could look more closely  
6 at the remedy, if you would like.  
7 Q. Well, I direct your attention, sir, to the definition  
8 of a Windows operating system product in Paragraph 22RR?  
9 A. Yes.  
10 Q. So a Windows operating system product is defined in  
11 this paragraph as Windows 95, Windows 98, Windows 98 Second  
12 Edition -- Well, actually it doesn't say that. It says  
13 Windows 95, Windows 98, Windows 2000 Professional, Windows  
14 ME -- do you understand that to mean a reference to Windows  
15 Millennium Edition?  
16 A. Yes.  
17 Q. Windows XP and their successors. So that's how Windows  
18 operating system product is defined in the non-Settling  
19 States' proposed remedy, correct?  
20 A. Yes.  
21 Q. And then if you turn back to Section 1.  
22 A. Yes.  
23 Q. It says: "Microsoft shall not in any Windows operating  
24 system product," that defined term we just looked at,  
25 "excluding Windows 98 and Windows 98SE, it distributes,

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1 beginning six months after the date of entry of this final  
2 judgment, bind any Microsoft middleware product to the  
3 Windows operating system" -- and then it proceeds on to  
4 explain what Microsoft has to do.  
5 So the only two operating systems that are excluded  
6 from the definition in 22RR are Windows 98 and Windows 98  
7 Second Edition, correct?  
8 A. Yes.  
9 Q. So that leaves Windows 95, Windows Millennium, Windows  
10 2000 Professional, Windows XP Home, and Windows XP  
11 Professional as operating systems that are subject to the  
12 requirements of Section 1 of the non-Settling States'  
13 proposed remedy?  
14 A. It has been my understanding that Windows ME is just a  
15 minor variant to Windows 98, and I wouldn't say that the  
16 definition of RR covers exactly a certain number of  
17 operating systems. It lists the ones you mentioned. It  
18 includes the Windows operating systems for personal  
19 computers code named this and that.  
20 I think the -- we could certainly interpret the  
21 intent of Provision 1 to treat Windows ME similarly to  
22 Windows 98 and Windows 98SE.  
23 Q. Well, where are you getting that, sir? Windows  
24 operating system product is a defined term in this  
25 document, is it not? Look back at Page 26 of the

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1 non-Settling States' remedy. It says, "Windows operating  
2 system product means," and it lists a variety of operating  
3 systems, including Windows ME.  
4 A. Yes.  
5 Q. And then if we flip back to Section 1, there's no  
6 exclusion of Windows ME in that parenthetical in the first  
7 sentence of Section 1, is there, sir?  
8 A. No, there is not.  
9 Q. And there is no exclusion of Windows 95 in that  
10 parenthetical, is there, sir?  
11 A. That is also true.  
12 Q. And you believe that Microsoft would be required to  
13 create so-called unbound versions of both Windows 95 and  
14 Windows ME if Microsoft continued to distribute those  
15 operating systems after Section 1 became effective?  
16 A. I think that is true of Windows 95. I'm not sure  
17 whether it's true of Windows ME.  
18 Q. And the basis for your equivocation on Windows ME is  
19 your understanding that it is a minor variant of Windows  
20 98?  
21 A. That's right.  
22 Q. You have made no effort to estimate how much time and  
23 effort would be required to create the unbound versions of  
24 Windows that are required by Section 1, have you?  
25 A. I have actually studied that issue in some ways.

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1 Q. In what ways have you studied that issue?  
2 A. One thing I've done is I've examined a tool called  
3 Windows XP Embedded, and another thing I've done is I've  
4 given some thought to various technical options open to  
5 Microsoft in complying with the provisions of Remedy 1.  
6 So, yes, I have studied this issue in various ways.  
7 Q. In that study, have you had occasion to look at the  
8 source code for Windows XP Home or Windows XP Professional?  
9 A. Yes, I have had a chance to look at the source code for  
10 Windows XP.  
11 Q. Okay. And how many hours have you spent studying the  
12 38 million lines of software code that comprise Windows XP?  
13 A. Since the time available -- since the source code was  
14 made available to the plaintiffs, it wasn't enough to read  
15 all 38 million lines of the source code in detail. I have  
16 engaged two assistants to -- and I've directed them in  
17 making various kinds of quantitative measurements and  
18 analytical nonquantitative measurements of different  
19 aspects of the operating system's source code and binary  
20 code from which I have been able to draw some conclusions.  
21 Q. Have you yourself spent any time looking at the source  
22 code of Windows XP, or has it entirely been your directing  
23 these assistants to do so?  
24 A. I have spent some time looking at the source code.  
25 Q. And who are these two assistants that you have engaged

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1 to help you in this project?  
2 A. The names are Joe Magura and Kelly Campbell, and  
3 they --  
4 THE COURT: Spell the first person's name.  
5 THE WITNESS: Magura is M-a-g-u-r-a. They work at  
6 a consulting company called Interface Technologies  
7 BY MR. HOLLEY:  
8 Q. Which is located where?  
9 A. In Research Triangle Park, North Carolina.  
10 Q. Is it affiliated with anyone else?  
11 A. Not that I know of.  
12 Q. Did they sign anything binding them to comply with the  
13 protective order in this action?  
14 A. Yes, I believe they have signed the protective order.  
15 Q. You believe, do you not, Professor Appel, that any  
16 software code in Windows that is not part of what you call  
17 the operating system kernel can be viewed as a species of  
18 application; is that right?  
19 A. Application or middleware or what we might call library  
20 code.  
21 Q. Well, look, if you would, sir, at Page 16 of your first  
22 deposition. I'll direct your attention to the answer that  
23 you gave starting at Line 11.  
24 You say there: "An operating system has a clear  
25 function, and that is to manage hardware resources and

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1 provide a largely hardware-independent view of those  
2 resources to applications programs, to manage access  
3 privileges to those hardware resources, and provide only  
4 those privileges to applications programs as specified by  
5 policy, and to protect hardware resources and applications  
6 programs from unauthorized access by other applications  
7 programs. So that's the purpose of an operating system,  
8 and, roughly speaking, most other things are applications."  
9 And do you continue to subscribe to that view, sir?  
10 A. Yes, roughly speaking.  
11 Q. How many kernels are shipped with Windows XP  
12 Professional?  
13 A. There is different ways to configure the kernel of the  
14 operating system, so there are several kernel components  
15 that are shipped with Windows XP. And depending on the  
16 hardware and software installed on the particular machine,  
17 these components are put together in different ways to  
18 configure a kernel. So there are many, many combinations  
19 of these components that could make, in a sense, many  
20 different kernels.  
21 Q. And there are four different executable files in  
22 Windows XP for building a kernel, depending on whether  
23 you're using a single processor or a multiprocessor system  
24 and whether you have a system that is capable of accessing  
25 physical memory in excess of 16 gigabytes; is that correct?

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1 A. There are those four files, and there are several  
2 others that are also part of the operating system kernel  
3 that manage windows and graphics, that manage hardware  
4 devices. There are many parts and components of the Windows  
5 XP operating system kernel.  
6 Q. And when you refer in your testimony to things that are  
7 middleware outside the kernel, which of the four executable  
8 files with associated other files are you referring to?  
9 A. I'm referring to any of those. Any way that the kernel  
10 is configured on a particular machine, the middleware sits  
11 at a layer that is above them. So the answer would be any  
12 and all of them.  
13 Q. Okay. How big is the kernel of Windows XP relative to  
14 the total size of the operating system?  
15 A. The kernel of Windows XP is several megabytes, and the  
16 rest of the operating system is larger than that.  
17 Q. By a couple of orders of magnitude, right?  
18 A. It's difficult sometimes to count exactly. I would say  
19 there may be at least an order of magnitude, partly because  
20 what we're counting there includes many Microsoft  
21 middleware products.  
22 Q. Which are included in the product made available to the  
23 marketplace in the case of Windows XP as Windows XP  
24 Professional or Windows XP Home, correct?  
25 A. That's right.

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1 Q. Are you aware that the two files in Windows XP called  
2 ntoskrnl.exe and ntkrnlpa.exe are only 1.8 megabytes of  
3 code apiece?  
4 A. Yes, I am aware of that, but they don't actually  
5 represent the kernel; they are a portion of the kernel.  
6 Q. And what other files comprise the kernel of Windows XP?  
7 A. Well, there is at least the file that manages windows  
8 and graphics display. There are many device driver files  
9 that in any particular installation may be used as part of  
10 the kernel. And there's TCP/IP networking code that's not  
11 in those files, I believe, that is also linked into part of  
12 the kernel.  
13 It would be difficult at this point for me to give  
14 an exhaustive list of all the files that can be used in the  
15 operating system kernel.  
16 Q. I would like you to take a look at what's been marked  
17 for identification as DX 1447.  
18 MR. HOLLEY: May I approach the witness, Your  
19 Honor?  
20 THE COURT: Yes.  
21 Q. Have you had occasion, Dr. Appel, in preparing for your  
22 testimony here today to go to Windows XP Professional and  
23 look in the System32 subdirectory of the Windows directory  
24 of a machine running Windows XP?  
25 A. Yes.

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1 Q. Can you identify for me, based on this list of files in  
2 that subdirectory, what comprises the kernel, as you refer  
3 to it, of Windows XP Professional?  
4 A. This appears to be a very long list of files, and it  
5 might be difficult for me at this point to go through every  
6 one and identify which ones are in the kernel. I can give  
7 some examples of files that I believe are in the kernel.  
8 I believe that some of the files or all of the  
9 files labeled ACM file on Page 2 may be used in kernel  
10 mode. There are some files that are device driver files  
11 with the DRV extension. This is not paginated, so it's  
12 difficult for me to refer you to a specific page number.  
13 There are certain .sys files that I believe are  
14 used in kernel mode that are linked in with the .exe files  
15 whose names you mentioned previously, so I can't at this  
16 point give you an exhaustive list.  
17 Q. And if we looked at everything else in the System32  
18 subdirectory of the Windows directory of Windows XP, is it  
19 all middleware, in your view?  
20 A. No, I don't think so necessarily. I mean, I haven't  
21 really had the opportunity to look at every single file  
22 name here and determine what exactly it does. And I think  
23 that would have been a difficult task even if I had spent  
24 all my time since February 20th just doing that. So I  
25 can't say categorically that everything else in here is

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1 middleware.  
2 Q. Okay. But you believe that middleware is, as that term  
3 is used in the non-Settling States' proposed remedy, is any  
4 block of software code in Windows that is outside the  
5 kernel, as you define the kernel, that exposes one or more  
6 APIs to software developers, and if ported to other  
7 operating systems would make code more portable, correct --  
8 make applications portable?  
9 A. That's approximately right, but there are certain  
10 qualifications you listed that I wouldn't have put in  
11 there. I wouldn't have felt it necessary, for example, to  
12 say outside the kernel, because I believe that there's  
13 nothing naturally in the kernel that would naturally fit in  
14 that definition. So we could simplify the definition in  
15 that way.  
16 The basic idea of middleware is it's software that  
17 exposes APIs or otherwise serves as a platform for  
18 applications, and to the extent that applications rely on  
19 services provided by that middleware instead of getting  
20 services directly from the operating system, if those  
21 middlewares can be ported, then the applications will be  
22 easier to port to run on other operating systems.  
23 So some of the software in this directory would fit  
24 that definition, and I think others would not.  
25 Q. Okay. Well, let's take a couple of examples and look

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1 at them. If you look at the second page of Defendant's  
2 Exhibit 1447, there's a reference there to an ActiveX  
3 control called msscript.ocx. Do you see that about  
4 two-thirds of the way down the column?  
5 A. Yes, I see that.  
6 Q. And the product name is Microsoft Script Control, and  
7 the description is Microsoft script control. Is the  
8 Microsoft Script Control in Windows XP middleware under the  
9 non-Settling States' proposed remedy?  
10 A. I'm not familiar with exactly what the Microsoft Script  
11 Control does.  
12 Q. Okay. Well, let's look at -- and I apologize for the  
13 lack of pagination, but if you count to the ninth page of  
14 DX 1447, at the first entry on that page is sdbinst.exe.  
15 Do you see that, sir?  
16 A. Yes, I do.  
17 Q. Looking down the page at the executable file called  
18 svchost.exe, which is identified in the product name as  
19 Microsoft Windows operating system and in the description  
20 as generic host process for Win32 services. Can you tell  
21 me, sir, whether that file, that executable file in this  
22 directory is middleware under the non-Settling States'  
23 proposed remedy?  
24 A. No, I can't.  
25 Q. And if you turn two pages further into this document

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1 where the first entry is -- has a question mark in yellow,  
2 and it says winhlp.exe. Do you see that, sir?  
3 A. Yes.  
4 Q. If you look down at the bottom, there's a reference to  
5 a dynamically linked library called advapi32.dll. It's  
6 indicated as the product name Microsoft Windows operating  
7 system; description, advanced Windows 32 base API.  
8 Can you tell me, sir, whether that dynamically  
9 linked library in this system, System32 subdirectory, is a  
10 Microsoft middleware product under the non-Settling States'  
11 proposed remedy?  
12 A. What did you say the name of it was?  
13 Q. Advapi32.dll. It's the last entry on this page.  
14 A. I didn't see it at first because it was highlighted.  
15 No, I'm not directly familiar with the function of  
16 that particular DLL.  
17 Q. It's called advanced Windows 32 base API. If it  
18 exposes the base of the Win32 API set to developers, would  
19 it meet your definition of a middleware product?  
20 A. There's a difference between the definition of a  
21 middleware product and middleware, per se. I can guess  
22 what this might do from its name. I'm not sure what it  
23 does. It's conceivable it might be middleware. I'm not at  
24 all sure that it would be a Microsoft middleware product.  
25 Q. Well, if you look at the definition of a Microsoft



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1 middleware product in Section X, little Roman ii of the  
2 non-Settling States' proposed remedy, does that assist you  
3 in making a determination?  
4 A. I think it's extremely unlikely that this has been  
5 distributed separately from an operating system product. I  
6 don't see that it provides functionality similar to that  
7 provided by middleware offered by a Microsoft competitor.  
8 Q. Well, is there anything, as you read Section X(ii) that  
9 says that the middleware at issue has to be distributed all  
10 by itself separately from a Microsoft -- from an operating  
11 system product?  
12 A. I don't see those words.  
13 Q. Okay. And does it say that Microsoft has to have done  
14 that separate distribution in X(ii) Arabic I?  
15 A. First of all, I'm not sure that it's middleware, but it  
16 does not say distributed by Microsoft separately from an  
17 operating system product.  
18 Q. Well, let's -- okay. Well, let's unwrap it. Let's go  
19 back to the definition of middleware in W on Page 22 of the  
20 non-Settling States' proposed remedy. It says, "Middleware  
21 means software," so that we don't have any limiting  
22 principles yet, "whether provided in the form of files  
23 installed on a computer" -- well, this advapi32.dll would  
24 meet its software, and it's installed in the form of files  
25 on a computer, right?

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1 A. Yes.  
2 Q. So, so far, so good.  
3 And then it says: "That operates directly or  
4 through other software within an operating system or  
5 between an operating system, whether or not on the same  
6 computer, and other software, whether or not on the same  
7 computer -- " well, so far we haven't excluded advapi32.dll  
8 by anything that's said there, have we, because it's  
9 operating between layers of software?  
10 A. Right.  
11 Q. "-- by offering services via APIs to other software."  
12 So if any application running on Windows calls  
13 advapi32.dll, it meets that test for middleware, right?  
14 A. Yes.  
15 Q. "And could, if ported to or made interoperable with  
16 multiple operating systems enable software products written  
17 for that middleware to be run on multiple operating system  
18 products."  
19 And so presumably if we took this file called  
20 advapi32.dll and moved it to Linux, it would contribute to  
21 the ability to run Windows applications on Linux, and so it  
22 would meet that part of the test for middleware, correct?  
23 A. I'm still not sure exactly what this file does. I have  
24 not studied this particular file.  
25 Q. But based on -- can you -- if you assume with me that

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1 if it exposes one or more APIs that are called by  
2 third-party applications, you would agree with me, would  
3 you not, sir, that if it were ported, the file advapi32.dll  
4 were ported to Linux, for example, it would help to enable  
5 software products written for that middleware to run on  
6 multiple operating systems?  
7 A. I'm just trying to figure out whether it would make  
8 sense to port that, and therefore whether any port would,  
9 in fact, make their applications for that interoperable  
10 with multiple operating systems.  
11 Q. Well, you believe that if a piece of software exposes  
12 just one API, it could still be middleware, right?  
13 A. If by making it run on multiple operating systems it  
14 could make applications easier to port, I would guess that  
15 this DLL does expose at least one API, and that's not  
16 really the issue here.  
17 Q. Your problem is, you don't know what this block of code  
18 does, and thus you can't tell whether moving it to Linux  
19 would assist anyone in running Windows applications on  
20 Linux; is that your testimony, sir?  
21 A. That's right.  
22 Q. Now, have you made any effort to assess what the cross  
23 dependencies are among the approximately 300 executable  
24 files that one finds in the System32 subdirectory of the  
25 Windows directory of Windows XP Professional?

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1 A. I have begun such an effort, but it's quite a large  
2 task to assess those interdependencies, and I certainly  
3 have not been able to do it in the time I've had in the  
4 last few weeks.  
5 Q. Okay. I'd like you to look at -- and spend as much  
6 time as you need to -- at the list of dynamically linked  
7 libraries that appear in Defendant's Exhibit 1447. I think  
8 there are roughly 1100 of them.  
9 Have you made any efforts, sir, to determine what  
10 the cross dependencies or interdependencies are among all  
11 of these different DLLs in Windows XP Professional?  
12 A. No. I have examined what kind of APIs these export in  
13 a general quantitative way, but I have not, as I've said,  
14 been able to analyze all of their cross dependencies.  
15 Q. Is there anything in Section 1 of the non-Settling  
16 States' proposed remedy that makes any reference to  
17 operating system kernels?  
18 A. I don't believe so.  
19 Q. So when you said earlier that Microsoft's obligations  
20 under Section 1 would not extend to things that are in the  
21 kernel, what is the basis for that testimony, sir?  
22 A. Because the States' remedy has specific API disclosure  
23 requirements, and those API disclosure requirements are at  
24 the boundaries of Microsoft middleware products and of the  
25 core operating system. And I know that none of those

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1 boundaries fall in the middle of internal interfaces of  
2 such core operating system components as the kernel.  
3 So it's not because it says the word "kernel" in  
4 Section 1. It's because the boundaries of what needs to be  
5 removable under Section 1 and what APIs need to be  
6 disclosed under other sections of the remedy, are not  
7 internal APIs inside the major components of the Windows  
8 operating system product.  
9 Q. But they are the boundaries among all 5,000 files  
10 listed in Defendant's 1447, are they not, sir?  
11 A. No, I don't think so. I think that the -- Section 1  
12 requires removability of, not middleware in general, but  
13 Microsoft -- and not even Microsoft middleware in general,  
14 but Microsoft middleware products, which is a much coarser  
15 grain.  
16 Q. I missed the last two words. A much?  
17 A. Coarser grain.  
18 Q. Coarser grain?  
19 A. Of module.  
20 Q. As you look at Defendant's Exhibit 1447, can you tell  
21 me how granular the obligation imposed by Section 1 is?  
22 How many of these 5,000 files have to be made optionally  
23 removable? Can you answer that question, sir?  
24 A. I think we could turn for guidance to the definition of  
25 Microsoft middleware product where in definition X(i) I

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1 think there's been a substantive attempt to list most of  
2 the Microsoft middleware products, and we can see that this  
3 is not a list of 5,000 components, it's a list of a dozen  
4 or so major components of the Microsoft operating system  
5 product. And, in fact, some parts of this are sold  
6 separately, are not part of the Microsoft operating system  
7 product.  
8 Q. Right. Some of these things don't make any sense as  
9 Microsoft middleware components of Microsoft operating  
10 systems because they aren't even part of Microsoft's  
11 operating system; isn't that right?  
12 A. It is true that the Section 1 removability requirements  
13 don't apply to a Microsoft middleware product that  
14 Microsoft doesn't bind into the operating system in the  
15 first place, one that it might, for example, sell  
16 separately.  
17 Q. Right. So it's a nonsense to say that Exchange or  
18 Office aren't Microsoft middleware products because they  
19 aren't shipped with Microsoft operating systems, right?  
20 A. No, that's not the case at all. What it means is that  
21 those particular Microsoft middleware products are not  
22 implicated in Provision 1 of the remedy; that Microsoft has  
23 no unbinding obligation with respect to those products that  
24 it has not already bound into the operating system.  
25 Q. But the obligations of Section 4 do apply to all of the

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1 products listed in Section X(i), correct?  
2 A. Yes.  
3 Q. And under Section X(ii), there is a different  
4 definition of middleware, isn't there, of Microsoft  
5 middleware products?  
6 A. Yes.  
7 Q. And that is much broader than the list of Microsoft  
8 middleware products in Section X(i)?  
9 A. I'm not sure that it's much broader. It's a  
10 categorization by kind rather than by enumeration, and I'm  
11 not at all sure that if the number of particular products  
12 would be much greater in Section ii.  
13 Q. Well, have you done this analysis? Have you gone  
14 through all of the files that appear in the product shipped  
15 to the public as Microsoft Windows XP Professional to  
16 determine which of them fall within the definition of  
17 Microsoft middleware product under X sub (ii)?  
18 A. No, I have not.  
19 Q. You believe that the Windows user interface is  
20 middleware, correct?  
21 A. I'm not sure whether I've considered that specific  
22 question.  
23 Q. Well, I'll direct your attention, sir, to Page 16 of  
24 your deposition, the first volume. This is Line 25, and  
25 carrying on to Page 17 through Line 6. Do you remember me

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1 asking you the question: "In your view, the Windows shell  
2 is an application?  
3 Answer: Yes."  
4 Was that answer correct?  
5 A. Yes. I said that it's an application, by which I meant  
6 an application-level component that is provided with the  
7 operating system and conventionally considered to be part  
8 of the operating system.  
9 Q. Well, under the definition of Microsoft middleware  
10 product in the non-Settling States' proposed remedy, it  
11 could be middleware under Section X sub (ii) right, the  
12 shell of Windows?  
13 A. I'm not sure to what extent it falls under the  
14 definition of "if ported," then it would render  
15 applications for it portable. I guess it's conceivable.  
16 Q. Well, there are shells or user interfaces like GNOME or  
17 KDE that are portable across operating systems, correct?  
18 A. Yes, I believe so.  
19 Q. Are there components of Windows operating systems as to  
20 which you are uncertain about whether they ought to be  
21 regarded as part of the kernel or instead to be regarded as  
22 a species of application?  
23 A. I have not looked at every component of the Windows  
24 operating system in enough detail to have made that  
25 determination, so, yes.

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1 Q. So, you can't look at Section 1 of the non-Settling  
 2 States' proposed remedy and give me an exhaustive list of  
 3 the things that would be encompassed by the definition of  
 4 Microsoft middleware products under Section X sub (ii)?  
 5 A. I'm not sure how that follows from the previous  
 6 question. We've already discussed that Section 1 does not  
 7 refer to the kernel as a criterion. When I discussed the  
 8 kernel, it was merely to make the point that the States'  
 9 remedy imposes sufficiently few API disclosure and  
 10 removability requirements not to implicate internal  
 11 interfaces.  
 12 Q. Well, I thought you drew a distinction earlier between  
 13 things that were part of the kernel, which you told me  
 14 could never be Microsoft middleware products under the  
 15 definition in the non-Settling States' proposed remedy, and  
 16 other things which could be encompassed by that definition,  
 17 assuming they have the other characteristics required. Did  
 18 I misunderstand you, sir?  
 19 A. I said that I believed that things in the kernel could  
 20 never be Microsoft middleware products, and that therefore  
 21 anything that's a Microsoft middleware product must not be  
 22 in the kernel.  
 23 Q. Okay. Now, what about the Andrew file system that was  
 24 developed while you were at Carnegie Mellon University  
 25 getting your Ph.D.? Is that part of the kernel when it's

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1 installed on Windows XP Professional, or is it an  
 2 application?  
 3 A. I don't know when it's installed on Windows XP.  
 4 Q. Do you agree with me, Professor Appel, that there is an  
 5 exponential relationship between the number of components  
 6 of Windows that get labeled as Microsoft middleware  
 7 products under the non-Settling States' decree, and  
 8 therefore that must be made optionally removable under  
 9 Section 1, and the number of possible configurations of an  
 10 unbound version of Windows that Microsoft has to create?  
 11 A. Yes.  
 12 Q. And so if there are ten components of one of the five  
 13 operating systems as to which Microsoft has to create  
 14 unbound versions that fall within the definition of  
 15 Microsoft middleware product, the number of possible  
 16 configurations of that one operating system is  
 17 mathematically of necessity two to the tenth or 1,024  
 18 configurations; is that correct, sir?  
 19 A. No. As I already explained, there are already many  
 20 different components of the base Microsoft operating system  
 21 that it already sells that are includable or not includable  
 22 in a configuration that a user might already run.  
 23 If there are 20 such components, and we've already  
 24 discussed what some of those components are just in the  
 25 kernel alone, but there are many device drivers as well

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1 which get included or not included, depending on which  
 2 brand of disk drives is installed in the user's machine.  
 3 Now, since there are many such components already  
 4 in what Microsoft already sells, the number of  
 5 configurations of the operating system that Microsoft  
 6 already sells is exponential in that number.  
 7 I believe there are dozens of such components. So  
 8 we already have two to the dozens. That's millions, or  
 9 billions even, of configurations of Microsoft's current  
 10 operating system product.  
 11 Q. Well, let's look at paragraph -- excuse me -- Page 265  
 12 of the second volume of your deposition, sir, starting on  
 13 Line 2, and tell me when you're there.  
 14 A. Yes, I'm there.  
 15 Q. Do you remember me asking you the question: "And just  
 16 as under the prior iteration of Section 1, if there are ten  
 17 components that are optionally removable, just as a matter  
 18 of mathematics, the number of possible configurations is  
 19 two to the tenth or 1,024, configurations?"  
 20 And your answer was: "The number of configurations  
 21 that the licensee could create by removing some combination  
 22 in that hypothetical would be two to the tenth."  
 23 Do you remember being asked that question and  
 24 giving that answer, sir?  
 25 A. Yes.

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1 Q. Now, you don't have any doubt in your mind, do you,  
 2 Professor Appel, that when you remove components from an  
 3 operating system like Windows, the functionality that was  
 4 supplied by those components disappears?  
 5 A. That's right.  
 6 Q. And you think that one way that Microsoft could comply  
 7 with Section 1 of the non-Settling States' proposed remedy  
 8 is to make a copy of each optionally removable component,  
 9 and include those copies as internal elements of Windows  
 10 such that they did not make APIs externally available  
 11 outside of the operating system?  
 12 A. Yes. If you take a software component and arrange that  
 13 it does not expose APIs as a platform for applications,  
 14 then it's not middleware, all right, because it does not  
 15 provide a platform for applications and thus makes them  
 16 easier to port to another operating system.  
 17 Q. And if we take as an example of this principle that  
 18 we're discussing the file in Windows XP called  
 19 mshtml.dll -- which stands for Microsoft HTML dynamically  
 20 linked library, correct?  
 21 A. Yes.  
 22 Q. -- your view is that Microsoft could include two copies  
 23 of that file in Windows, one that is removable by OEMs and  
 24 third-party licensees, and one that always stays in the  
 25 operating system but doesn't expose APIs to third-party

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1 software developers?  
2 A. I think I would now phrase that in a different way.  
3 Microsoft could take the functionality from that file and  
4 incorporate it into a different part of the operating  
5 system so that it provides functionality to that part of  
6 the operating system, but not expose HTML rendering APIs as  
7 a platform for application development, and that software  
8 would then not be required to be removable by the OEMs,  
9 except inasmuch as it forms a part of some other Microsoft  
10 middleware product which the OEMs would designate  
11 removable.  
12 Q. Well, let me direct your attention, Professor Appel, to  
13 Page 266 of the second volume of your deposition starting  
14 at Line 11. Do you remember me asking you the question:  
15 "So in the case of the file in Windows called mshtml.dll,  
16 which is the HTML rendering engine, Microsoft could include  
17 two copies in the unbound version, one which is removable  
18 and exposes APIs to third-party developers, and one which  
19 is utilized by the operating system but does not expose  
20 APIs to third-party developers?"  
21 And you answered: "That's right."  
22 Do you remember being asked that question and  
23 giving that answer, sir?  
24 A. Yes. I would remark that when you have a second copy  
25 of the HTML rendering that does not expose APIs to

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1 third-party developers, it's also necessary that it not  
2 expose APIs to Microsoft middleware platforms -- products,  
3 that other Microsoft middleware products do not use it as a  
4 platform, as a middleware platform.  
5 So I think the situation you describe in your  
6 question expressed part of the scenario under which it  
7 would be permissible under the States' remedy Provision 1  
8 to do that, but I'm not sure that it told the whole story.  
9 Q. So are you now saying that when you said, "that's  
10 right," in response to my question on March 13th, you'd  
11 like to withdraw that answer and give a different answer,  
12 sir?  
13 A. No. I think it's basically right, and I think that it  
14 would be useful to clarify the situation you described.  
15 Q. Well, Professor Appel, I'm trying to understand what it  
16 is you mean when you say that it would be possible for  
17 Microsoft to comply with Section 1 by moving the  
18 functionality in a Microsoft middleware product to some  
19 other part of the operating system where it did not expose  
20 APIs to third-party developers. Does that mean that the  
21 only thing that can call upon that newly moved  
22 functionality is the kernel?  
23 A. No. What can -- this functionality can be moved into a  
24 Microsoft middleware product or into the core operating  
25 system, which includes more than just the kernel. And in

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1 whichever of those it is included -- let us say it is  
2 included in the core operating system -- then it can be  
3 called upon only by the core operating system. Or if it's  
4 included in another Microsoft middleware product, then it  
5 can be called upon only by that Microsoft middleware  
6 product.  
7 In that way, the API between this component, the  
8 HTML rendering component and some other component in which  
9 its embedded, would be a purely internal API, so that this  
10 piece of software would not be serving as a middleware  
11 platform for other applications and middleware.  
12 Q. Now, if we look at Defendant's Exhibit 1447, can you  
13 help me identify what comprises what you just referred to  
14 as the core operating system?  
15 A. I don't think that this list of several hundred files  
16 in roughly alphabetical order is a really good way to  
17 explain which things are core operating systems and which  
18 are not.  
19 Q. Well -- but assume for me that I need to know the  
20 answer to that question because I need to know how to  
21 comply with Section 1, and I know that all of these  
22 5,000-odd files are in Windows XP, and I want to know which  
23 of them are in what you call the core operating system.  
24 How do I make that determination, Professor Appel?  
25 A. As I've explained, we're discussing where you can put

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1 functionality that had been a piece of a Microsoft  
2 middleware product, and I've said you can put it here or  
3 there in the core operating system or in another Microsoft  
4 middleware product. So there are many places you can put  
5 it.  
6 The question is, does it expose APIs across these  
7 major boundaries? And we've already discussed these major  
8 boundaries. They are the boundaries between the Microsoft  
9 middleware products, which are ones defined in the States'  
10 remedy. These are fairly major subcomponents, and I think  
11 they are on the order of, you know, order of magnitude ten  
12 or so of them, and not several hundred.  
13 So I don't really understand the point of trying to  
14 do this file-by-file.  
15 Q. Well, you like to refer to Section X(i) of the  
16 definition of Microsoft middleware products, and I like to  
17 refer to Section X(ii), and they're different, are they  
18 not? There is no list of middleware products, Microsoft  
19 middleware products in X(ii), is there?  
20 A. Yes. And I think there is a reason for that. I think  
21 the intent of definition X(ii) is to be forward looking,  
22 not to craft a remedy that will be immediately obsolete on  
23 the day it goes into effect. We can expect in the future  
24 that there will be other novel kinds of middleware, and  
25 that some of these may become Microsoft middleware

<p style="text-align: right;">Page 2993</p> <p>1 products, and if we tried to do this only by enumeration of 2 a specific set of what are the Microsoft middleware 3 products in the year 2001, I don't think we'd get the right 4 remedy. 5 Q. Well, put yourself in the position of James Allchin, 6 the senior vice president in charge of Windows operating 7 systems of the Microsoft Corporation. When Section 1 8 becomes effective, and he's trying to figure out what he 9 can do to comply with Section 1 consistent with your view 10 that it would be all right for him to move functionality 11 that used to be in Microsoft middleware products into the 12 core of the operating system, and what he will need to know 13 is, what is the core of the operating system? Can you tell 14 me the answer? 15 A. What I said was that he can move this functionality 16 into the core of the operating system or into middleware 17 products. So when he's examining where he might want to 18 move some functionality, he doesn't have to make that 19 distinction. 20 Q. So in the case of HTML rendering, he might decide that 21 he's got to have one HTML rendering engine in Internet 22 Explorer, because it uses HTML; he has to have one in MSN 23 Explorer, because it uses HTML; he has to have one in 24 Outlook Express, because it uses HTML; he has to have one 25 in Windows Media Player, because it uses HTML; he has to</p>	<p style="text-align: right;">Page 2995</p> <p>1 Section 1, which is not necessarily the approach I would 2 recommend, then it might have to put a copy of this 3 rendering engine in several different Microsoft middleware 4 products, which is approximately a dozen or so, and in the 5 core operating system. 6 Q. And you told me, sir, previously that that could lead 7 to a waste of system resources, that sort of redundancy, 8 correct? 9 A. Yes, it could. 10 Q. And it can also lead to incompatibilities if all those 11 different HTML rendering engines diverged over time, 12 correct? 13 A. Yes. Although usually subject divergence is observed 14 in software written by different people or produced by 15 different companies. When we have several pieces of -- 16 several versions of software that are all under the control 17 of the same company, then it's relatively easy for that 18 company to avoid such divergence. 19 Q. You would agree with me that it is much more difficult 20 to fix a bug in the HTML rendering engine in Windows if 21 there are 12 of them in different parts of the operating 22 system than if there's only one? 23 A. No, I don't think I would. I think that to a large 24 extent, these different copies of the rendering engine 25 could be compiled from the same source code, so that fixing</p>
<p style="text-align: right;">Page 2994</p> <p>1 have one in the Windows user interface, because it uses 2 HTML; he has to have one in the Windows help system, 3 because it uses HTML. 4 Where does it end, Professor Appel? Are we 5 supposed to put an HTML rendering agent in every component 6 of Windows that uses HTML rendering? 7 A. Well, in fact, the States' remedy does not require you 8 to do that. The States' remedy gives Microsoft a great 9 deal of flexibility in technical options that it has 10 available to it to comply with Remedy 1, and I can 11 enumerate them for you, if you would like. 12 Q. Well, I'd like to focus, sir, if you could, please, at 13 the first technical option that you proffered at your 14 deposition, which is the one that we have been discussing, 15 and that is the one that says that Microsoft doesn't have 16 to remove anything; it can move the functionality that was 17 in a Microsoft middleware product either to the core of the 18 operating system or to other Microsoft middleware products. 19 Can we focus on that? 20 A. All right. 21 Q. Okay. And in that circumstance, how many different 22 places in Windows does Microsoft have to put an HTML 23 rendering engine in order to comply with this approach to 24 Section 1? 25 A. If it chooses to use this approach to comply with</p>	<p style="text-align: right;">Page 2996</p> <p>1 the bug once in that source code would fix it in all of the 2 places that it's installed. 3 Q. So it's your testimony that there would be no material 4 difference in fixing bugs in Windows XP if there were 12 5 different HTML rendering engines, 12 different copies of 6 the same HTML rendering engines as opposed to just one that 7 everybody could call upon? 8 A. Well, you said much easier, and I don't think it would 9 be much easier or much harder one way or the other. There 10 might be some difference. I can't say there's no 11 difference. 12 Q. Now, if an OEM or a third-party licensee under 13 Section 1 decided in the unbound version of Windows to 14 replace the HTML rendering engine with an alternative that 15 did not perform well, then things like Windows help, which 16 rely on the HTML rendering engine, would be adversely 17 affected? 18 A. I take it you're assuming that Microsoft is using one 19 of the other technical alternatives available to it under 20 Provision 1? 21 Q. Right. 22 A. Which is not to include copies of the HTML rendering in 23 all the different middleware products, but to continue to 24 let each Microsoft middleware product rely on the 25 mshtml.dll?</p>

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1 Q. That is correct, sir. So in this situation, Microsoft  
2 decides to reduce redundancy and have shared code available  
3 to different parts of the operating system, and somebody  
4 decides -- some OEM or third-party licensee decides to  
5 replace the HTML rendering engine in Windows with an  
6 alternative that doesn't work very well. That's my  
7 hypothetical.  
8 A. If the OEM were to decide for some reason to make that  
9 replacement, then the performance of any application or  
10 middleware that depended on HTML rendering would suffer  
11 some, yes.  
12 Q. And that would include parts of the Windows operating  
13 system like the Windows help system that you regard as  
14 species of applications, correct?  
15 A. Yes. Their performance in HTML rendering might suffer.  
16 Q. And in those circumstances, when customers encountered  
17 those problems with the Windows help system, you're not  
18 really sure who is supposed to help them, are you, sir?  
19 A. I think that Microsoft already has experienced  
20 supporting customers who run non-Microsoft software on  
21 their operating system. The purpose of an operating system  
22 is to run different kinds of software upon it, and when  
23 someone has a problem with the HTML rendering, even if its  
24 an end-user, it's very easy for whoever is doing customer  
25 support, for them to find out which HTML rendering engine

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1 is installed on the computer, whether it's a Microsoft HTML  
2 rendering engine or a non-Microsoft HTML rendering engine.  
3 Q. In forming that opinion, did you have occasion to  
4 consider what happened in 1995 when various Internet  
5 service providers, including CompuServe, decided that they  
6 would replace the file called winsock.dll in the Windows  
7 system directory with a copy of their own creation? Did  
8 you think about that? Do you know about what happened  
9 then, sir?  
10 A. No, I don't.  
11 Q. Are you aware of other circumstances in which third  
12 parties have taken copies of files in the Windows System  
13 directory and replaced them with their own versions which  
14 do not perform identically to the Microsoft version on  
15 which other parts of the operating system are relying?  
16 A. Can you repeat the first part of the question, please.  
17 Q. Sure. Are you aware of other situations in which third  
18 parties have taken files that appear in the Windows System  
19 directory, replaced them with their own versions with  
20 exactly the same names? Are you aware of other situations  
21 in which that's occurred and what effect it has had on  
22 pieces of the operating system that rely on those files?  
23 A. Yes. For example, Professor Felton, when he made the  
24 experiments leading up to his testimony in the liability  
25 phase of this trial, wrote software that modified and

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1 applied a different version of one or two DLLs in the  
2 system folder, and therefore the system operating system  
3 performed differently. It respected the user's choice of  
4 default browser in many cases rather than overriding it,  
5 but it didn't perform worse, for example.  
6 Q. Oh, it did, indeed, did it not, sir? Are you not aware  
7 that in the first version of Dr. Felton's i.e. removed  
8 program, he created a serious memory leak which caused  
9 Windows 98 to crash? Were you aware of that?  
10 A. No, I was not aware of that.  
11 Q. All right. Do you have any expertise in the area of  
12 providing customer support for operating systems?  
13 A. No, I don't.  
14 Q. And you have no experience in providing customer  
15 support for software products that are distributed in  
16 excess of a hundred million people a year as Windows is, do  
17 you, sir?  
18 A. No.  
19 Q. And you have no knowledge about the way in which  
20 Microsoft actually provides customer support for Windows  
21 operating systems?  
22 A. I have not studied that, no.  
23 Q. And you don't know what it means in Section 1 of the  
24 non-Settling States' proposed remedy to say that Microsoft  
25 has an obligation to directly and indirectly support the

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1 so-called unbound versions of five different Windows  
2 operating systems?  
3 A. I think I know something about what that means. That  
4 what Microsoft does to support its operating system  
5 products is to fix bugs in them when discovered, to advise  
6 OEMs, licensees and end-users about how to use the  
7 products, to provide documentation about the products, to  
8 make the products run on various kinds of hardware. I do  
9 understand what is meant in general by support.  
10 Q. Okay. But my question was slightly different, sir.  
11 You don't know what it means to say in Section 1 that  
12 Microsoft has an obligation to, quote, "directly and  
13 indirectly support," closed quote, the unbound versions of  
14 Windows operating system?  
15 A. I haven't thought about the precise meanings of those  
16 terms in this context.  
17 Q. Well, in fact, if you look at Page 227 of your  
18 deposition, starting at Line 10 --  
19 THE COURT: Is that the first or the second?  
20 MR. HOLLEY: The first volume, Your Honor.  
21 A. Yes  
22 BY MR. HOLLEY  
23 Q. And I asked you the question, the words -- "Well, the  
24 addition of the words, quote, "both directly and  
25 indirectly," closed quote, after the word, quote,

<p style="text-align: right;">Page 3001</p> <p>1 "support," closed quote, does that in your view alter the 2 normal meaning of support?" 3 And your answer was: "I'm not exactly -- I'm not 4 sure exactly what that's intended to mean." 5 Do you recall being asked that question and giving 6 that answer? 7 A. Yes. 8 Q. You are aware, are you not, sir, that there are 9 thousands and thousands of existing Windows applications 10 that call upon functionality supplied by modules in Windows 11 operating systems that would need to be made optionally 12 removable under Section 1 of the non-Settling States' 13 proposed remedy? 14 A. Yes. 15 Q. Do you know whether in the Macintosh OS X operating 16 system that things outside the kernel are optionally 17 removable? 18 A. No. 19 Q. Are you aware that in Mac OS X, the kernel is referred 20 to as Darwin, and is open source? 21 A. Yes, I believe so. I know that Darwin is either the 22 kernel or a part of the kernel. 23 Q. I'd like to have you look at what's been marked for 24 identification as Defendant's Exhibit 1445. 25 MR. HOLLEY: May I approach, Your Honor?</p>	<p style="text-align: right;">Page 3003</p> <p>1 everything from the kernel all the way up to the user 2 interface? 3 MR. HODGES: I object to his asking what Apple is 4 referring to. 5 MR. HOLLEY: I'm just asking him, Your Honor, what 6 his understanding is as a computer science expert looking 7 at this chart. 8 THE COURT: Well, if he can answer it, he can 9 answer; and if he can't, I'm sure he'll tell us so. 10 THE WITNESS: It appears that that might be what it 11 means. It doesn't say explicitly that these are the 12 operating system components. 13 BY MR. HOLLEY: 14 Q. Well, I'd like to show you what's been marked as 15 Defendant's Exhibit 1446. 16 MR. HOLLEY: May I approach, Your Honor? 17 THE COURT: Yes. 18 BY MR. HOLLEY: 19 Q. Have you had occasion, Dr. Appel, over the last 48 20 hours to review this brochure from Apple entitled "Mac OS 21 X, An Overview for Developers"? 22 A. I have seen it. I have not had time to read it. 23 Q. Well, if you look at Page 4, sir, under the heading 24 Stability and Power, there's a reference to Darwin, and it 25 says: "The stability of Mac OS X begins with Darwin, the</p>
<p style="text-align: right;">Page 3002</p> <p>1 THE COURT: Yes. 2 BY MR. HOLLEY: 3 Q. Have you had occasion to look at what's been marked for 4 identification as DX 1445 in the last 48 hours? 5 A. I did see a copy of it when it was provided as an 6 exhibit to the plaintiffs. 7 Q. And this is a diagram, is it not, sir, of the system 8 architecture of the Mac OS X operating system from Apple 9 Computer? 10 A. That's what it purports to be. 11 Q. And Apple, in telling the world about the system 12 architecture of Mac OS X, talks about everything from the 13 Darwin kernel all the way up to the aqua user interface; is 14 that correct? 15 A. Can you repeat the question? 16 Q. Yes. 17 In describing its new operating system to the 18 world, Apple refers to everything from the Darwin kernel up 19 to the aqua user interface, correct? 20 A. The only basis I would have for judging that would be 21 from reading this page. 22 Q. Well, that's the interpretation that you draw from 23 looking at this page, correct; that when Apple refers to 24 something called Mac OS, which stands for operating system, 25 10, and its system architecture, Apple is talking about</p>	<p style="text-align: right;">Page 3004</p> <p>1 open source core of the system. Darwin integrates a number 2 of technologies, including the Mock 3.0 kernel, operating 3 system services based on BSD UNIX, Berkeley Software 4 Distribution, high performance networking facilities, and 5 support for multiple integrated file systems." 6 Reading that statement, does that suggest to you, 7 sir, that Apple views Darwin, the lowest of the components 8 listed on DX 1445, as only the beginning of Mac OS X? 9 A. Based on the sentence you read, it appears to be 10 something like that, yes. 11 Q. Now, the Mock 3.0 kernel was something developed at 12 Carnegie Mellon University by Mr. Rashid and various other 13 people; is that correct? 14 A. I know that at Carnegie University, the Mock operating 15 system was developed, but I don't know whether Mock 3.0 was 16 developed there. I know that the Mock project ended at 17 Carnegie Mellon several years ago, so it may be some 18 versions of Mock had been developed there, yes. 19 Q. Now, as you read this description of Darwin in the Mac 20 OS X operating system, can you discern what the kernel of 21 the operating system is? 22 A. I would think that's some of the things listed in the 23 second sentence beginning with "Darwin integrates" are 24 kernel, and some may be nonkernel. 25 Q. Okay. Can you tell me, first of all, the things in</p>

<p style="text-align: right;">Page 3005</p> <p>1 that sentence that you think are part of the kernel of Mac 2 OS X? 3 A. I have not studied Mac OS X, so this would be pure 4 guesswork based on this sentence. I would think that the 5 Mock 3.0 kernel is part of the kernel. I would think that 6 some of the operating system services would be part of the 7 kernel, and I'm not sure that all of them would be; that 8 some of the high performance networking facilities would be 9 part of the kernel and some not; and support for multiple 10 integrated file systems would probably be part of the 11 kernel. 12 Then in the next sentence where it says, "Further, 13 Darwin's modular design" -- 14 THE COURT REPORTER: I'm sorry. 15 THE COURT: You need to slow down a little bit. 16 THE WITNESS: In the next sentence where it says, 17 "Further, Darwin's modular design," I would imagine that 18 such things as device drivers are part of the kernel. Some 19 of the networking extensions may be part of the kernel. 20 And new file systems might be part of the kernel. 21 And there are several more paragraphs that may also 22 describe some parts of the software that are kernel and 23 some that are nonkernel. 24 Q. And do you know, sir, whether the things that are 25 listed in the first sentence that are outside what you</p>	<p style="text-align: right;">Page 3007</p> <p>1 A. What do you mean exactly by "the code called Internet 2 Explorer"?" 3 Q. Well, you could tell me, if you have been studying the 4 source code. What do you understand the code in Windows 5 called Internet Explorer to be? 6 A. I understand the code in Internet Explorer to be the 7 browser product, and by browser I understand the software 8 that permits users to select, receive and perceive 9 information from the worldwide Web. 10 So to select -- for users to select information, 11 there is a graphic user interface that underlines 12 hyperlinks and allows users to click on them and allows 13 users to type Web addresses into a title bar, and has a 14 back and forward button and so on. 15 To receive the information, there's a network 16 protocol, the hypertext transport protocol, that allows the 17 Web browser to communicate with Web servers on other 18 machines. 19 And to perceive the information, there is an HTML 20 rendering software that displays the text on the screen in 21 the right fonts and with the right paragraphing. 22 There are also some other things that are part of 23 browsers, such as support for certain kinds of scripting, 24 sometimes support for Java or other languages, support for 25 content filtering and so forth that are part of the</p>
<p style="text-align: right;">Page 3006</p> <p>1 would call the kernel are optionally removable from the Mac 2 OS X operating system? 3 A. No, I don't. 4 Q. All right. I would like you to turn, if you would, 5 please, to the page numbered 9 of this document under the 6 heading "Development Options." 7 A. Yes. 8 Q. And there's a list here of four different sets of APIs 9 that developers can use to write applications to run on Mac 10 OS X. One's called the Carbon, one's called Cocoa, one is 11 the Java, J2SE APIs, and one is a set of traditional UNIX 12 APIs. Do you know whether these API subsystems are 13 optionally removable from the operating system called Mac 14 OS X? 15 A. No, I don't. 16 Q. Okay. Turn back one page, sir. There's a statement 17 here that says: "Mac OS X supports the following industry 18 standard protocols." And there's a list of approximately 19 ten or so protocols, including HTTP, the hypertext 20 transport protocol; FTP, the file transfer protocol; LDAP, 21 the lightweight directory access protocol; and DHCP, the 22 dynamic host configuration protocol. Do you know which of 23 those protocols in Windows operating systems are 24 provided -- are supported in the code called Internet 25 Explorer?</p>	<p style="text-align: right;">Page 3008</p> <p>1 browsing experience. 2 Q. And so -- 3 A. And that's what I understand by Internet Explorer. 4 Q. Okay. And in that answer, sir, are you speaking of 5 functionality in categories, or are you speaking in 6 particular blocks of software code in the operating system? 7 A. I have studied which blocks of software code in the 8 operating system fall under those categories. 9 Q. Okay. Let's start with one called urlmon.dll. Is that 10 part of Internet Explorer? 11 A. I believe it is. 12 Q. And a file called wininet, wininet.dll, do you believe 13 that that is part of Internet Explorer? 14 A. I believe it is. 15 Q. And -- 16 A. No. And in particular I believe WinInet may contain 17 commingled some code that is specific to Web browsing with 18 HTTP transport protocol and some code that is not specific 19 to Web browsing. 20 Q. Not specific to that particular protocol? 21 A. Right, that may implement other protocols that are not 22 specific to Web browsing. 23 Q. Right. And what about the file called shdocview, 24 shdocvw.dll, is that part of Internet Explorer? 25 A. I believe that file is also commingled code of Explorer</p>



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1 functionality and some non-Explorer functionality.  
2 Q. And when you say it's commingled code, how do you come  
3 to that conclusion? What tests have you done to determine  
4 that?  
5 A. That particular file -- first of all, I haven't studied  
6 the internals of every single DLL file in the Microsoft  
7 Internet Explorer browser product. I believe there are at  
8 least a couple dozen such files.  
9 So in some cases I've used one means or another,  
10 including looking at the source code and including looking  
11 at Microsoft's documentation of the purpose of each DLL, to  
12 understand what functions are provided by that DLL. And I  
13 believe in the case of shdocvw.dll, I've used information  
14 from Microsoft's documentation of what's provided there and  
15 also information from the liability phase of this trial  
16 where witnesses described the different kinds of  
17 functionality found in that piece of software.  
18 Q. What particular evidence are you relying on from the  
19 liability phase of the trial to draw conclusions about what  
20 shdocvw.dll does?  
21 A. I believe -- and I can't remember specifically -- I  
22 believe there was discussion of the fact that certain  
23 DLLs -- and I believe that was one of them -- contained  
24 browser functionality, some functions that are purely  
25 browser functionality and some functions that are clearly

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1 nonbrowser functionality.  
2 Q. Have you come to a conclusion, sir, about which of the  
3 couple of dozen files that you say are associated with  
4 Internet Explorer must be made optionally removable under  
5 Section 1 of the non-Settling States' proposed remedy?  
6 A. Yes, I have.  
7 Q. And can you tell me which files, in your view, have to  
8 be removable optionally?  
9 A. I will tell you the methodologies -- one of the  
10 methodologies that I used in order to make this  
11 determination, because I think --  
12 Q. Can you answer my -- can you start off, sir, by  
13 answering the question that I asked you, and then we can  
14 talk about methodology?  
15 A. No, because the list of files is more than two dozen, I  
16 believe, DLLs, and I cannot remember all of their names.  
17 So I will tell you how I went about determining what the  
18 boundaries of Internet Explorer were.  
19 I used the Microsoft XP embedded target designer.  
20 This is a tool provided by Microsoft to OEMs who use it to  
21 determine which components to select or remove from the  
22 Windows XP operating system. Microsoft licenses it to  
23 these OEMs for the purpose of reselling the operating  
24 system for embedded machines. And one of the features of  
25 the Microsoft XP embedded target designer tool is to group

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1 files such as DLL files in groups corresponding to the  
2 major categories or products of the operating system.  
3 So, for example, in the category of HT -- of XP  
4 embedded target designer designating HTML rendering, I find  
5 a few DLLs, about half a dozen files, including the one you  
6 mentioned, mshtml.dll, that all appear to have to do with  
7 HTML rendering.  
8 In the category called Internet Explorer, I find  
9 about two dozen files, all of which have to do with  
10 different features of Internet browsing, especially its  
11 user interface components, but not including the HTML  
12 rendering component which is found in the other category.  
13 There is also a category basically called WinInet,  
14 in which we find support for the HTTP protocol, which is  
15 one invented for the purpose of Web browsing, but not, for  
16 example, support for the TCP/IP protocol, which is a more  
17 core Internet protocol that predated the invention of Web  
18 browsing.  
19 So by selecting a few -- and by few I mean  
20 approximately four of these major subsystems of the XP  
21 operating system, namely, for example, HTML rendering,  
22 Internet Explorer, WinInet, we can find how Microsoft  
23 apparently technically and internally designates the  
24 boundaries of the browser. And in large part, as far as I  
25 have been able to examine within the last couple of weeks,

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1 this is a reasonable boundary that one could draw to  
2 designate what is the -- what is the Internet Explorer  
3 browser product.  
4 Q. And have you determined, sir, from your experimentation  
5 with target designer how many other components of the  
6 operating system have cross dependencies with these  
7 components that you have just identified?  
8 A. No, I have not done that.  
9 THE COURT: I think we need to stop at this point.  
10 All right.  
11 Let me ask you to return tomorrow. We'll start at  
12 nine. I do need, say, 15 or 20 minutes before we start  
13 with the witness to discuss with you the motion that was  
14 filed about the use of depositions as part of the trial so  
15 I get some additional information in order to make a  
16 decision. So we'll start with that and then move to the  
17 witness.  
18 MR. HOLLEY: Yes, Your Honor.  
19 THE COURT: All right. Everybody have a good  
20 evening. The parties are excused.  
21 (Proceedings adjourned at 5:03 p.m. until  
22 Wednesday, April 10, 2002.)  
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CERTIFICATE

I, Scott L. Wallace, Official Court

Reporter for the U.S. District Court for the District of Columbia, do hereby certify that as such reporter I took down in stenotype all of the proceedings had in said U.S. District Court in the above-entitled cause; that I have transcribed my said stenotype notes into typewritten form, as appears in the foregoing Transcript of Proceedings; that said transcript is a complete record of the proceedings had in the trial of said cause and constitutes a true and correct Transcript of Proceedings had therein.

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Scott L. Wallace, RDR, CRR  
Official Court Reporter

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