DIRECT TESTIMONY OF AVADIS TEVANIAN, JR.

TABLE OF CONTENTS

SUMMARY OF TESTIMONY 2

BACKGROUND 2

MICROSOFT HAS MONOPOLY POWER IN THE MARKET FOR DESTOP OPERATING SYSTEMS 4

THE ECONOMIC RELATIONSHIP BETWEEN APPLICATION PROGRAMS AND OPERATING SYSTEMS 5

BARRIERS TO COMPETITION IN THE OPERATING SYSTEM MARKET: APPLE'S EXPERIENCE WITH THE RHAPSODY OPERATING SYSTEM 6

MAINTAINING AND EXPANDING A MONOPOLY OVER THE OPERATING SYSTEMS THROUGH CONTROL OF APPLICATION PROGRAMS 7

BROWSERS AND THE MAC OS OPERATING SYSTEM 8

MICROSOFT USED THE THREAT OF STOPPING ITS SUPPORT FOR A CRITICAL APPLICATION TO PRESSURE APPLE TO AGREE TO GIVE A SIGNIFICANT ADVANTAGE INTERNET EXPLORER 9

MICROSOFT'S ATTEMPTS TO CONTROL MULTIMEDIA PLATFORMS: AN OVERVIEW 14

APPLE'S QUICKTIME MULTIMEDIA SOFTWARE 15

A TECHNOLOGY OVERVIEW OF QUICKTIME 18

MICROSOFT HAS DESIGNED ITS MULTIMEDIA PRODUCT TO EXCLUDE COMPETITORS AND EXTEND ITS MONOPOLY POWER 21

MICROSOFT HAS USED ITS MONOPOLY POWER AND ANTICOMPETITIVE TACTICS TO TRY TO DEFEAT QUICKTIME 23

MICROSOFT REPEATEDLY PRESSURED APPLE TO GIVE UP QUICKTIME AND CEDE THE MULTIMEDIA PLAYBACK MARKET TO MICROSOFT 24

The April 1997 Meeting 24

Meetings In August, September and October, 1997 25

Continued Threats From Microsoft 26

June 15, 1998 Meeting 28

TO THWART QUICKTIME, MICROSOFT EMPLOYED PUNITIVE AND EXCLUSIONARY ACTIONS 29

THE TECHNICAL PROBLEMS AND MISLEADING ERROR MESSAGES INTRODUCED BY MICROSOFT IMPAIR QUICKTIME'S PERFORMANCE AND IMPEDE APPLE'S ABILITY TO COMPETE 31

The Windows Registry 31

Streaming With Microsoft's Products 32

Misleading Error Messages 33

Microsoft's Response To The Problems 34

ORIGINAL EQUIPMENT MANUFACTURERS AND INDEPENDENT SOFTWARE VENDORS FEAR REPRISAL FROM MICROSOFT IF THEIR BUSINESS CONDUCT DOES NOT CONFORM TO MICROSOFT'S WISHES 36

Compaq 36

AVID 39

TrueVision 41

CONCLUSION OF TESTIMONY 42

DIRECT TESTIMONY OF AVADIS TEVANIAN, JR.

1. The facts recited below are known by me personally except where they were taken from business records, deposition transcripts or other documents provided to me. In such cases, I have indicated the source of those facts.

2. I am the Senior Vice President of Software Engineering for Apple Computer. I am responsible for virtually all the software products developed and sold by Apple.

3. My educational background is in mathematics and computer science. In 1983, I received a Bachelor's Degree in Mathematics from the University of Rochester in New York. I received a Master's Degree in Computer Science in 1985, and a Ph.D. in Computer Science in 1988, both from Carnegie Mellon University. My graduate work and doctoral dissertation focused on the design of computer operating systems.

4. Before joining Apple in 1997, I was Vice President of Engineering at NeXT Software where I was employed for 9 years. I joined Apple when it acquired NeXT in 1997.

5. Shortly after I began at Apple, I had a meeting with a developer who was working on a product that would operate with Apple's highly successful multimedia product. The developer urged that Apple withdraw from the market for multimedia products that ran on Microsoft's Windows operating system; otherwise, he told me, Microsoft would take any necessary action to drive Apple out of that business. At the time, I found his comments to be odd. Eighteen months later, after the events described below, I appreciate the prophetic import of his words.

SUMMARY OF TESTIMONY

6. Microsoft has acquired a monopoly of the market for desktop operating systems. Apple, which offers the only real alternative to Microsoft's Windows operating system, accounts for less than five percent of the market. Microsoft has leveraged its operating system monopoly to gain increasing and often dominant power in markets for critical application programs, power which Microsoft in turn uses to protect and extend its operating system monopoly. Microsoft has aggressively employed this anticompetitive strategy against Apple in an effort to control not only the market for Internet browsers, but the emerging market for technologies that create, send, receive and display multimedia content. If Microsoft succeeds in these efforts, it will drastically curtail consumer choice, stifle innovation, impede the development of superior technologies and extend its monopoly power into a profoundly important new area.

BACKGROUND

7. Apple's primary business is to develop and market computer systems. Apple has long been recognized as one of the most innovative companies in the computer industry. Over the past 20 years, Apple has been responsible for a number of the most important developments in the industry, including innovations relating to the graphical user interface that permits easy interaction between the user and the computer.

8. Apple develops the operating systems contained in the computers it manufactures. An operating system is the primary software that controls a computer. The operating system provides various basic services for a computer such as process management, user interaction, data management for the hard disk, network interfaces and control of peripheral devices such as printers and keyboards.

9. The basic services provided by the operating system are used by application programs such as Web browsing, spreadsheet or word processing programs. Because the operating system provides essential services for application programs, we often speak of an application program as "running on" a particular operating system. Information and commands are passed back and forth between the operating system and the application programs through application program interfaces ("APIs"). For example, a word processing application program can issue commands via the API to cause the operating system to open a file, print a document or provide some other basic service. The relationship between computer hardware, the operating system, APIs and application programs is illustrated in Attachment 1.

10. Apple's operating system for desktop computers is known as the Macintosh Operating System, or simply, Mac OS. The Mac OS 8.1 operating system is the only operating system that Apple is currently selling.[1] Apple, however, is preparing to ship Mac OS 8.5 (an upgrade to Mac OS 8.1), and the Mac OS X operating system is under development.

11. Apple directly distributes the Mac OS operating system (1) to end-user customers as a pre-installed operating system on computers manufactured by Apple, or (2) to distributors for retail sale to end-users who wish to upgrade their operating system to the latest version of Mac OS. In addition, Apple has licensed a number of value-added resellers ("VARs") to resell its computer systems. These value-added resellers have the right to make certain minor changes in the configuration of Apple computer systems to meet their customers' needs. Apple does not currently sell or

[1]Apple still makes available to customers who require it a version of the NeXT operating system, which Apple has discontinued.

license its Mac OS operating systems to any original equipment manufacturer ("OEM") for preinstallation on the OEM's computers.

12. Application programs must be developed so that they are compatible with the APIs of the underlying operating system. For example, Microsoft's popular word processing program, Word for Windows, will run on the Windows operating system; it cannot run on the Mac OS operating system. Microsoft, however, makes a different version of its Word program, Word for Macintosh, that will operate on the Apple operating system. This relationship is illustrated in Attachment 2.

13. Apple is committed to providing the end-user an operating system that is hospitable to the products of other software developers, including Apple 's main operating system competitor, Microsoft. For example, Apple developed its Mac OS 8 operating system so that it runs different browsers, including both the Netscape Navigator and the Microsoft Internet Explorer browsers. Apple bundles Navigator, Internet Explorer and America Online 3.0 with the Mac OS 8.1. When Apple announced the release of the Mac OS 8 operating system, Apple explained that including "both of the world's leading browser technologies [gives] customers choices for the best possible Internet experience."[2]

MICROSOFT HAS MONOPOLY POWER IN THE MARKET FOR DESKTOP OPERATING SYSTEMS

14. Apple competes in the sale of desktop computer systems with a large number of OEMs, all of which preinstall Windows operating systems on the computers they sell, known generally as Windows PCs. Apple's share of the desktop computer system market has declined in the past ten years from a high of 12.8 percent in 1988 to

[2] Apple Press Release dated May 13, 1997, Exhibit 2 to the deposition of Avadis Tevanian, Jr., taken July 16, 1998.

approximately 3.5 percent in 1997.[3] Apple recently released its iMac, a product that has been extremely well received by the public. Although Apple hopes and expects that its market share will increase with this new product, Apple does not expect to gain significant market share by the end of 1998. For the foreseeable future, Microsoft will maintain a market share in excess of 90 percent of the desktop operating system market, a dominance that will enable it to continue effectively to control both price and technologies in that market.

THE ECONOMIC RELATIONSHIP BETWEEN APPLICATION PROGRAMS AND OPERATING SYSTEMS

15. Microsoft's monopoly relies, in part, on a commercial symbiosis that exists between application programs and the computer operating systems on which those programs run. An application program is condemned to commercial failure if it will not operate reliably on the operating systems of a sufficiently large installed base of computer systems. Similarly, the commercial viability of an operating system is critically dependent on the availability of application programs -- including well-accepted, broadly-used application programs -- that are written for use on that system.

16. As Apple has learned through experience, when one company has monopoly power in the operating system market, the symbiosis between operating system and application programs creates significant barriers to the introduction and growth of competing operating systems. Independent software developers have no incentive to invest in the effort to adapt their programs to run on an alternative operating system that

[3]This market share data is found in two reports from Dataquest, an independent market research firm. These reports, both entitled "Unit Shipments By Product Type," are dated 1991 and April 20, 1998, respectively. The market share figures are based on Apple's percentage of the total world-wide annual sales volume of the number of desktop computer units sold during the calendar years 1988 and 1997.

has little or no market share, even when that alternative operating system offers significant, compelling advantages for consumers or developers.

BARRIERS TO COMPETITION IN THE OPERATING SYSTEM MARKET: APPLE'S EXPERIENCE WITH THE RHAPSODY OPERATING SYSTEM

17. Apple's experience with its Rhapsody operating system illustrates how difficult it is to gain acceptance and support for a new operating system in the face of Microsoft's monopoly of the operating system market. This experience shows that innovation and technical advantages may be insufficient to overcome the barriers imposed by Microsoft's domination of the operating system market.

18. In 1997, Apple purchased NeXT Software with the intent to use NeXT's technology to develop a new operating system. Apple's goal was to build a more robust, technologically superior operating system that would offer significant benefits over existing systems. The operating system would take advantage of NeXT's demonstrated advancements in the emerging field known as "object-oriented" programming. Among other things, these advancements would enable software writers to increase their productivity in developing application programs. The new operating system was code-named Rhapsody.

19. Because an operating system cannot be successful unless it has the ability to run a sufficient number of popular applications, Apple embarked on an ambitious campaign to convince independent software vendors ("ISVs") to adapt their programs to make use of Apple's new application program interfaces for Rhapsody. This campaign was not successful. Developers, including Microsoft, told Apple that they were concerned that Apple would not be able to obtain a critical mass of application programs

written to work with the new Rhapsody APIs and that customers, accordingly, would not buy computers containing the new operating system.

20. Apple eventually concluded that it would be unable to convince a sufficient number of ISVs to develop applications for the new APIs. Most professional developers are simply unwilling to develop application programs for a new platform in a world dominated by Microsoft's Windows operating system. Thus, Apple abandoned its plans to introduce Rhapsody as a new operating system.

MAINTAINING AND EXPANDING A MONOPOLY OVER THE OPERATING SYSTEM THROUGH CONTROL OF APPLICATION PROGRAMS

21. Apple has learned another lesson from its experiences with Microsoft: an operating system monopolist can use its power to advance its own application programs. If these applications then become popular and widely accepted, the monopolist can maintain and extend its power by withholding, or threatening to withhold, these programs from competing operating systems. When faced with such threats, a competing operating system supplier may be forced to agree to concessions that disadvantage its operating system or other application programs, thereby further increasing the monopolist's power.

22. As Microsoft's power in the operating system market has expanded, application programs owned or controlled by Microsoft have become dominant in many of the most important application program markets. Versions of some of these applications have been developed to run on the Mac OS operating system. As more fully described below, Microsoft has used its control of certain critical application programs to impede competition with Microsoft's popular Internet browser, Internet Explorer ("IE"). Once Microsoft dominates the market for Internet browsers, it will use

that power to extend its control over not only the operating system market, but also other emerging markets that rely on the Internet.

BROWSERS AND THE MAC OS OPERATING SYSTEM

23. As noted above, Apple bundles a number of application programs with the Mac OS operating system. Some of these programs are developed by Apple while others are developed by third parties. We include these application programs for the convenience of our customers, and sometimes for the benefit of our business partners.

24. An Internet browser is one example of the type of application program that we bundle with the Mac OS operating system. Our experience indicates that some customers prefer Netscape Navigator, others prefer Internet Explorer, while many users simply want the flexibility to use either browser. Because we believe that customers may want to use either or both of the leading Internet browsers, we bundle both Microsoft Internet Explorer and Netscape Navigator with Mac OS 8.1. (We also had previously bundled with Mac OS a now discontinued Internet browser developed by Apple entitled Cyberdog.)

25. The existence of these two popular browsers is a good example of how competition among application programs spurs innovation and creates significant advantages for customers. By bundling both browsers with the Mac OS operating system, Apple offers consumers the freedom to choose among the features offered by each program and, in return, Apple benefits from the brand-recognition of the two preeminent browser creators.

26. The fact that Internet Explorer and Navigator are bundled with the Mac OS does not make them part of the operating system. The Mac OS operating system will continue to function if either or both of these browsers are removed. As

noted above, we permit value-added resellers ("VARs") the flexibility to reconfigure our systems to meet their direct customers' needs. We provide VARs the flexibility to remove browsers or other applications, and to reconfigure the Macintosh desktop to address what they perceive to be their customers' desires.

27. Today, with the growth in popularity of the Internet, browsers are among the most widely used application programs. However, as the experience recounted below demonstrates, Microsoft has used the market power that flows from its operating system monopoly to give it a significant advantage over Netscape in the market for users of Apple computers.

MICROSOFT USED THE THREAT OF STOPPING ITS SUPPORT FOR A CRITICAL APPLICATION TO PRESSURE APPLE TO AGREE TO GIVE A SIGNIFICANT ADVANTAGE TO INTERNET EXPLORER

28. In 1996, Apple became involved in discussions with Microsoft on a number of issues, including two important disputes. First, Apple advised Microsoft that it was infringing Apple's patents. Second, Microsoft was concerned about Apple's arrangements with Netscape relating to distribution of Netscape's Navigator browser. Microsoft ultimately succeeded in resolving both disputes by threatening to withdraw its support from an essential application that ran on the Mac OS.

29. The first dispute began when Apple put Microsoft on notice in 1996 that its Windows operating systems and Internet Explorer infringed Apple's patents. (TX:1101)[4] Extensive licensing negotiations started in late 1996 and extended into 1997. (TX:5288)

30. Concurrent with the ongoing patent dispute, in late 1996 or early 1997, Apple's then-CEO, Gilbert F. Amelio, and Microsoft's CEO, Bill Gates, reached an oral

[4](TX:A) refers to the Trial Exibits, where A is the Trial Exhibit number.

agreement for Apple to bundle Microsoft's Internet Explorer with the Mac OS operating system. In return, Microsoft agreed to show public support for Apple's acquisition of NeXT Software. This was important to Apple because Microsoft is the largest supplier of application programs for the Mac OS, and its support would be seen by other software developers as a significant endorsement of the acquisition. (TX:573)

31. Beginning with the Mac OS 8.0 operating system, Apple implemented the agreement reached between Mr. Gates and Mr. Amelio by placing both Microsoft Internet Explorer and Netscape Navigator into a "folder." Netscape Navigator, however, was the "default" browser on Mac OS 8.0; that is, if the user simply "clicked" on the browser icon on the Mac OS desktop and made no other selections, the Netscape Navigator would run by default.

32. When Mr. Gates learned that Internet Explorer was not planned to be the default browser on Mac OS 8.0, he became very upset, claiming that this arrangement was a violation of the agreement that he had reached with Mr. Amelio.[5]

33. In the spring of 1997, Microsoft insisted on merging the disputes over the patents, the browsers and other aspects of the companies' relationship to seek a comprehensive solution. (TX:570; TX:1046) Many Apple executives, however, were pessimistic about achieving an equitable agreement with Microsoft. In fact, certain individuals within Apple's management felt that Apple should aggressively pursue patent infringement issues against Microsoft.

---

[5]In a letter from Mr. Amelio to Mr. Gates, dated July 3, 1997, Mr. Amelio states, "I'd like to comment on the inclusion of Internet Explorer with our release of Mac OS 8. I know this is a source of great irritation to you. However, at this point, our people feel we have complied with the agreement we made in January. . . . We were careful to explain to Brad Silverberg [at Microsoft] the preexisting agreement with Netscape." (TX:1053)

34. In mid-May 1997, Microsoft's negotiators told Apple's negotiating team that Microsoft would remove its support for Microsoft application programs for the Mac OS operating system if Apple refused to resolve the disputes concerning the patents, the browsers and other aspects of the companies' relationship on terms acceptable to Microsoft. Microsoft's threat to withdraw support for its applications that run on the Mac OS operating system, especially Microsoft Office for Macintosh, was extremely disturbing. Microsoft Office is a so-called "office productivity suite" that includes word processor, spreadsheet and presentation programs. Based on published reports and information related by Apple's marketing executives, I understand that Microsoft Office has greater than a 90 percent share of the office productivity suite applications market. (TX:1036)

35. Microsoft produces a version of Microsoft Office, called Microsoft Office for Macintosh, that will run on the Mac OS. Because Microsoft Office completely dominates the market for office productivity suites, it is critical to the commercial viability of the Apple Mac OS to have a version of Microsoft Office that can run on the Mac OS operating system. Withdrawal of Microsoft's support for its Microsoft Office for Macintosh program would have a devastating effect on the Mac OS. This not only would be due to the loss of the specific application, but also because it would prompt independent software vendors to reassess their continued investment in developing application programs for Apple's operating system.

36. Microsoft was aware that Apple desperately needed to maintain support for Microsoft Office for Macintosh.[6] In addition, there was a strong demand in

[6]In a letter dated July 3, 1997, to Mr. Gates, Mr. Amelio stated, "Our surveys tell us that in the enterprise market segment, for example, a very high percentage of our end customers use Microsoft Office. . . ." (TX:1053)

the market for Microsoft Office 98 for Macintosh based on the reports of its development. Because the prior Office for Macintosh version was poor in terms of performance and stability, Apple computer users were especially anxious to obtain a new and improved version of Microsoft Office.

37. By June 1997, Microsoft had substantially completed the development work on Microsoft Office 98 and, in fact, had shown a preliminary "Beta" version of the product to some Apple personnel. Although Microsoft had made a substantial investment getting Office 98 for Macintosh ready for market, it was willing to risk an outright loss of that entire investment to force Apple to terms.

38. The pressures exerted by Microsoft compelled Apple to resolve the dispute on terms that gave significant advantages to Microsoft's Internet Explorer. On August 5, 1997, Apple agreed to a Technology Agreement with Microsoft that included the following basic elements. First, Apple agreed to bundle Internet Explorer on all Macintosh computers and Mac OS operating systems for five years. Apple also agreed to make the Internet Explorer the default browser on all Mac OS systems. Although Apple can bundle other browser programs with the Mac OS, it is prohibited from promoting any browser other than Internet Explorer. The agreement states that all other browsers must be stored inside a folder; this means that Apple cannot allow any browser that competes with Internet Explorer to appear on the desktop. The Technology Agreement also gives Microsoft the right of first refusal to develop the default browser for any new operating system Apple develops during the term of the agreement.[7]

39. In return, Microsoft agreed to continue development of Office for Mac for five years, subject to Macintosh meeting certain sales minimums. Microsoft also

[7] *See* Technology Agreement between Apple and Microsoft, dated August 5, 1997. (TX:1167)

agreed to provide a browser to Apple for five years without charge. Finally, Apple and Microsoft agreed to cooperate in efforts related to Java technologies.[8]

40. Concurrent with the signing of the Technology Agreement, Apple and Microsoft entered into two other agreements. The most significant terms of these agreements included the following: (1) Microsoft agreed to make a $150 million investment in Apple and pay certain other undisclosed amounts to Apple[9], and (2) the parties agreed to cross-license their patents and settle outstanding patent disputes.[10]

41. The Technology Agreement gives Microsoft significant advantages in its efforts to defeat Netscape Navigator and gain total control of the browser market. Apple users have been very important to Netscape. We had learned through conversations with Netscape that approximately 25 percent of the visitors to Netscape's Website were Macintosh users. After we entered into the Technology Agreement, however, Apple was prohibited from promoting Netscape Navigator. While Navigator could still be bundled with the Mac OS operating system, Navigator could not appear on the desktop where it could be most readily used by a consumer. Our experience, however, shows that customers seldom reconfigure their systems to change the default browser. Making Microsoft's Internet Explorer the default browser on the Mac OS did not confer any substantive technical benefit on users, but it would help Internet Explorer to become the most commonly used browser among Mac customers.

42. If Microsoft had not exercised its monopoly power in the office application market by threatening to stop supporting Office for Macintosh, Apple would

---

[8] Id.

[9] *See* Preferred Stock Purchase Agreement between Apple and Microsoft, dated August 5, 1997. (TX:583)

[10] *See* Patent Cross License Agreement between Apple and Microsoft, dated August 5, 1997. (TX:584)

not have resolved the disputes on the terms outlined above. Many individuals within Apple were dissatisfied with Apple having agreed to Microsoft's terms regarding Internet Explorer. They predicted that the deal would have an adverse effect on competition in the browser market and, ultimately, in the operating systems market.

43. Despite the opposition of some within the company, Apple agreed to the deal with Microsoft because (1) other aspects of the agreement, i.e., the continued development of Office for Macintosh, were too important to Apple's future to forego; (2) by the time the deal was concluded there was a consensus that Internet Explorer had achieved rough technological parity with Navigator; (3) it appeared that because Microsoft would use its monopoly in the operating system market to favor its Internet Explorer, Microsoft would most likely win the browser war anyway; (4) Microsoft's agreement to provide Internet Explorer for five years without charge offered some limited protection to Apple in the event that Microsoft drove Netscape out of the browser business and left Apple without a browser alternative; and (5) the $150 million investment was a crucial show of support for Apple from the largest, most important source of application programs for the Mac OS.

MICROSOFT'S ATTEMPTS TO CONTROL MULTIMEDIA PLATFORMS: AN OVERVIEW

44. If Microsoft succeeds in driving Netscape out of the browser business, it will gain control of another critical application. Such control, however, has more far-reaching consequences than mere domination of a single application market. Indeed, the control of such Internet-related technologies is crucial to the maintenance of Microsoft's operating system monopoly.

45. Internet-related technologies such as browsers are important in the development of future software platforms which could operate "on top" of different operating systems. These software platforms could be used to run various applications such as programs that display, edit, manipulate and transmit various types of content. Importantly, applications written for such platforms would be able to run on any computer that has the software platform, regardless of the underlying operating system.

46. The development and widespread adoption of such software platforms would seriously threaten Microsoft's operating system monopoly. Companies that create programs that run on such software platforms would not have to adapt their programs to run on different operating systems. Operating system competitors, such as Apple, would not have to overcome the resistance of ISVs who refuse to invest in adapting their programs to run on an operating system that had little or no market share. As long as the competing operating systems could support the software platform, the ISV's programs would run.

47. Apple has developed a promising new product called QuickTime that can serve as such a software platform for multimedia content. As detailed below, Microsoft has used various anticompetitive actions to thwart the growth of Quicktime.

APPLE'S QUICKTIME MULTIMEDIA SOFTWARE

48. A student preparing a report on the civil rights movement uses her computer to search through an encyclopedia stored on a CD-ROM for an article on Dr. Martin Luther King, Jr. She is able not only to read about Dr. King, but to view and listen to a video clip of his famous "I have a Dream" speech. A man preparing for a trip overseas accesses an Internet Web site for travel information and takes a "virtual" tour of the Louvre, stopping to "zoom in" on pictures of interest and listen to a brief account of

the artist's life. A realtor takes a client on a virtual tour of a house, manipulating images to show different, three dimensional views of each room.

49. Each user is taking advantage of the multimedia capacity of modern computers that can combine images with words, music or other sounds to create "virtual" experiences. Apple has been a pioneer in this field through its QuickTime technology.

50. QuickTime is Apple's patented software architecture for creating, editing, publishing and playing back multimedia content on both Macintosh and Windows computers.[11] Among other things, QuickTime allows for the creation and playback of a broad range of media, from simple audio and still images to music, video and even virtual reality and 3D.

51. In developing QuickTime, Apple has had as one of its goals the creation of a powerful platform for dynamic media that would enable that media to be created and played back on virtually any computer system. The same QuickTime file can be played back on computers that use the Mac OS, Windows 95, Windows 98 or Windows NT systems. Its versatility frees a media producer using QuickTime to sell its products to the broadest possible audience without spending additional time or money creating different versions of the product for different operating systems.

52. An extraordinarily diverse number of software content products use QuickTime for playback of multimedia content both from the Internet and from local sources, such as a CD-ROM. For example, QuickTime is used in computer games, encyclopedias, news clips, movie clips and sound clips that can be accessed over the Internet or some other network. QuickTime even has a virtual reality capability, enabling the creation and playback of "interactive photographs" - both 360° panoramas

[11]Microsoft acquired a license to Apple's QuickTime patents as a result of the 1997 negotiations.

and three-dimensional objects that can be rotated on the screen. By using a mouse and keyboard – with no special gloves, goggles, or other equipment – users can explore landscapes and interiors and view objects from all sides.

53. QuickTime brings products, museums, cities, scenic areas and computer-generated scenes alive through Web pages and CD-ROMs. Tens of thousands of Web sites and CD-ROM titles have already been enhanced with QuickTime VR technology, including ones from Boeing, BMW, Century 21 Real Estate, CNN, Ferrari and IBM. Even Microsoft's Encarta Encyclopedia has used QuickTime to replay certain multimedia content contained in the encyclopedia.

54. QuickTime was originally developed for use on the Macintosh operating system. It was first released for the Macintosh in 1991 and then for Windows in 1992. QuickTime is now a mature, well-recognized and universally-utilized product in a substantial installed customer base. An independent survey revealed that Apple's QuickTime was in the top ten most widely-owned applications programs. (TX:1080)

55. We estimate at Apple that roughly 50 million desktop computers have QuickTime already installed. With the Internet revolution, the base of QuickTime-installed computers should grow dramatically over the next two years in a truly competitive market, given QuickTime's superiority as a product and the current demand from original equipment manufacturers for multimedia capabilities.

56. Years ago, Microsoft recognized that QuickTime was superior to its multimedia product offering. Regrettably, Microsoft has taken steps to impede the adoption and use of QuickTime 3.0 by additional users. These steps include causing QuickTime to fail to work for certain content in the Windows environment and the

generation of misleading error messages. These anticompetitive actions are described in detail in the testimony that follows.

A TECHNOLOGY OVERVIEW OF QUICKTIME

57. QuickTime includes a special set of application program interfaces. As discussed above in paragraph 9, an API allows an application to "talk to" the operating system. QuickTime APIs enable software application program developers to manipulate data in a QuickTime file that can in turn interact directly with the computer operating system.

58. In order to draw upon QuickTime's capabilities, a consumer needs not only the QuickTime APIs, but also a QuickTime "viewer" or "player." This player can be a "plug-in" to a consumer's browser which enables the consumer to run QuickTime movies and other content from within the browser. When used as a plug-in, the QuickTime player extends the Internet browser's functionality by enabling it to integrate the multimedia capabilities that QuickTime makes possible. This has the effect of extending the Internet browser's architecture to include the QuickTime functionality.

59. Because we have created QuickTime for both Windows and Macintosh computers, developers can create a single version of a content product that will run on both Macintosh and Windows, without the additional expense of "porting" the product to different operating systems. This is referred to in the industry as "cross-platform" capability. QuickTime is currently the most popular multimedia technology used by creators of multimedia content for computers, in part because of this capability. This feature of QuickTime is illustrated in Attachment 3.

60. Three other aspects of QuickTime are relevant to the storage and transmission of multimedia content: (1) the "file format" in which data for multimedia

generation of misleading error messages. These anticompetitive actions are described in detail in the testimony that follows.

A TECHNOLOGY OVERVIEW OF QUICKTIME

57. QuickTime includes a special set of application program interfaces. As discussed above in paragraph 9, an API allows an application to "talk to" the operating system. QuickTime APIs enable software application program developers to manipulate data in a QuickTime file that can in turn interact directly with the computer operating system.

58. In order to draw upon QuickTime's capabilities, a consumer needs not only the QuickTime APIs, but also a QuickTime "viewer" or "player." This player can be a "plug-in" to a consumer's browser which enables the consumer to run QuickTime movies and other content from within the browser. When used as a plug-in, the QuickTime player extends the Internet browser's functionality by enabling it to integrate the multimedia capabilities that QuickTime makes possible. This has the effect of extending the Internet browser's architecture to include the QuickTime functionality.

59. Because we have created QuickTime for both Windows and Macintosh computers, developers can create a single version of a content product that will run on both Macintosh and Windows, without the additional expense of "porting" the product to different operating systems. This is referred to in the industry as "cross-platform" capability. QuickTime is currently the most popular multimedia technology used by creators of multimedia content for computers, in part because of this capability. This feature of QuickTime is illustrated in Attachment 3.

60. Three other aspects of QuickTime are relevant to the storage and transmission of multimedia content: (1) the "file format" in which data for multimedia

content is kept, (2) the communications "protocols" used to transmit the data between computers, and (3) the compression/decompression algorithms, or "codecs" that are used to reduce the amount of data that must be transmitted.

61. File format. A file is a container for data; a file format is a method for organizing the data in the container. QuickTime specifies its own file format which is known as a QuickTime Movie file. QuickTime Movie files are capable of storing many types of multimedia content such as audio, video and 3D images. The QuickTime file format is highly flexible and may be adapted to meet the requirements of future types of multimedia content.

62. Protocols. To communicate over a network, such as the Internet, computers must follow the same conventions for transmitting data. These conventions are referred to as protocols. For example, Web browsers request and retrieve Web pages from Web "servers," i.e., computers that provide information or, in some cases, processing services to other "client" computers in the network. In order to transmit and receive such data, the Web browser uses a standard and widely-used, public Internet protocol known as "HTTP" for Hypertext Transfer Protocol.

63. Apple's QuickTime technology does not require any particular protocols other than HTTP for the transmission of QuickTime files. This fact has important operational consequences. It means that any server on the Worldwide Web is capable of transmitting a QuickTime file to a desktop computer or Internet device client via the Internet. Because QuickTime files are fully compatible with HTTP, no proprietary or specialized server software is needed to transmit or receive QuickTime files.

64. Compression technologies. At its most fundamental level, data is transmitted between computers as a stream of 1's and 0's called bits. Computer programmers use compression algorithms to compress that data and thereby make its transmission more efficient; decompression algorithms restore the compressed data to its original format. These compression and decompression algorithms are referred to as codecs.

65. The QuickTime software incorporates about a dozen different codecs. A Web site developer who uses QuickTime-based tools for content creation can choose which of these codecs to utilize for each file. In addition, QuickTime allows the developer to incorporate codecs of their own or to use no codecs at all.

66. Despite the data compression that codecs provide, it can still take several minutes, possibly even hours, to transmit large multimedia files such as movies across the Internet. In the past, a user would have to wait for the entire file to be transferred before the player would start to play back the movie or audio clip. To mitigate this delay, QuickTime uses a process called "streaming," which begins playback of the multimedia content after a portion of the file has been received but before the entire file is transferred. Thus, the user will only experience a delay of a few seconds to begin playback. Transmission of the remainder of the file occurs in parallel with playback.

67. The QuickTime architecture is "extensible," meaning that other vendors can add functionality without Apple's knowledge or permission. Because QuickTime's APIs are fully documented and publicly known, enterprising ISVs can develop programs that extend QuickTime's capabilities in ways that tap into special features in their applications. For example, a developer can take the source code to the Netscape

browser and incorporate new features that take advantage of QuickTime's APIs, in the same way that CD-ROM developers have created customized players to take advantage of new or special features that they then incorporate into their applications or games.

68. QuickTime's extensibility, power and open architecture afford it significant advantages over alternative products. By contrast, Microsoft's strategy has been to develop competing multimedia products based on a closed, less functional, less extensible approach. One would expect that Quicktime's flexibility and technical merits would prevail against Microsoft's approach in a competitive market. Microsoft, however, appears determined to dominate the multimedia market not through the quality of its products, but by leveraging its operating system monopoly to gain control over both the client and the server sides of multimedia technology.

MICROSOFT HAS DESIGNED ITS MULTIMEDIA PRODUCT TO EXCLUDE COMPETITORS AND EXTEND ITS MONOPOLY POWER

69. Microsoft's multimedia technology includes both a set of APIs and a media player which, to my knowledge, are now referred to as DirectX and Windows Media Player, although they have undergone several name changes. Microsoft also offers a server-side component in a product called NetShow that provides multimedia files to Web browsers.

70. Microsoft's approach to the multimedia market is similar to the strategy it has pursued in the browser market with Internet Explorer. Microsoft "gives away" multimedia technologies such as DirectX and Windows Media Player by bundling them with the Windows operating systems. As it did in the browser market, Microsoft intends to establish an installed base of its multimedia products that will predominate in the market. Microsoft expects its resulting monopoly will guarantee that consumers will

necessarily purchase and use other related Microsoft software products designed to operate solely on the Windows operating system.

71. As noted above, Apple's QuickTime technology uses standard Internet communication protocols for the transmission of files during playback of Internet multimedia content with the use of Apple's streaming technology. By contrast, the streaming capability in any network using Microsoft's multimedia products must use Microsoft's proprietary and undocumented communication protocols for streaming. Because Microsoft does not divulge those proprietary protocols, Apple's QuickTime movie player on a desktop computer cannot be configured to view a NetShow movie.

72. Microsoft's proprietary protocols require the use of Microsoft's operating system and multimedia software for both the server (NetShow) and the client (Windows Media Player) for streaming. With Microsoft's multimedia products, one cannot use a Web server from one of Microsoft's competitors, such as Apache, Netscape, or Sun, for streaming with Microsoft products; it is necessary to have a Microsoft Net Show server running on Microsoft's Windows NT operating system.

73. Microsoft seeks to impose its proprietary format on the market, actively opposing efforts to designate QuickTime as the basis for a standard format for certain multimedia data. Oracle, Apple, IBM, Netscape, Silicon Graphics and Sun Microsystems jointly proposed QuickTime to the International Standards Organization ("ISO") as the developmental starting point for the MPEG-4 multimedia storage specification.[12] The ISO adopted the proposal in 1998 despite vigorous opposition from Microsoft.

---

[12]"MPEG," an acronym for the Moving Picture Experts Group, is the name of a family of standards used for coding multimedia information (e.g., movies, video, and music) into a digital compressed format. MPEG-4 is one of the standards in this group.

74. The ISO's selection of QuickTime as the MPEG-4 standard reflects three major considerations. First, the QuickTime file format has been publicly documented since 1991 and its extensibility features are well-demonstrated. Second, the QuickTime format has been widely used for the storage of multimedia files. Third, the QuickTime file format supports a broad range of media types, including video, sound, graphics, animation, text, music and virtual reality.[13]

MICROSOFT HAS USED ITS MONOPOLY POWER AND ANTICOMPETITIVE TACTICS TO TRY TO DEFEAT QUICKTIME

75. The widespread popularity and use of QuickTime pose a significant threat to Microsoft. The cross-platform capability of QuickTime holds the promise of weakening the symbiotic relationship between the operating system and application programs that is the foundation of Microsoft's monopoly position and that poses such a substantial barrier to competition in the operating systems market.

76. Microsoft appears to have fashioned a two-track strategy against QuickTime. Microsoft has repeatedly pressured Apple to cede the multimedia playback market to Microsoft. At the same time, Microsoft has pursued several actions to impede the growth of QuickTime and gain dominance over the multimedia market. As detailed below, Microsoft has written steps into its operating system to ensure that a QuickTime file will not operate reliably on Windows. Microsoft has also caused misleading error messages to appear that trick the user into believing that QuickTime technology is part of the problem actually caused by the Windows operating system. Finally, Microsoft has employed threats and exclusionary practices against third parties, compelling them to refuse to deal with QuickTime.

---

[13]See ISO Adopts QuickTime File Format as Starting Point for Developing new Component of MPEG-4 Specification.

MICROSOFT REPEATEDLY PRESSURED APPLE TO GIVE UP QUICKTIME AND CEDE THE MULTIMEDIA PLAYBACK MARKET TO MICROSOFT

77. As recounted in the sworn deposition testimony of Phil Schiller and Tim Schaaff, Microsoft repeatedly pressured Apple to abandon its business of providing software that enables users to view multimedia content on their computers. In return, Microsoft offered Apple the much smaller portion of the market for software tools used to create multimedia content. Microsoft made it clear that if Apple refused to relinquish the playback market, Microsoft would use its monopoly power to drive Apple out of the entire multimedia market.

The April 1997 Meeting

78. In April 1997, a meeting took place at Apple between Tim Schaaff and Peter Hoddie of Apple, and Eric Engstrom, the manager of Microsoft's multimedia technology and Christopher Phillips, the business development manager for its multimedia API's, DirectX. Microsoft ostensibly initiated the meeting to discuss cross licensing codecs. Microsoft's true purpose was later revealed when Mr. Engstrom and Mr. Phillips stated that Microsoft wanted to take over the playback market. Mr. Phillips and Mr. Engstrom suggested that Apple cede the playback market to Microsoft and focus solely on the "authoring" area of multimedia, i.e., the development of software tools used to create multimedia content. (Schaaff Depo., pp. 33-38, 282-86)[14]; (TX:888)

79. Apple declined Microsoft's proposal to carve up the market by having Apple relinquish its media player. (TX:1045) Apple's engineers could see no reason for

[14]All citations to deposition testimony are referenced by the last name of the deponent and the relevant page number(s). The deposition of Tim Schaaff was taken on August 28, 1998. The deposition of Phil Schiller was taken on September 11, 1998.

Apple to abandon its highly popular QuickTime player technology and use what they felt was an inadequate and less capable Microsoft media player.

Meetings in August, September and October, 1997

80. In August 1997, Messrs. Hoddie, Schaaff, Engstrom and Phillips again met to discuss codecs. The Microsoft representatives again used the meeting to urge Apple to withdraw from the market for multimedia playback capability. (Schaaff Depo., pp. 55-58)

81. In September 1997, Microsoft hosted a meeting at the Fairmont Hotel in San Jose to unveil its new Advanced Streaming Format ("ASF") used in Microsoft's new media player. Mr. Engstrom from Microsoft and Mr. Schaaff from Apple were present at the meeting. (Schaaff Depo., p. 58)

82. At this event, Mr. Engstrom again urged Apple to focus on the authoring segment and to cede the playback business to Microsoft. Mr. Engstrom warned that if Apple refused, Microsoft would take over the authoring segment of the market. Mr. Engstrom stated that, if necessary, Microsoft would assign 150 engineers to an authoring development project in order to displace Apple from that market. At that time, Apple's entire QuickTime engineering group only consisted of approximately 100 engineers. (Schaaff Depo., pp. 58-62)

83. Mr. Engstrom noted at the meeting that Microsoft's Bill Gates was not interested in an authoring program because the market for this product was too small. He assured the Apple representatives, however, that if Microsoft needed to make an investment in providing authoring tools in order to push Apple out of the playback market, then Microsoft would devote all the necessary resources to accomplish this goal. (Schaaff Depo. pp. 60-61)

84. At Microsoft's request, another meeting was held at Apple on October 17, 1997, ostensibly to discuss codecs. Microsoft again used that meeting as an opportunity to press Apple to cede the playback market to Microsoft. Microsoft would allow Apple to continue with QuickTime playback for the Mac operating system, but would require Apple to relinquish the QuickTime playback capability in Windows. (Schaaff Depo., pp. 62-71)

Continued Threats From Microsoft

85. Throughout the events described above, Apple engineers kept me informed of the pressure Microsoft was exerting as well as the problems they were having in getting the QuickTime plug-in to work with Internet Explorer 4.0. Mr. Schaaff and Mr. Hoddie told me that Microsoft had demanded that Apple leave the playback market. Specifically, they related to me the Microsoft engineers' position that, without an agreement that would cede the playback market to Microsoft, Microsoft would "kill" Apple in the media playback market.

86. Microsoft's statements were of great concern to me. The problems that we were experiencing in running QuickTime on Windows with Internet Explorer 4.0 -- problems that had not existed with earlier versions of Internet Explorer -- suggested that Microsoft would use its control of Windows to harm QuickTime. I was particularly concerned about Microsoft's bundling of its multimedia technology with its Internet Explorer for the Mac OS. This would give Microsoft access to the Mac OS operating system while, at the same time, Microsoft was seeking to exclude Apple's multimedia technology from Windows.

87. As a result of these concerns, I updated Steve Jobs, the interim CEO of Apple, about the situation. On February 3, 1998, Mr. Jobs sent an electronic mail

message to Mr. Gates expressing Apple's concerns about the threatening behavior of Microsoft's employees. (TX:904)

88. On February 13, 1998, I had a lunch meeting in Cupertino with Don Bradford of Microsoft. The purpose of this meeting was to discuss the problems described in Mr. Jobs' message to Mr. Gates.

89. At this meeting, Mr. Bradford conveyed the same proposal that Microsoft had presented in the past. Specifically, ~~if~~ Apple would abandon the playback segment of the business, Microsoft would be willing to endorse QuickTime as the solution for the authoring portion. Mr. Bradford told me that Mr. Gates thought that this would be a way to resolve our dispute.

90. In early-April 1998, Microsoft communicated the same proposal once again. Mr. Jobs at Apple received a phone message from Mr. Engstrom of Microsoft, stating that Microsoft was developing a new file format called Advanced Authoring Format ("AAF") for its media technology and would like Apple to participate in that project. Mr. Jobs forwarded the message to Mr. Schiller and asked him to get a better idea of what Microsoft was proposing. (Schiller Depo., pp. 51-57)

91. Mr. Schiller telephoned Mr. Engstrom to discuss the proposal. (Schiller Depo., pp. 51-57) After a conversation about ways in which the two companies could work together in the multimedia market, Mr. Engstrom changed his tone. "I don't want you to misunderstand," Mr. Engstrom bluntly warned Mr. Schiller. "We're going to compete fiercely on multimedia playback, and we won't let anybody have playback in Windows. We consider that part of the operating system, so you're going to have to give up multimedia playback on Windows." (Schiller Depo., p. 55)

92. Surprised, Mr. Schiller asked, "So we have to give up playback on Windows to work together on authoring?" Mr. Engstrom answered, "Yes, we would work together on authoring. You guys have done a great job there, but you have to give up playback on Windows." (Schiller Depo., p. 56)

June 15, 1998 Meeting

93. At Microsoft's request, a meeting was held at the Apple campus on June 15, 1998, between Messrs. Engstrom, Phillips and Pierry of Microsoft and Messrs. Schiller, Schaaff, Tevanian, Hoddie and Jobs of Apple. The purpose of the meeting was to discuss ways that Apple and Microsoft might work together in the multimedia business. The agenda for this meeting is documented in Trial Exhibit 904. (Schiller Depo., p. 59)

94. At this meeting, Microsoft proposed a convergence between Apple's QuickTime and Microsoft's DirectX technologies. Microsoft's basic proposal was that Microsoft would take over the playback market for Windows, while allowing Apple to control the much smaller playback business for Macintosh. (Schiller Depo., pp. 59-60)

95. Microsoft's proposal, the substance of which is contained in documents marked as Trial Exhibit 912, entitled QuickTime/DirectX Convergence Proposal, includes the following provisions: (1) the parties would cross-license their codecs to each other and collaborate on all future codecs, (2) Apple must adopt Microsoft's inferior DirectX run-time platform for Windows, (3) Apple must adopt Microsoft's inferior, proprietary streaming technology, and (4) Apple must adopt Microsoft's new, inferior AAF file format for authoring.

96. Microsoft's proposal amounted to a forced abandonment of one of Apple's most successful and innovative products (and the programmers and customers

who had relied on it). Accordingly, Steve Jobs told Microsoft that Apple had no interest in giving up QuickTime. Microsoft's response conveyed a simple message: Microsoft would drive Apple out of the multimedia business.

TO THWART QUICKTIME, MICROSOFT EMPLOYED PUNITIVE AND EXCLUSIONARY ACTIONS

97. While Microsoft was pressing Apple to withdraw from the playback market, Microsoft took several steps to sabotage QuickTime. These included creating misleading error messages and introducing technical bypasses that deprived QuickTime of the opportunity to process certain types of multimedia files. In some instances users were left with the false impression that QuickTime was not functioning properly when, in reality, Microsoft never allowed QuickTime the chance.

98. Apple has experienced technical issues with each new version of Microsoft's Internet Explorer, the Windows operating system and Microsoft's multimedia software. Most recently, the challenges that Apple has faced have revolved around providing customers access to the QuickTime features that allow a user to play back a variety of Internet file formats in the Internet Explorer browser. (Schaaff Depo., p. 116-17)

99. In contrast to the compatibility problems that Apple's QuickTime program has experienced with Microsoft's browser technologies, QuickTime's compatibility history with Netscape's browser has been much smoother. In the mid-1990s, Apple built a QuickTime plug-in for the Netscape Navigator browser. This plug-in was designed to be compatible with Navigator Version 2.0, which was the first version of Netscape's browser that allowed extensibility through plug-ins. Generally, the purpose of the extensibility feature was to enable other developers to extend the functionality of

the browser by creating new and better ways to display the various types of Internet data that the browser was going to access. Because Netscape treats the plug-in as an "open" architecture, Netscape publishes its plug-in interfaces in order to allow this development. This extensibility feature was not built into the first two versions of Microsoft's browser, Internet Explorer 1.0 and Internet Explorer 2.0. (Schaaff Depo., p. 113-14)

100. When Microsoft introduced Internet Explorer 3.0, it touted the ability of its browser to use plug-ins developed for Netscape Navigator. After the introduction of Internet Explorer 3.0, Apple was able to introduce a QuickTime plug-in that was fully compatible with both the Netscape Navigator and Internet Explorer 3.0 browsers. (Schaaff Depo., pp. 114-15) However, with the successive releases of Microsoft's Internet Explorer 4.0, Microsoft Windows 98, and Microsoft multimedia software, Apple has seen a steady degradation of QuickTime's capability to play back a variety of QuickTime-compatible media file formats while operating with Microsoft's Internet Explorer running on the Windows operating system. (Schaaff Depo., p. 116-17)

101. The chart in Attachment 4 illustrates the increasing degradation of QuickTime's performance as Microsoft has introduced greater technical incompatibilities between QuickTime and Microsoft products. The left side of the chart lists various file formats used to store multimedia content. The top of the chart shows various combinations of products used with Windows to display the content in each file format. The boxes in the middle of the chart indicate whether or not QuickTime is allowed to process the designated file format. A green, checked box means that QuickTime is allowed to process the designated format; a red, unchecked box indicates that QuickTime is not afforded a chance to process the file. Because QuickTime has the capability to process all the listed formats, each column should be green absent some interference

from Microsoft's products. The first column contains all green boxes, showing QuickTime's compatibility with Netscape Navigator and Windows 95 for all the file formats. By contrast, the last column indicates that QuickTime is deprived of the opportunity to process all but a few of the file formats when QuickTime is used with Internet Explorer 4.0 and Windows 98.

THE TECHNICAL PROBLEMS AND MISLEADING ERROR MESSAGES INTRODUCED BY MICROSOFT IMPAIR QUICKTIME'S PERFORMANCE AND IMPEDE APPLE'S ABILITY TO COMPETE

102. With the introduction of Internet Explorer 4.0, Microsoft has manipulated the plug-in architecture of its browser and multimedia software at the point in time that one would expect if those changes were driven for the purposes of market control rather than technical requirements. When Microsoft produced its first plug-in capable browser and needed to compete in the Netscape-dominated market by being technologically compatible, Microsoft used and adhered to Netscape's plug-in architecture. With the growth of Microsoft's browser market share through the bundling of Internet Explorer and Microsoft multimedia software with Windows, Microsoft reduced the compatibility between its browser and the open Netscape standard, starting with the introduction of Internet Explorer 4.0.

The Windows Registry

103. One source of Microsoft's ability to impair QuickTime's capabilities rests in Microsoft's control of the Windows "registry." The registry is a database of information that affects the functionality of the computer's operating system with various types of software. The registry creates an association between a particular file type and a particular application or plug-in so that the computer automatically knows which

application to run whenever the browser is used to open a particular type of file. (Schaaff Depo., p. 122)

104. Microsoft has used undocumented changes to the Windows registry to impair the ability of QuickTime to play numerous multimedia file types. In some cases, Internet Explorer 4.0 bypasses QuickTime and uses Microsoft software to play a multimedia file from a Web server. For many formats, the Microsoft software is not able to process the file at all. In other cases, the Microsoft software will play the file but with a severely degraded quality. (Schaff Depo., pp. 122-23, 475-79) This bypassing of QuickTime in preference to Microsoft multimedia software produces the results discussed in paragraph 102 above and illustrated on Attachment 4.

105. In order to overcome these limitations imposed by Microsoft, Apple made a significant effort to effectively reverse engineer the Windows registry software and the Internet Explorer 4.0 registry preferences so that the multimedia file types would be properly associated with the QuickTime plug-in. Apple's efforts to correct these defects achieved only limited success. Thus, Apple was forced to ship a QuickTime product having degraded functionality for the Windows/Internet Explorer 4.0 platform. (Schaaff Depo., pp. 117-18, 123-25); (TX:272-3)

Streaming with Microsoft's Products

106. As discussed above, when Microsoft software bypasses QuickTime for certain files, the user will experience poor multimedia performance. "Streaming" provides an example of this. As noted in paragraph 67 above, streaming refers to the ability to experience a media presentation, view a movie or to listen to an audio clip almost immediately. Without streaming, the consumer would have to wait for the entire file to be downloaded to a local computer before it can be played. This is particularly

important in the multimedia arena since files are typically large in size. (Schaaff Depo., p. 125)

107. QuickTime enables consumers to stream multimedia files from an industry standard HTTP server. By contrast, Microsoft's multimedia player on Internet Explorer 4.0 only supports streaming of data from Microsoft proprietary servers, and only if that data is structured in Microsoft's ASF file format. In contrast, when accessing non-ASF files with the Microsoft browser software, streaming is not employed, which forces the consumer to wait while all of the files are downloaded. Even if the consumer has installed QuickTime 3 with its inherent streaming capabilities, the consumer must download the entire file first since Microsoft associates the file with Microsoft's media player that does not support streaming from non-ASF files. Without streaming, the consumers' audio and video experience of certain multimedia files has been severely degraded. (Schaaff Depo., pp. 123-27, 477)

Misleading Error Messages

108. In the past, Microsoft has caused misleading error messages to appear for consumers who used QuickTime for various file formats. For example, Microsoft bundled with Windows and Internet Explorer a version of Microsoft's multimedia software called ActiveMovie. Under certain conditions, an error dialog message would pop up when the user tried to gain access to types of media files, such as a QuickTime movie file, which were not associated with ActiveMovie. The Windows operating system would then ask the user if he wished to reconfigure his system, suggesting that there was a problem that the consumer should fix although no actual error had occurred. Attachment 5 shows the screen as it would appear to a user. (Schaaff Depo., pp. 127-30)

109. If the user selected "yes" to the query, Windows would reconfigure the system to select Microsoft's ActiveMovie instead of QuickTime -- even though QuickTime was capable of running the movie file. From that point forward, Internet Explorer would launch the ActiveMovie player whenever the consumer clicked on a file containing a QuickTime movie. This could cause problems for certain multimedia files because the ActiveMovie player could only process a subset of the file formats that QuickTime could process. If a file could not be processed by ActiveMovie, an error message would appear telling the user that the player is not available -- even though QuickTime was capable of operating with the file. This could mislead consumers into believing that QuickTime was not operating properly.

110. Microsoft continues to program Windows, Internet Explorer and Microsoft multimedia software in such a way that certain file formats are routed to Microsoft's media player instead of QuickTime. These files include many standard Internet audio file formats that cannot be played by the Microsoft products. For example, when included in certain file formats, Apple's licensed audio codecs, QDesign for music and Qualcomm Purevoice, cannot be played on Microsoft's Media Player. (Schaaff Depo., p. 134) If the user clicks on a QDesign or Qualcomm Purevoice file to play, Internet Explorer 4.0 invokes the Microsoft media player instead of passing the files to QuickTime. Since it cannot decode any of these formats, Microsoft's system will generate an error message to the user. (Schaaff Depo., pp. 123-25, 127-30, 135-36, 477-79)

Microsoft's Response to the Problems

111. Because Apple's past experience with seeking technical assistance from Microsoft was not encouraging, Apple attempted to reverse engineer the technology to

solve the problems. When this effort did not yield good results, we attempted to expedite cooperation with Microsoft by establishing a dialogue at the executive level of both companies.

112. In an effort to enlist further assistance, Mr. Schaaff wrote an e-mail on July 21, 1998 to Microsoft describing some of the problems. According to Mr. Schaaff, when QuickTime was installed by a customer, Internet Explorer 4.0 would not use QuickTime to play multimedia files in spite of Apple's best efforts to solve the problem. (TX:273) Netscape Navigator handled playback through a standard plug-in. However, with Windows 98, Internet Explorer 4.0 and the latest Microsoft multimedia player software, this standard plug-in mechanism seemed to be completely ignored. With the advent of Internet Explorer 4.0, Microsoft software used information from the Windows registry (which is largely undocumented) to determine which software should be invoked to process different multimedia format files on a Web page. Apple's engineers were unable to manipulate the Windows registry to achieve the desired multimedia playback for most file formats. (Id.)

113. Mr. Schaaff asked Microsoft to properly support the standard plug-ins or to inform Apple how to set the registry to achieve the expected playback. (TX:273) Mr. Pierry from Microsoft responded that Apple should be developing a Microsoft ActiveX control. Such a control was not necessary with Internet Explorer 3.0, which supported industry standard plug-ins. ActiveX controls are Microsoft's proprietary format for extending the functionality of the system; ActiveX controls are supported only in Internet Explorer 4.0 and only on the Windows operating system. (Schaaff Depo., pp. 141-43) (TX:272)

114. Mr. Schaaff responded to this e-mail by inquiring whether there was any way to achieve QuickTime playback without rewriting everything as an ActiveX control. Such a rewrite would require that Apple create two separate, distinct QuickTime browser plug-ins for Netscape Navigator and Microsoft Internet Explorer 4.0 since Netscape is not ActiveX compatible. (Schaaff Depo., p. 143) (TX:274) Mr. Schaaff commented that he would at least expect Microsoft to maintain compatibility with existing, widely adopted standards, such as the Netscape plug-in API. (Schaaff Depo. p. 144) (TX:274) Mr. Schaaff received no response from Microsoft to this e-mail. (Schaaff Depo., pp. 145-46)

ORIGINAL EQUIPMENT MANUFACTURERS AND INDEPENDENT SOFTWARE VENDORS FEAR REPRISAL FROM MICROSOFT IF THEIR BUSINESS CONDUCT DOES NOT CONFORM TO MICROSOFT'S WISHES

115. Despite the overwhelming success Apple has enjoyed in the multimedia market through QuickTime, original equipment manufacturers and independent software vendors who support, or who are considering supporting, QuickTime fear reprisal from Microsoft.

Compaq

116. Before the release of QuickTime 3, Apple considered licensing OEMs to distribute QuickTime with the sale of their computer systems. Compaq Computer Corporation, the largest vendor of personal computers in the world, was bundling the previous version of QuickTime with its computers, and was therefore an obvious OEM candidate to distribute QuickTime 3. (Schiller Depo., p. 23)

117. In fact, Compaq first approached Apple to inquire about licensing opportunities for QuickTime 3. In or about February 1998, Eric Federman, a product manager for the Compaq Presario Division, contacted Phil Schiller, Vice President of

114. Mr. Schaaff responded to this e-mail by inquiring whether there was any way to achieve QuickTime playback without rewriting everything as an ActiveX control. Such a rewrite would require that Apple create two separate, distinct QuickTime browser plug-ins for Netscape Navigator and Microsoft Internet Explorer 4.0 since Netscape is not ActiveX compatible. (Schaaff Depo., p. 143) (TX:274) Mr. Schaaff commented that he would at least expect Microsoft to maintain compatibility with existing, widely adopted standards, such as the Netscape plug-in API. (Schaaff Depo. p. 144) (TX:274) Mr. Schaaff received no response from Microsoft to this e-mail. (Schaaff Depo., pp. 145-46)

ORIGINAL EQUIPMENT MANUFACTURERS AND INDEPENDENT SOFTWARE VENDORS FEAR REPRISAL FROM MICROSOFT IF THEIR BUSINESS CONDUCT DOES NOT CONFORM TO MICROSOFT'S WISHES

115. Despite the overwhelming success Apple has enjoyed in the multimedia market through QuickTime, original equipment manufacturers and independent software vendors who support, or who are considering supporting, QuickTime fear reprisal from Microsoft.

Compaq

116. Before the release of QuickTime 3, Apple considered licensing OEMs to distribute QuickTime with the sale of their computer systems. Compaq Computer Corporation, the largest vendor of personal computers in the world, was bundling the previous version of QuickTime with its computers, and was therefore an obvious OEM candidate to distribute QuickTime 3. (Schiller Depo., p. 23)

117. In fact, Compaq first approached Apple to inquire about licensing opportunities for QuickTime 3. In or about February 1998, Eric Federman, a product manager for the Compaq Presario Division, contacted Phil Schiller, Vice President of

Worldwide Product Marketing for Apple. Mr. Federman told Mr. Schiller that he was anxious to get QuickTime 3 onto the Presario products as soon as possible. (Schiller Depo., p. 24)

118. Compaq's inquiry regarding QuickTime 3 followed Compaq's attendance at the Software Publisher's Association ("SPA") conference in late 1997. Microsoft had announced at the conference that it would henceforth support only its new multimedia APIs. This announcement meant that any existing software that worked to play multimedia through other APIs would not work with the new content types, such as digital video disks ("DVDs"). As a result, content providers would have to re-author their content in order to sell their products as a DVD title using Microsoft's multimedia software. (Schiller Depo., pp. 24-26)

119. At the SPA Conference, Apple presented its QuickTime multimedia software. Apple representatives explained that with the QuickTime 3 format, content providers could transfer their existing CD titles into a DVD product with relative ease. (Schiller Depo., p. 26)

120. After attending the multimedia presentations by both Compaq and Apple, Mr. David Obelcz, a procurement engineer for Compaq's Presario division, approached Mr. Schiller's product manager, Mr. Steve Bannerman, and expressed excitement about QuickTime 3. Mr. Obelcz requested a meeting between Apple and Compaq to present QuickTime to Compaq's executives and engineers. (Schiller Depo., pp. 26-27)

121. On March 12, 1998, Mr. Schiller and a number of Apple representatives traveled to Compaq's offices in Houston, Texas, to give a presentation on QuickTime 3. Before the meeting, Mr. Obelcz took Mr. Schiller aside and expressed

concern that the meeting was not going to start off well. Mr. Obelcz showed Mr. Schiller an internal e-mail from the head of the Presario Division, Rod Schrock, stating that he was not interested in doing business with Apple in connection with QuickTime. (Schiller Depo., pp. 27-28)

122. Confident that there was still enough interest at Compaq, Mr. Schiller proceeded with the presentation. The Apple representatives began the meeting by explaining the unique capabilities and features that QuickTime 3 would add to the Windows operating systems installed on Compaq's personal computers. These capabilities and features were not available from Microsoft or from any other vendor. Apple discussed Compaq's ability to license either a royalty-based version or a free version of QuickTime. Apple was prepared to include Compaq in the launch of QuickTime 3 and offered the possibility that Compaq could be the first and, for some period, the exclusive OEM with QuickTime. (Schiller Depo., pp. 31-34)

123. The questions and statements that followed reflected a clear conflict between the Compaq engineers and the Compaq marketing employees. On the one hand, the engineering participants expressed great excitement about the technology embodied in QuickTime 3. On the other hand, the comments made by Compaq's marketing managers showed some resistance to bundling any QuickTime product with Compaq computers. (Schiller Depo., pp. 42-44)

124. Mr. Obelcz's frustration became so great that he stood up and explained to Compaq's marketing team that the technology paths Microsoft had chosen in the past had failed Compaq, and he doubted that Microsoft's latest strategy would fare any better. Mr. Obelcz stated that Apple had the solution in QuickTime, for which there was a much clearer opportunity for success. He explained from the perspective of a

Compaq engineer why the QuickTime 3 software was important to bundle with Compaq's computer products. "Compaq has been screwed before in multimedia by Microsoft," Mr. Obelcz exclaimed, and he reiterated the point that the Microsoft representative had made at the SPA Conference that the use of Microsoft's multimedia APIs would require the re-authoring of completed works. Mr. Obelcz stated his belief that QuickTime offered a better strategy for making hundreds of DVD titles available very quickly. (Schiller Depo., pp. 41-46)

125. At the conclusion of the meeting, the Compaq engineering team stated that they were very pleased with what Apple had presented. As Mr. Schiller was leaving the meeting, Steven Decker, the Director of Procurement in the Presario Division, came up to him and said, "You have to understand what's going on here. They're very afraid of doing anything to upset Microsoft. We are very wary of bundling anything that would upset Microsoft because they touch us in so many places." (Schiller Depo., pp. 46-48)

126. A week after the meeting, Apple was informed that Compaq had decided not to move forward with any licensing plan for QuickTime 3. Compaq, moreover, had also decided to remove all QuickTime products that were currently being bundled with its computers. (Schiller Depo., pp. 48-49)

AVID

127. The fear of retribution from Microsoft has also forced ISVs to consider whether to adopt or continue supporting QuickTime. For example, Microsoft has pressured AVID, a video software producer, to stop supporting QuickTime or face the loss of Microsoft's assistance in the sale of Avid's new video products. (Schiller Depo., p. 73)

128. AVID and Apple have a strong technological partnership. Apple and AVID have collaborated on an important multimedia application called AVID Cinema, a consumer editing video product that relies heavily on QuickTime. (Schiller Depo., p. 73)

129. In January of 1998, Mr. Schiller attended a regularly scheduled quarterly meeting with Cliff Jencks of AVID, at which numerous collaborative technologies and products were discussed. During the discussion, Mr. Jencks stated that he was under tremendous pressure from Microsoft not to support QuickTime. He explained to Mr. Schiller that it was an example of the strength of the partnership between AVID and Apple that he repeatedly resisted pressure from Microsoft to stop supporting QuickTime. (Schiller Depo., pp. 73-74)

130. Mr. Schiller asked Mr. Jencks to provide an example of such pressure from Microsoft. Mr. Jencks explained that Microsoft was about to announce a new channel for selling software and that the channel would be part of the Windows 98 (code name "Memphis") product. This new software channel, he was told, would allow ISVs to sell software to users directly from the users' desktop. (Schiller Depo., p. 74)

131. Mr. Jencks told Mr. Schiller that he had approached Microsoft and the Memphis team about being part of the new software channel to sell their Cinema software. The Memphis team told him that as long as Cinema supported QuickTime, his product would not be part of that sales channel. Mr. Jencks explained that he attempted to explore with Microsoft the possibility of AVID developing new products for the software channel. He was told by Microsoft, "That's not good enough. You need to rip QuickTime out of your product if you want to be in this channel." (Schiller Depo., pp. 74-75)

132. Mr. Schiller asked Mr. Jencks, "Where is this coming from? Who at Microsoft is so bent on killing QuickTime that they would impact the Memphis team?" Mr. Jencks replied that the directives were coming from the NetShow team at Microsoft. (Schiller Depo., p. 75)

133. Microsoft's pressure obviously succeeded. On April 6, 1998 at the meeting of the National Association of Broadcasters, Microsoft introduced its AAF format for multimedia authoring. Joining Microsoft as a partner in this announcement was AVID.

TrueVision

134. Shortly after I joined Apple in February of 1997, I met with Lou Doctor of TrueVision. TrueVision produced a "video capture card," a piece of hardware that could be installed to enhance a computer's ability to work with video images. Mr. Doctor recommended to me that Apple get out of the playback market for multimedia because Microsoft was committed to taking over that market. He explained that Microsoft was cutting deals with third parties, investing money for development and taking other acts to foreclose Apple from that business.

135. I later learned that Apple executive Phil Schiller heard similar warnings from TrueVision when Mr. Schiller was employed at MacroMedia in 1996 through 1997. Mr. Schiller was involved with the development of FinalCut, a video editing software package that would create significant new desktop video capabilities. FinalCut was developed to be cross-platform. It was initially going to be based on QuickTime for the Mac OS and on Microsoft's ActiveMovie for the Windows operating system. (Schiller Depo., pp. 68-69)

136. MacroMedia was working with TrueVision to develop a "driver" to ensure that its video capture card was compatible with FinalCut software. (A driver is a specialized piece of software that links a peripheral device, such as a printer or video capture card, with the operating system.) When MacroMedia realized that Microsoft was not going to deliver ActiveMovie as promised, MacroMedia decided to alter the development of FinalCut so that it would be based on QuickTime for both the Mac OS and Windows operating systems. (Schiller Depo., pp. 69-70)

137. Although this work continued, TrueVision eventually informed MacroMedia that it could no longer continue with the development of a Windows QuickTime driver to support FinalCut. Mr. Schiller was informed that Microsoft had agreed to invest in Truevision, but only on the understanding that TrueVision could not deliver or support QuickTime drivers for the Windows operating system with TrueVision products. (Schiller Depo., p. 70)

138. According to Mr. Schiller, TrueVision and Microsoft reached an arrangement that allowed TrueVision to create a QuickTime driver for its video capture card. However, the driver could work only with FinalCut, and TrueVision could not market, brand or refer to the driver as a QuickTime driver. (Schiller Depo., p. 71)

CONCLUSION OF TESTIMONY

139. As my testimony illustrates, Microsoft does not hesitate to use its operating system monopoly power and application program dominance to try to eliminate competition, acquire control of new markets and block innovation that could challenge its position. In its recent dealings with Apple, Microsoft has used its power to acquire significant advantages for its Internet browser and impede Apple's QuickTime technology.

140. By bundling its application programs with Windows, Microsoft can directly introduce its products into an installed base that comprises more than 90 percent of the market. Once Microsoft moves into an application program market in this way, competition and innovation will inevitably be diminished. As our experience with QuickTime shows, Microsoft will seriously disparage and disable competing application programs through its control of the operating system. Because Microsoft can use its monopoly power in this way, consumers are deprived of a fair opportunity to judge competing products on their merits.

141. Once it controls the market for a particular application, Microsoft will use that power to pursue other objectives. As it did with Microsoft Office for Macintosh, Microsoft will aggressively leverage its control of essential application programs to dominate other markets, such as the market for Internet browsers. The advantages Microsoft gains for its products through this strategy are not the result of technological advances or consumer preference; they result solely from the use of monopoly power.

142. As the only real competitor to Microsoft in the market for desktop computer operating systems, Apple has a singular appreciation for the barriers to competition in a market dominated by Windows. Microsoft's massive installed base for Windows makes it extremely difficult to convince software developers to adapt their existing programs or write new applications for a competing operating system, even one that offers significant technical advantages. Consumers are reluctant to abandon their investments in applications that run on Windows in order to switch to a new system, despite advantages in price or technical merit.

143. The barriers to competing directly with Microsoft in the operating system market make the development of cross-platform products, such as QuickTime and

Internet browsers, critical to the future of the industry. Such cross-platform products offer ISVs and content providers the assurance that their programs will run on all major operating systems without modification.

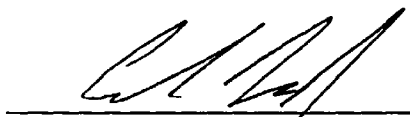
144. As described in my testimony, Microsoft has launched a series of anticompetitive measures against Apple's QuickTime. Microsoft has pressured important customers and developers not to support QuickTime. Microsoft has introduced a series of changes in Windows to defeat Quicktime's power and flexibility and to mislead consumers into believing that QuickTime will not operate as designed. Microsoft has tried to force Apple out of the multimedia playback market and to impose standards and protocols that Microsoft will control. Microsoft's actions have compelled Apple to devote critical resources to fix problems introduced by Microsoft's exclusionary tactics, resources that could otherwise be better used for product development and improvement.

145. Microsoft's success in the browser wars illustrates how quickly Microsoft's strategies can accomplish its intended goals. Given the speed with which Microsoft can attain market dominance, remedial measures directed to the effects of Microsoft's actions in a single market will be too late to preserve competition and too limited to address systemic abuses.

146. If competition is to be restored and fostered in critical markets, fundamental structural change is necessary. Such change must address Microsoft's ability to move on many fronts, to exploit its power in one of many markets in order to acquire or consolidate control in others. As long as Microsoft can dominate new markets by leveraging its unchallenged control of both the Windows operating system and essential

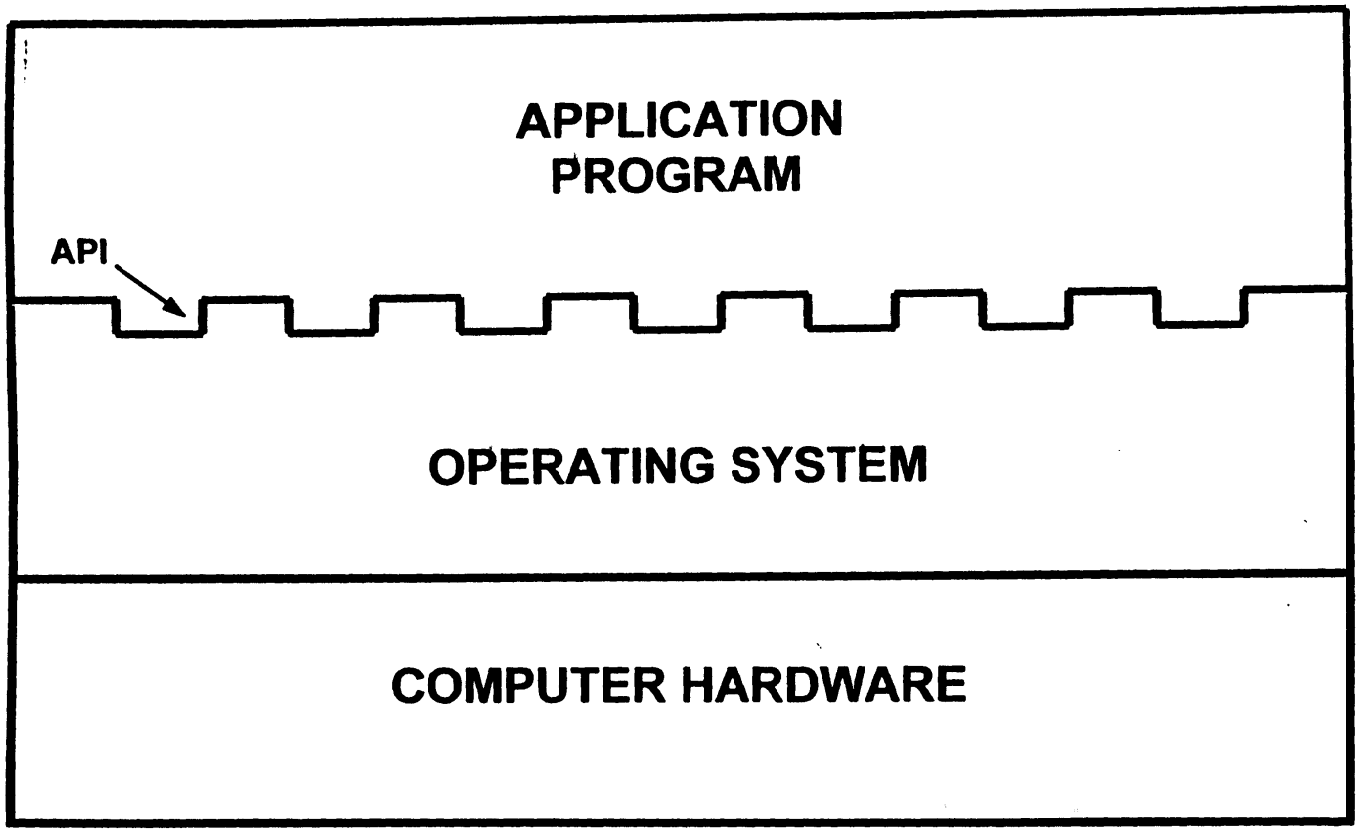
application programs, competition -- which has been the engine of innovation and growth in this industry -- will be curtailed.

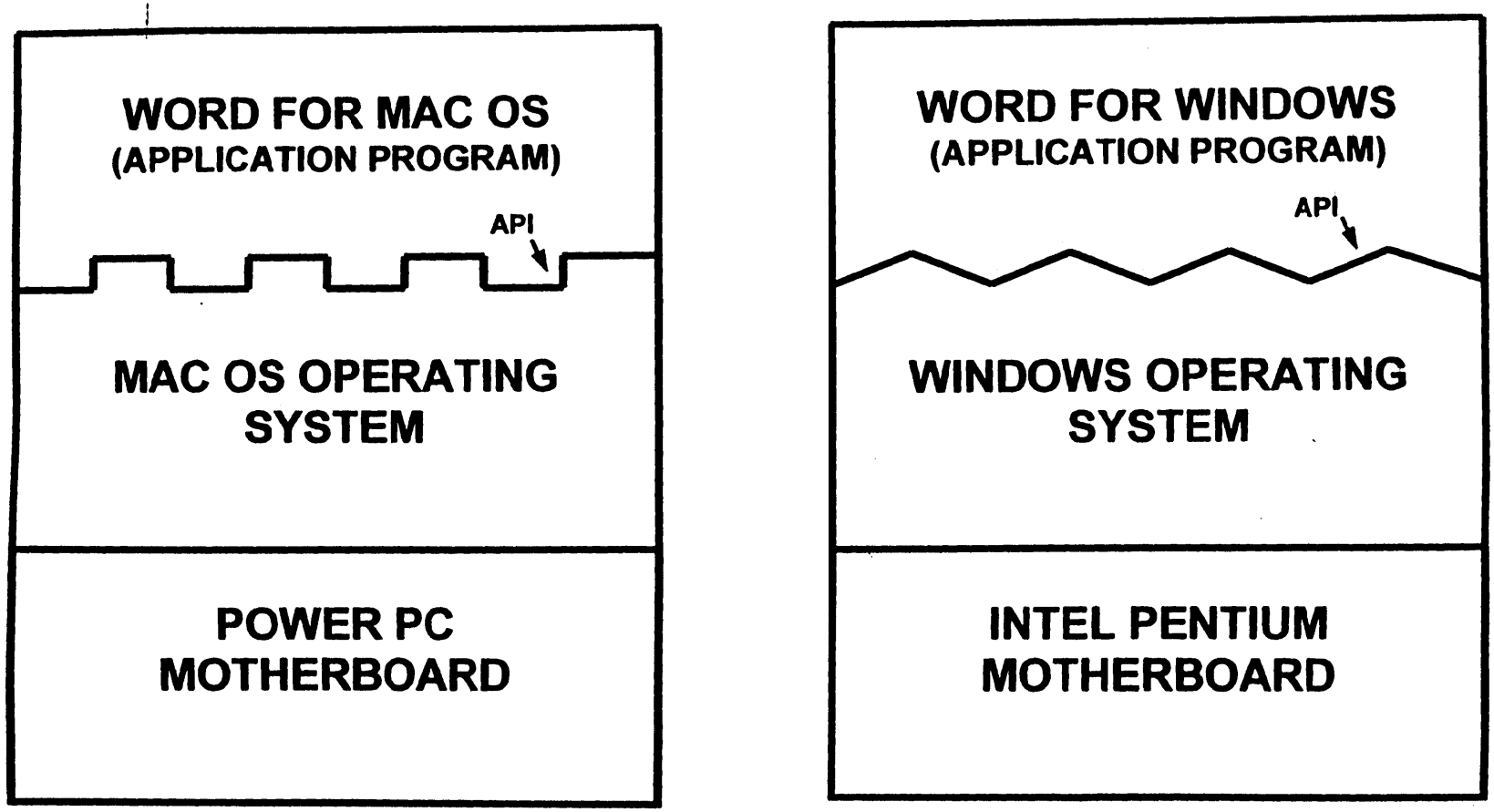
I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct and that this declaration is executed in Cupertino, California on October 12, 1998.



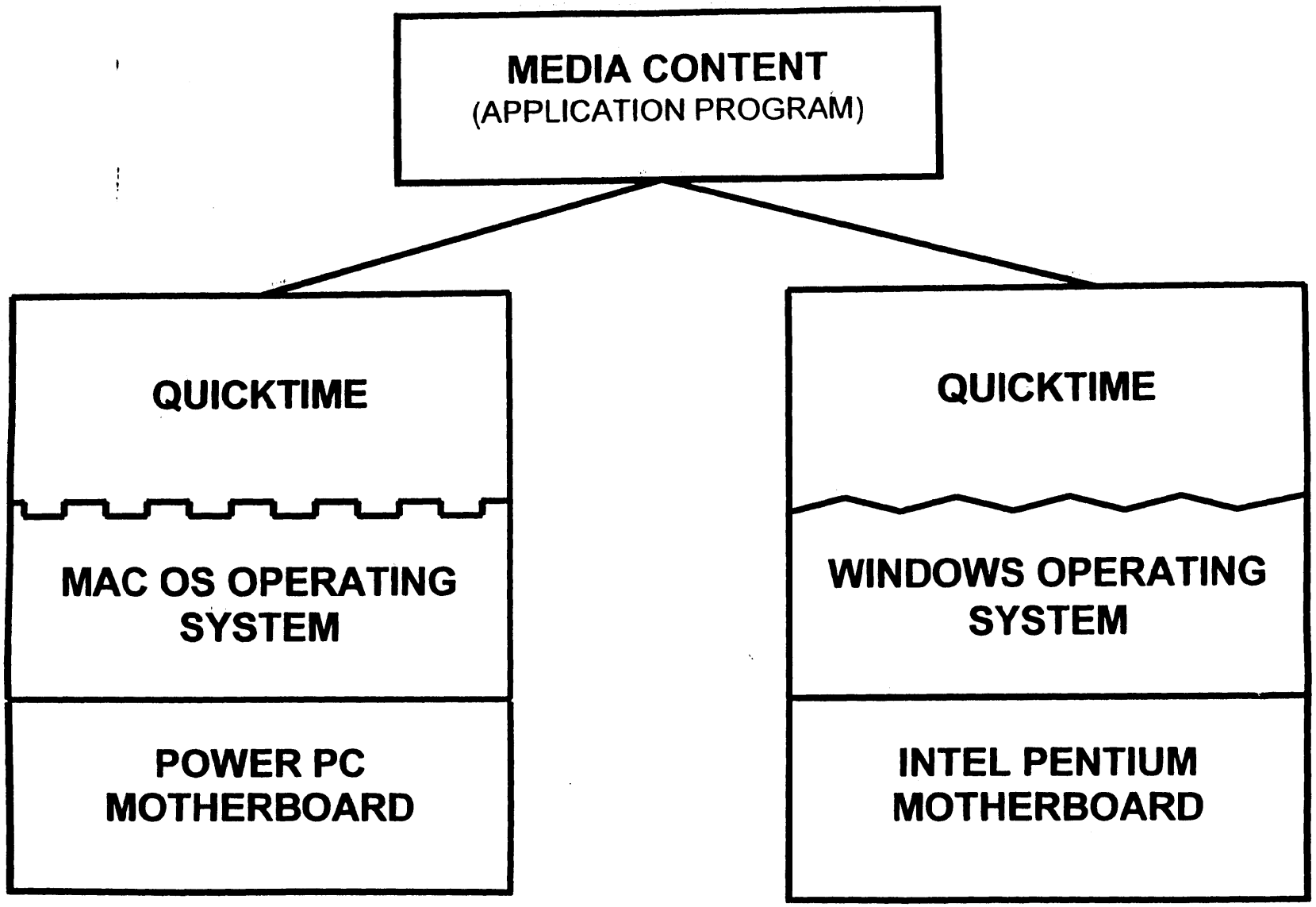
Avadis Tevanian, Jr.

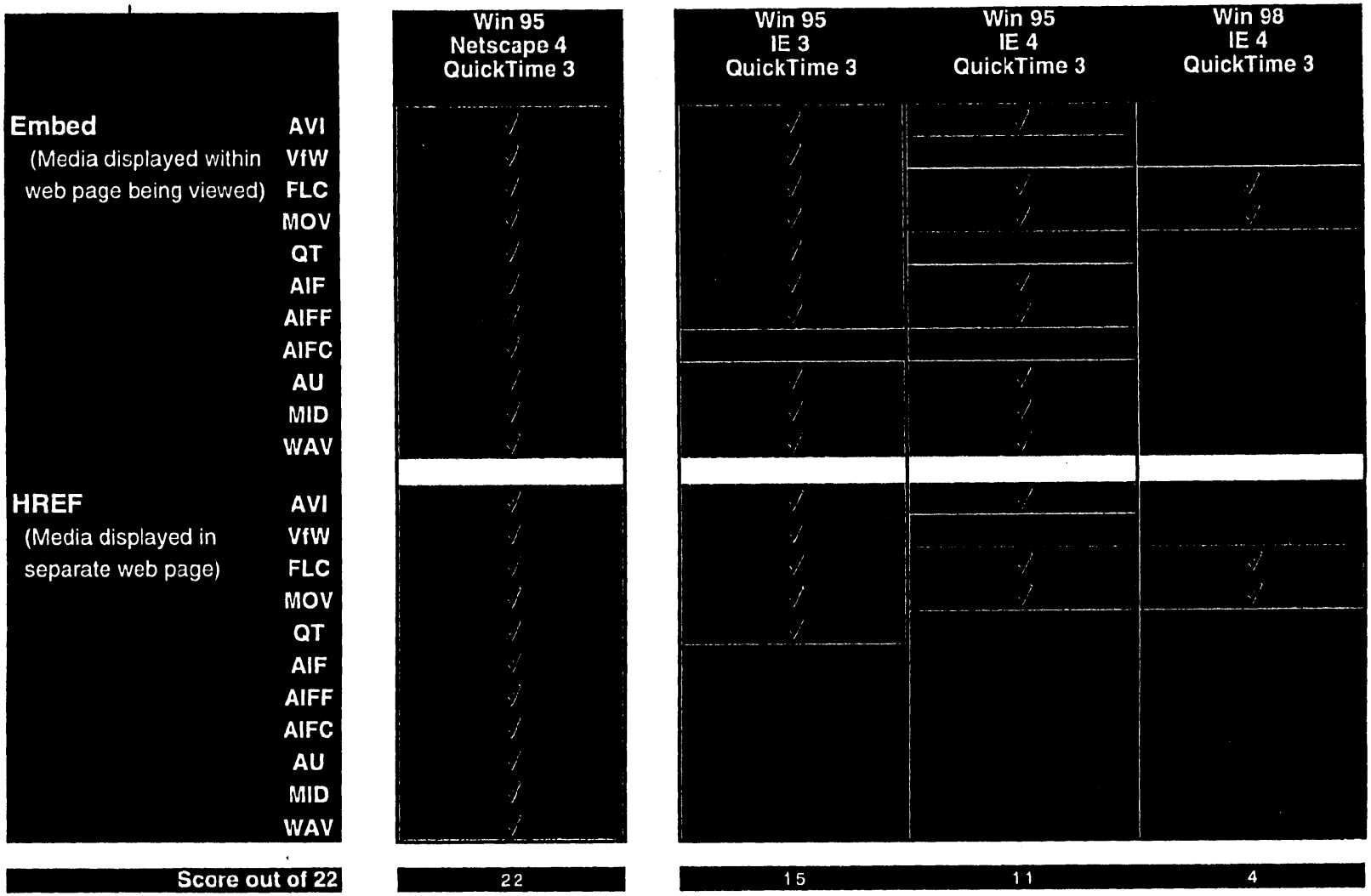
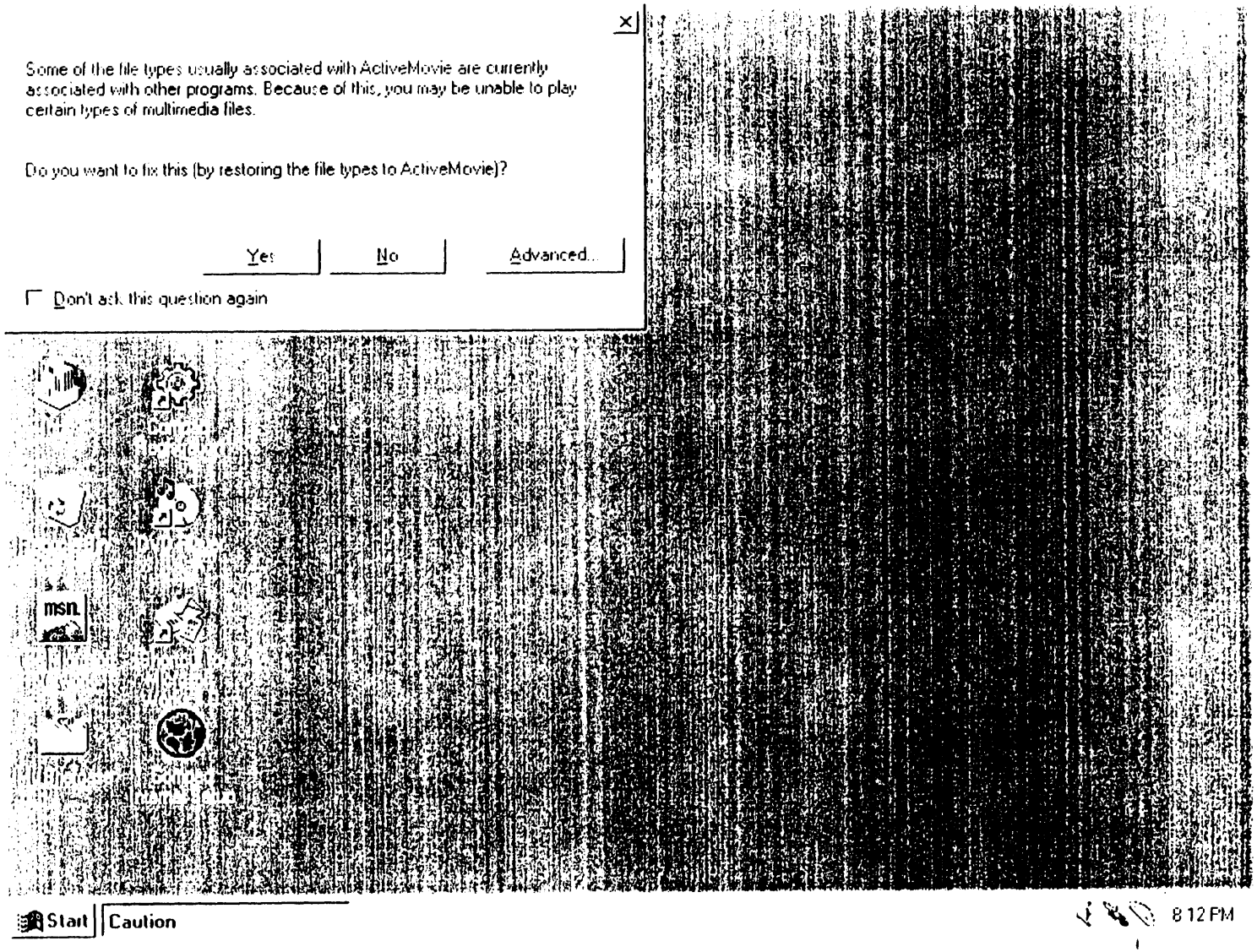
Attachment 1




WORD FOR MAC OS
(APPLICATION PROGRAM)
API
MAC OS OPERATING SYSTEM
POWER PC MOTHERBOARD
WORD FOR WINDOWS
(APPLICATION PROGRAM)
API
WINDOWS OPERATING SYSTEM
INTEL PENTIUM MOTHERBOARD

Attachment 3




Win 95 Netscape 4 QuickTime 3
Win 95 IE 3 QuickTime 3
Win 95 IE 4 QuickTime 3
Win 98 IE 4 QuickTime 3
Embed
(Media displayed within web page being viewed)
HREF
(Media displayed in separate web page)
AVI
VfW
FLC
MOV
QT
AIF
AIFF
AIFC
AU
MID
WAV
Score out of 22
22
15
11
4
Key:
Uses QuickTime Plug-In
Never gets to QuickTime

ATTACHMENT 5