

**UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF TEXAS  
TYLER DIVISION**

MIRROR WORLDS, LLC,

Plaintiff,

v.

APPLE INC.,

Defendant.

Civil Action No. 6:08-CV-88 LED

JURY TRIAL DEMANDED

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APPLE INC.,

Counterclaim Plaintiff

v.

MIRROR WORLDS, LLC,  
MIRROR WORLDS TECHNOLOGIES, INC.,

Counterclaim Defendants.

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**DECLARATION OF JOHN LEVY, Ph.D. REGARDING CLAIM CONSTRUCTION**

I, John Levy, hereby declare that:

1. I have been retained by Mirror Worlds, LLC (“Mirror Worlds”) and Mirror Worlds Technologies, Inc. (“MWT”) to serve as an expert in the above-captioned case. I make this declaration to offer my opinions regarding the interpretation of certain language in the claims of Mirror Worlds’ United States Patent Nos. 6,006,227 (“the ‘227 patent”), 6,638,313 (“the ‘313 patent”), 6,725,427 (“the ‘427 patent”), and 6,768,999 (“the ‘999 patent”) (collectively, “the Mirror Worlds Patents”) and Apple’s U.S. Patent No. 6,613,101 (“the ‘101 patent” or “the Apple Patent”).

2. This declaration is based upon information currently known to me and I reserve the right to rely upon any additional information I become aware of after the date of this declaration and to respond to any arguments or opinions regarding the subject matter of my declaration raised by Apple or its experts after the date of this declaration, including at trial.

#### **I. PROFESSIONAL BACKGROUND AND QUALIFICATIONS**

3. I am the sole proprietor of John Levy Consulting, a consulting firm that specializes in consulting on managing development of high tech products, including computers and software.

4. I have a Bachelor of Engineering Physics degree from Cornell University, a Master of Science degree in Electrical Engineering from the California Institute of Technology, and a Ph.D. in Computer Science from Stanford University.

5. I have spent over thirty years in the computer systems, software and storage industry. After earning my doctorate from Stanford University in Computer Science, I worked as an engineer at a number of leading companies in the computer and hard disk industry, including Digital Equipment Corporation, Tandem Computer, Inc., Apple Computer, Inc., and Quantum Corporation.

6. During my employment at Stanford Linear Accelerator Center while I was a graduate student at Stanford University, I was a programmer and I participated in the design and implementation of a real-time operating system for use in data acquisition and display. In my course work at Caltech and at Stanford, I studied the structure and operation of operating systems. At Digital Equipment Corporation for approximately one and a half years I was Supervisor of development of the operating systems RSX-11D and IAS. During my employment

at Quantum, I was involved in the design of file systems and of hard disk input/output drivers used in personal computers.

7. I am a named inventor on seven United States patents. I have been disclosed as a witness in over 25 cases and have testified at trial and deposition. A list of my testimony over the last four years is attached hereto as Exhibit A. I also have served as a technical advisor to two United States District Judges. A complete copy of my curriculum vitae, which includes a list of my publications, is attached as Exhibit B.

8. I base my opinions below on my professional training and experience and my review of documents and materials produced in this litigation, as well as documents I uncovered in researching the assignment. A list of materials I considered in arriving at my opinions is attached as Exhibit C. My compensation for this assignment is my standard rate of \$475 per hour. My compensation is not dependent on the substance of my opinions or my testimony or the outcome of this case.

## **II. THE MIRROR WORLDS PATENTS**

### **A. TECHNOLOGY OVERVIEW**

9. The patents-in-suit relate to a new model and system for managing personal electronic information which uses a time-ordered stream and stream filters to organize and locate the stored information, as well as incoming information. *See, e.g.*, '227 patent, col. 3, lines 62-65.<sup>1</sup>

10. The patents-in-suit recognize that conventional systems, which require users to access stored information through filenames and folders, become unwieldy when the amount of information stored on a computer becomes large. And the patents-in-suit further recognize that

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<sup>1</sup> Citations to the '227 patent in this declaration apply also to the corresponding portions of the '427 patent and '313 patent.

what users really want is a way of retrieving all documents pertaining to a particular topic regardless of whether the document is a piece of correspondence, bill, picture, movie, email or even a document relating to a future event, such as a calendar entry. The patents-in-suit also provide a unique, intuitive way of displaying that information for the user.<sup>2</sup>

**B. LEVEL OF ORDINARY SKILL IN THE ART**

11. Based on my experience, it is my opinion that a person of ordinary skill in the art of the Mirror World Patents would have a bachelor's degree in computer science, computer engineering or the equivalent, and 3-5 years of experience in the field of computer operating systems, or a post-graduate degree in computer science, computer engineering or the equivalent, and 1-2 years of experience in the field of computer operating systems.

**C. CLAIM CONSTRUCTION AND ANALYSIS**

**a. "data unit"**

12. Claims 1, 13 and 25 of the '227 patent (as well as other claims) recite a "data unit." Based on the specification and file history of the '227 patent, one of ordinary skill in the art would understand that "data unit" refers to a collection of data of significance to the user that the user considers as a unit.

13. I understand that the parties have agreed that a "data unit" is something that is "of significance to the user that the user considers as a unit," but disagree over whether "data unit" should be construed as a "collection of data," as Mirror Worlds proposes, or an "item of information," as Apple proposes. In my opinion, a "collection of data" more closely tracks the actual claim language and more accurately conveys the meaning of "data unit"—in particular, it encompasses any data that is regarded as a unit by the user, including, but not limited to data that

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<sup>2</sup> Further information regarding the technology in the Mirror Worlds patents and the Apple patent will be provided in connection with a Technology tutorial.

the user may read or view (such as pictures, correspondence, bills, movies, videos, email, voice mail, text files, calendar entries, etc.) and data in the form of, for example, computer software and other binary files that are not directly read or viewed by the user. In contrast, an “item of information” (Apple’s proposal) appears to be limited to something that is small in size and would not ordinarily be thought of as applying to, for example, computer software or other types of data that are not directly read or viewed by the user.

14. In addition, I understand that Apple includes examples of data units in its proposed construction—in particular that a data unit is “e.g., an email, picture, voice mail, software program, reminder or calendar item.” The term “data unit” is not limited to the particular examples identified by Apple and, therefore, those examples add nothing. To the extent that Apple would argue that a data unit must in some manner be similar to the listed examples, that would be incorrect.

**b. “stream”**

15. The term “stream” appears in claims 1, 13, and 25 of the ‘227 patent, claim 1 of the ‘313 patent, claims 1 and 25 of the ‘427 patent, and claim 1 of the ‘999 patent.

16. One of ordinary skill in the art would understand that “stream,” as used in the ‘227, ‘313 and ‘427 patents, refers to a time-ordered collection of data units, or documents, unbounded in number, in which the time associated with a data unit can be in the past, present or future, and the location of file storage is transparent to the user.

17. I understand that the parties disagree as to whether a stream is best described as a “time-ordered *collection of data units, or documents*” (Mirror Worlds’ position) or a “time-ordered *sequence of documents*” (Apple’s position). There are two differences in those positions—(1) whether the construction of “stream” should include the phrase “data units, or

documents” or only “documents”; and (2) whether the construction should use “collection” or “sequence.”

18. As to (1), the Mirror Worlds Patents use the terms “data unit” and “document” interchangeably, but “document” is not used in its ordinary sense of a paper that a user may read. For example, the patent uses the term “document” (and “data unit”) to refer to audio data, video data and software—items that people would not commonly identify as documents in the traditional sense, (*See* ‘227, col. 4, lines, 16-18; col. 14, lines 34-36). The term “data unit” is more general and has no such restrictive connotations. In addition, certain claims of the Mirror World Patents expressly recite a “main stream *of data units*” and therefore including “data units” in the construction of “stream” more closely tracks the claim language. (*See, e.g.*, ‘227 patent, claims 1, 13 and 25). Accordingly, in my opinion, it is important that the construction of stream include both “data units” and “documents.”

19. As to (2) (“collection” versus “sequence”), in my opinion, the term “collection” is clearer and more readily understood than “sequence.” The specifications of the Mirror Worlds Patents often refer to a stream as a collection of documents—*see, e.g.*, ‘227, col. 5, lines 16-17 (“A substream, in other words, is a “subset” of the main stream ***document collection.***”);<sup>3</sup> col. 6, lines 12-14 (“Each view of a stream is implemented as a client of the server and provides the user with a ‘viewpoint’ interface to ***document collections, that is, streams.***”); *see also* col. 4, line 24 and 54, col. 14, lines 6, 10, 13, 15. A stream is also referred to as a collection of documents in the file histories of the Mirror Worlds Patents—*see, e.g.*, ‘227 File History, Office Action dated 11/03/98 (“However, in the instant claims, it is assumed that any data stream of interest determines a closed system, and the ***collection*** of ‘each data unit received’ ***defines the stream***

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<sup>3</sup> All emphasis has been added unless otherwise noted.

and vice versa.”). While the Mirror World Patents and their file histories also refer to streams as a “sequence of documents,” that relates to the time-order which is already in the proposed construction.

20. I understand that Apple has not included in its proposed construction of “stream” that a stream be unbounded in the number of data units, or documents, in the stream. A stream plainly is unbounded. For example, as described in the specifications of the Mirror Worlds Patents, a main stream contains all data units, or documents, received by or generated by a person or entity—which is plainly an unbounded number. (‘227 patent, col. 4, lines 8-10; *see also* col. 4, lines 57-59, describing a substream as generated from all documents in the main stream, and thus also unbounded). Similarly, claims 1, 13 and 25 recite a “main stream” that receives “each data unit received by or generated by the computer system”—again, an unbounded number.

21. I also understand that Apple has not included in its proposed construction of “stream” that, in a stream, the location of file storage is transparent to the user. The specifications of the Mirror Worlds Patents, however, plainly identify transparency as an aspect of a stream. (*See, e.g.*, ‘227 patent, Abstract, col. 2, lines 20-24).

22. I understand that the parties disagree as to whether the construction of “stream” should state that “the time associated with a data unit can be in the past, present or future” (Mirror Worlds’ position) or “is designed to have three main portions: past, present, and future” (Apple’s position). In my opinion, it is clearer to state that the time associated with a data unit can be in the past, present or future. Time is a constantly changing quantity and, as a result, the boundaries between past, present and future are not fixed. For example, a data unit may at one moment have a time associated with it that is in the future (such as an appointment); then, as

time progresses, in the present; and then, in the past. While it may be true that, for a given point in time, a stream may be divided into past, present and future portions, the data units associated with those portions are constantly changing. A data unit is not assigned to a particular past, present or future “portion” and reassigned to another portion as time changes. Instead, the data unit simply has a time associated with it that may be in the past, present or future.

23. I also understand that Apple has included in its proposed construction of “stream” that it “functions as a diary of a person or an entity’s electronic life.” That language (which appears, for example, in the ‘227 patent at col. 4, lines 6-8) is an attempt to informally describe a stream by analogizing it to a diary. It does not describe the structure of a stream, but rather its function, and is too imprecise to be used as part of a formal definition of that term.

24. The term stream is similar in the ‘999 patent, except that the ‘999 patent refers to “information assets,” rather than “data units.”

**c. “main stream”**

25. Claims 1, 13 and 25 of the ‘227 patent and claim 2 of the ‘313 patent recite a “main stream.” One of ordinary skill in the art would understand that a “main stream” refers to a stream of each data unit, or document, received by or generated by the computer system.

26. I understand that the parties have agreed in large part to the construction of “main stream,” except that they disagree as to whether a main stream is a “stream of *each* data unit ...” (Mirror Worlds’ position) or a “stream which *stores every* data unit ...” (Apple’s position). There are two differences in those positions—(1) “each” versus “every”; and (2) whether the construction should include the word “stores.”

27. As to (1), the claims recite “each,” which is a common term requiring no construction. *See, e.g.*, ‘227 patent, claims 1, 13 and 25 (“receiving *each* data unit received by or



generated by the computer system). There is simply no reason to substitute “every” for “each,” as Apple proposes.

28. As to (2), claims 1, 13 and 25 of the ‘227 patent do not specify that the main stream “stores” data units. The term “store” has several meanings in the field of computers and therefore should not be used in the construction of the term “main stream” without a good reason for doing so—which does not exist here. In particular, “store” is sometimes used to refer to the action of storing information on a physical medium, such as a hard disk drive. Other times it is used to refer to the action of placing information in a data structure in main memory or elsewhere. The data structure may have pointers, identifying, directly or indirectly, the location of the information on, for example, a physical disk drive or in memory (such as random access memory) or may have the actual information itself. Pointers are often used in data structures when the size of the information exceeds a relatively small number of bytes.

29. To the extent that Apple is asserting that the actual information comprising the data units must be placed in the data structures comprising the main stream, in my opinion, that would be contrary to the understanding of one of ordinary skill in the art. The main stream described in the Mirror Worlds Patents comprises various data structures, such as chronological indicators (discussed below). A person of ordinary skill in the art would not understand the Mirror Worlds Patents to require that the main stream data structures actually contain the information comprising the data units, but instead would understand that they may contain pointers to data physically stored elsewhere. For example, the Mirror Worlds Patents describe an implementation of the invention that is built on top of a conventional operating system, such as DOS, Windows and Operating System 7. It would be quite clear to one of ordinary skill in the art that such an implementation would involve utilizing pointers that identify documents stored

in the file system of the underlying operating system. Thus, including “stor[ing]” in the construction of “data unit,” as Apple proposes, may lead to confusion.

30. Claim 2 of the ‘313 patent is a dependent claim that recites a step of “storing said documents as a main stream.” In my opinion, one of ordinary skill in the art would understand this step to mean that the data structures comprising the main stream include information regarding the location of respective documents in the stream, as described above.

**d. “substream”**

31. Claims 1, 13 and 25 of the ‘227 patent and claim 2 of the ‘313 recite a “substream.” One of ordinary skill in the art would understand that a “substream” refers to a subset of data units, or documents, yielded by a filter on a stream, the filter identifying certain documents within the stream.

32. I understand that the parties have agreed in large part to the construction of “substream,” except that Mirror Worlds proposes that the construction should be “a subset of data units, or documents, yielded by a filter on a stream, the filter identifying certain documents within the stream,” whereas Apple adds the lead-in phrase “*a stream that is* a subset ...” In my opinion Apple’s additional phrase is superfluous. In addition, since a stream and substream may be implemented differently in software—a substream containing information necessary to act as a filter on a stream—it is cleaner and clearer to separate the two for definitional purposes.

**e. “time-ordered stream”**

33. Claim 1 of the ‘999 patent recites a “time-ordered stream.” Based on the plain language of that claim, one of ordinary skill in the art would understand that “time-ordered stream” refers to a displayed stream in which the elements are arranged in time order. In particular, claim 1 of the ‘999 patent recites “*displaying* browse cards related to respective

information assets *in a time-ordered stream.*” The claim language, thus, plainly refers to the *display* being time-ordered, as opposed to some other order.

**f. “stream-based operating system” and “document stream operating system”**

34. Claim 1 of the ‘427 patent recites a “stream-based operating system” and claim 25 of the ‘427 patent and claim 1 of the ‘313 patent recite a “document stream operating system.” One of ordinary skill in the art would understand both those terms to refer to an operating system that includes support for streams. The specifications of the Mirror Worlds Patents repeatedly refer to the system described therein as a “document stream operating system.” *See, e.g.,* ‘227 Patent, Abstract; col. 1, lines 1-10; col. 2, line 6; col. 2, line 13 - col. 3, line 29; col. 4, lines 1-13; col. 14, lines 38-51. Indeed, the title of the ‘313 patent is “Document Stream Operating System” and the title of the ‘427 patent is “Document Stream Operating System With Document Organizing and Display Facilities,” which further confirms that the term “document stream operating system” is meant to generally refer to a system of the type described in the Mirror Worlds Patents—namely, an operating system that includes support for streams. A “stream-based operating system” is the same as a “document stream operating system.”

35. I understand that Apple has construed “stream-based operating system” and “document stream operating system” to mean “a non-hierarchical operating system in which, as each document is presented to the operating system, the document is placed according to a time indicator in the sequence of documents already stored relative to the time indicators of the stored documents.” I disagree with that construction. The claims containing those terms recite the relevant limitations that apply to those terms in each respective claim. Moreover, to the extent the Apple is implying that those terms cannot apply to systems that utilize or are built on top of conventional hierarchical operating systems, that would be wrong. The Mirror Worlds Patents

clearly describe implementing a document stream operating system utilizing a conventional operating system. *See, e.g.*, col. 14, lines 44-51.

**g. “timestamp to identify”**

36. Claims 1, 13 and 25 of the ‘227 patent recite a “timestamp to identify.” One of ordinary skill in the art would understand that term to refer to a time-based identifier.

37. As described and claimed in the Mirror Worlds Patents, a timestamp is associated with each data unit and identifies the data unit. *See, e.g.*, ‘227, col. 4, lines 35-47, col. 7, lines 39-63, col. 15, line 20, col. 16, line 18, and col. 17, lines 33-34.

38. I understand that Apple proposes that this term be construed to be a “date and time value that uniquely identifies each document.” In my opinion, one of ordinary skill in the art would understand that, while the timestamp is based on time, it may be unsuitable as an identifier based on its date and time value alone. For example, the Mirror World Patents describes how a user can create a future data unit, such as a calendar item, by setting the time to the future, which in turn will create a future timestamp for the data unit. *See, e.g.*, ‘227 patent, col. 7, lines 39-60. One of ordinary skill in the art would understand that a user might easily set the date and time to the same value for more than one document and that therefore the date and time alone cannot serve as a unique identifier. In that case, further information must be used in addition to the date and time in order to identify data units. Similarly, depending on the clock resolution, more than one data unit may receive the same date and time value and a document received from another computer may have the same date and time value as another data unit. One of ordinary skill in the art would also understand that timestamps, as frequently used in various software applications, identify data items on the basis of timestamps based on the date and time plus additional information.

**h. “including each data unit according to the timestamp in the respective chronological indicator in the main stream”**

39. Claims 1, 13 and 25 of the ‘227 patent recite “including each data unit according to the timestamp in the respective chronological indicator in the main stream.” That phrase is self-explanatory and requires no construction. It means including each data unit in the main stream, ordered according to the time stamp in the respective chronological indicator. In other words, each data unit is included in the main stream based on the timestamp in the data unit’s respective chronological indicator. As used in the Mirror Worlds Patents, a “chronological indicator” is simply a data structure that contains a timestamp.

40. I understand that Apple proposes that the above phrase be construed to mean storing each document in the main stream in the location required by its identifying timestamp. Apple’s proposed construction, however, departs from the plain language of the claim and, in my opinion is confusing and incorrect. As I explained above, the term “store,” or “storing,” has several meanings in computers, depending on its context. Insofar as Apple’s proposed construction refers to “storing” a document in a particular “location,” it appears to use “storing” to mean storing at a physical location (such as a location on a disk drive). The main stream, however, is implemented using software and related data structures and the physical location of the documents is transparent to the user and irrelevant. From a software implementation viewpoint, the time ordering of documents in the main stream can be implemented in many different ways. One such way is using an index.

**i. “abbreviated form” or “abbreviated version(s)”**

41. Claim 20 of the ‘227 patent recites “abbreviated form” and claim 29 of the ‘227 patent, claims 1 and 9 of the ‘313 patent, and claims 5, 13, 22, 29 and 37 of the ‘427 patent recite “abbreviated version” or “abbreviated versions.” Those phrases are self-explanatory and require

no construction. They mean, simply, a form or version that is less than the full form or version—*i.e.*, abbreviated.

42. I understand that Apple proposes that the above phrases be construed to mean “a shortened version of the content to be displayed from the data unit or document.” In so doing, Apple simply substitutes a long phrase (“shortened version of the content to be displayed from the data unit or document”) for a straightforward term (“abbreviated”). It does not clarify the meaning of “abbreviated,” which is a common term.

**j. “controlling” operating system**

43. Claims 8 and 16 of the ‘427 patent recite a “controlling operating system.” The meaning of that phrase is clear from the plain claim language and refers to an operating system that utilizes subsystems from another operating system. In particular, claims 8 and 16 of the ‘427 patent recite, more fully, a “controlling operating system *utilizing subsystems from another operating system.*” One of ordinary skill in the art would understand that this claim language identifies an operating system as “controlling” precisely because it utilizes subsystems from another operating system.

44. I understand that Apple proposes that the above phrase be construed to mean “an operating system that controls another operating system.” But that does not answer the question as to what it means to “control[] another operating system.” It is not necessary to answer this question because the claim explains exactly what is meant in the subsequent text of the claim.

**k. “archiving”**

45. Claims 1 and 9 of the ‘313 patent and claims 1 and 8 of the ‘427 patent recite “archiving.” One of ordinary skill in the art would understand that archiving refers to copying documents to a secondary storage medium.

46. I understand that Apple proposes that “archiving” be construed to mean “moving from immediately-accessible storage to long-term storage.” By using the term “moving,” Apple appears to imply that the original version of the document in “immediately accessible storage” must be deleted. I disagree. Archiving has to do with creating copies of files typically for long-term storage. While a program or person who engages in archiving may or may not subsequently delete the original files, the essence of archiving is the copying. Well known archiving utilities, such as *arj* in the Windows operating system and the *tar* command in the Unix operating system, leave it to the user to decide whether the original file shall be deleted or not. While an example of archiving described in the Mirror Worlds Patent involves moving files to long-term storage, the term archiving is not limited to that example.

**I. “glance views”**

47. Claims 1 and 9 of the ‘313 patent and claims 1, 8 and 16 of the ‘427 patent recite “glance view(s).” One of ordinary skill in the art would understand that a glance view refers to an abbreviated presentation of a document. For example, as described in the Mirror Worlds Patents, a glance view helps a user identify a document by providing the user information regarding the document’s contents. (*See, e.g.,* ‘227, col. 7, line 64-col. 8, line 10; *see also* ‘227, col. 6, lines 32-36).

48. I understand that Apple proposes that “glance view” be construed to mean “a different graphical representation of a document that appears when a document representation is touched by the cursor or pointer and provides additional information about the document.” I disagree with that construction.

49. First, there is no requirement that a “glance view” must be a “different graphical representation”—which I take to mean a graphical representation of a document that is different

from the graphical representation displayed for that document in the stream view. The purpose of the glance view is to help the user identify a document. There is no requirement that it be different from the stream view document representation for that document. For example, in Fig. 1 of the '227 patent, the glance view is shown to the side of the graphical depiction of the stream. One of ordinary skill in the art would understand that the glance view may be identical to the document representation in the stream view, and would be useful, for example, in displaying in its entirety information that is partially obscured in the graphical depiction of the document representation in the stream.

50. Second, the phrase “provides additional information about the document” in Apple’s construction appears to mean information in addition to the information provided in the stream view document representation for that document. I disagree for the reasons I explained immediately above.

51. Third, the phrase “that appears when a document representation is touched by the cursor or pointer” is not part of the construction of “glance view,” but instead relates to other claim language. For example, claim 1 of the '427 patent recites “display[ing] a glance view of a document whose document representation is currently touched by the cursor or pointer.” Certainly then, “glance view” should be construed independently so as not to confuse it with other claim language that recites a circumstance in which a glance view may be displayed. Apple’s construction renders the other claim language superfluous.

**m. “receding foreshortened stack”**

52. Claims 1 and 9 of the '313 patent and claims 1, 10, 18 and 25 of the '427 patent recite a “receding, foreshortened stack.” One of ordinary skill in the art would understand that a “receding, foreshortened stack,” refers to a representation of a stack that uses perspective to



create the illusion of increasing distance from the viewpoint implied by the image. The claims simply use the commonly understood meaning of the terms “receding” and “foreshortened.” *See, e.g.,* Random House Webster’s Unabridged Dictionary, Second Edition, 2001 (“foreshorten”: “to reduce or distort (parts of a represented object that are not parallel to the picture plane) in order to convey the illusion of three-dimensional space as perceived by the human eye: often done according to the rules of perspective.”; “recede”: “(of a color, form, etc. on a flat surface) to move away or be perceived as moving away from an observer, esp. as giving the illusion of space.”); The American Heritage College Dictionary, Third Edition, 1993 (“foreshorten”: “To shorten the lines of (an object) in a drawing or other representation so as to produce an illusion of projection or extension in space.”; “recede”: “To become or seem to become fainter or more distant.”).

53. I understand that Apple asserts that “receding, foreshortened stack” should be construed to mean “a stack where the document representations get smaller, and appear farther from the surface of the screen, toward the bottom of the stack.” While Apple’s construction provides one example of a receding, foreshortened stack, the claim term is not limited to that specific example.

**n. “archiving the documents and indicators in consistent format for selective retrieval”**

54. Claims 1 and 8 of the ‘427 patent recite “archiving the documents and indicators in consistent format for selective retrieval.” That phrase is self-explanatory and requires no construction. It means what the words say—archiving documents and indicators in a consistent format that enables uniform selective retrieval of the documents. The “indicators” are data structures that contain information about the documents. Thus, this claim language refers to maintaining in an archive, in a consistent format, information about the archived documents,

including information about the content of those documents, so that the documents can later be selectively retrieved.

55. I understand that Apple proposes that the above phrase be construed to mean “archiving the documents and indicators in a consistent format rather than the diverse formats appearing in conventional directories and subdirectories of files.” I disagree with that construction. First, it ignores the “for selective retrieval” language. Second, to the extent that it could be read to mean that the contents of files containing data in different formats be converted to the same format (such as a file containing audio data being converted to the same format as an email), that does not make sense. The Mirror Worlds Patents do not describe converting documents to such a universal data format, nor would such a universal format have been known to one of ordinary skill in the art. It is the information about the documents, not the documents themselves, that is in a consistent format in order to aid in selective retrieval of those documents. Of course, the information about the documents would also identify the corresponding document. In that sense, both the information about the documents and the documents themselves are stored in a consistent format.

**o. “complex analysis”**

56. Claims 7, 15, 24, 31 and 39 of the ‘427 patent recite “complex analysis.” One of ordinary skill in the art would understand that this refers to “analysis involving the form, content and/or type of a document.” The claims, in particular, recite a glance view comprising “important words, pictures, and/or sounds of the respective document resulting from *complex analysis* of the document.” Whether complex analysis is required depends on whether such words, pictures and/or sounds can be displayed using non-complex techniques—such as header stripping to display the first non-trivial words in a document. (*See* ‘227, col. 8, lines 5-10).

57. I understand that Apple proposes that “complex analysis” be construed to mean “analysis of the content of a document that allows selection of important words, pictures, and/or sounds in the document.” I disagree with that construction. The claims do not require that complex analysis select “important words, pictures, and/or sounds”—but instead that complex analysis be performed so that such “important words, pictures, and/or sounds” may be presented in the glance view.

**p. “enterprise information management system”**

58. Claim 1 of the ‘999 patent recites an “enterprise information management system.” One of ordinary skill in the art would understand that enterprise information management system refers to a system that manages information for an enterprise or organization. Indeed, the ‘999 patent, which is entitled an *Enterprise, Stream-Based, Information Management System*, generally describes such a system for managing information for an enterprise or organization. *See, e.g.*, ‘999 patent, col. 8, lines 21-44; col. 10, lines 40-50; col. 12, lines 3-62; col. 14, lines 19-67; col. 15, lines 47-60; col. 16, lines 5-10.

59. I understand that Apple proposes that “enterprise information management system” be construed to mean “a system with a client-server architecture, a multi-computer, multi-node, high volume server, and a number of clients in the order of hundreds, rather than tens.” Neither the ‘999 patent nor its file history support such a narrow construction of “enterprise information management system.” In my opinion, one of ordinary skill in the art would not understand the term to be restricted in the manner asserted by Apple.

60. I have reviewed the deposition testimony of Dr. Gelernter, which apparently is where Apple derives its proposed construction. I do not understand Dr. Gelernter’s testimony to

be restrictive, but rather an attempt to answer a question by providing example implementations of enterprise information management systems.

**q. “document object model”**

61. Claim 1 of the ‘999 patent recites a “document object model.” One of ordinary skill in the art would understand that a document object model refers to a consistent structure containing information about information assets of diverse types, created by diverse software. Indeed, the ‘999 patent generally describes document object models as being created for “all types of different documents or items of information,” having different, even unknown, formats. *See, e.g.*, ‘999 patent, col. 3, lines 30-36; *see also* col. 5, lines 6-67. In addition, the ‘999 patent describes examples of the types of information about an information asset that may be contained in a document object model. *See, e.g.*, ‘999 patent, col. 3, lines 36-43; *see also* col. 5, lines 6-67.

62. I understand that the parties basically agree to the construction of “document object model,” but that Apple proposes including in the construction examples of items that may be stored in the document object model. Such examples are not limiting and are, therefore, unnecessary verbiage that, in my opinion, should not be part of the construction.

**r. “means for generating a main stream of data units...the main stream for receiving each data unit received by or generated by the computer system”**

63. Claims 1 and 27 of the ‘227 patent recite “means for generating a main stream of data units...the main stream for receiving each data unit received by or generated by the computer system.” I understand that I must consider whether certain claim terms at issue this case should be construed according to the provisions of 35 U.S.C. §112, ¶6, which states:

“An element in a claim for a combination may be expressed as a means or step for performing a specified function *without the recital of structure, material, or acts in support* thereof, and such claim shall be construed *to cover the corresponding structure,*

*material, or acts described in the specification and equivalents thereof.”*

I also understand that terms that are subject to 35 U.S.C. §112, ¶6 are sometimes referred to as “means-plus-function” elements or limitations, and I use that terminology in this declaration.

64. One of ordinary skill in the art would not construe the “means for generating a main stream of data units ...” as a means-plus-function limitation, because the main stream is a data structure, which in itself, supports the function recited in the claim. In particular, one of ordinary skill in the art would understand that, in software, generating an item that is a data structure involves generating an instance of that data structure—an action that is well understood in the art and does not require an algorithm. The Mirror Worlds Patents, for example, explain that “[a] stream is a data structure...,” and, as recited, for example, in claim 1 of the ‘227 patent, for each data unit that is received by or generated by the computer system, another data structure, a chronological indicator, is added to the main stream. *See, e.g.*, ‘227 patent, col. 13, line 50 and claim 1 (col. 15, lines 12-15 and 22-26). Accordingly, the main stream is a data structure that is instantiated by executable code. Algorithmic steps to generate a main stream are not required.

65. I understand that Apple asserts that the “means for generating a main stream of data units” is a means-plus-function limitation. While I disagree, if it is interpreted in that manner, then the corresponding structure would be the computer hardware and executable code implementing a main stream of data units.

66. I also understand that Apple asserts that the structure corresponding to the “means for generating a main stream of data units” is “computer hardware and software that creates a main stream by linking every existing document in a computer system according to the uniquely identifying timestamp in the document’s chronological indicator using a data structure that can

be examined and to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation.” I disagree.

67. The claims recite a “means for generating a main stream of data units”—the additional phrase—“the main stream for receiving each data unit received by or generated by the computer system”—stating the intended purpose of the main stream. It is clear that other terms in claims 1 and 25 are responsible for populating the main stream with information about data units received by or generated by the computer system. Indeed, Apple’s identification of corresponding structure would subsume the following limitations of claims 1 and 25 and render them superfluous: “means for selecting a timestamp ...,” means for associating each data unit ..., “means for including each data unit ...,” and “means for maintaining the main stream ...”

**s. “means for generating ... at least one substream”**

68. Claims 1 and 27 of the ‘227 patent recite “means for generating ... at least one substream.” One of ordinary skill in the art would not construe the “means for generating at least one substream...” as a means-plus-function limitation because, as with the main stream discussed above, a substream too comprises a data structure. *See, e.g.*, ‘227 patent, col. 4, lines 48-61 and col. 5, lines 14-19. In this case, the data structure identifies data units within the main stream. *See, e.g.*, ‘227 patent, col. 5, lines 14-19.

69. I understand that Apple asserts that the “means for generating ... at least one substream” is a means-plus-function limitation. While I disagree, if it is interpreted in that manner, then the corresponding structure would be computer hardware and executable code implementing substreams—*i.e.*, computer hardware and executable code that creates an instance of data structures associated with a substream.

70. I also understand that Apple asserts that the structure corresponding to the “means for generating ... at least one substream” is “computer hardware and software that runs a search of a stream using a boolean attribute and keyword expression or a ‘chronological expression’ and generates another stream having the results of the search, using a data structure that can be examined and to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation” I disagree.

71. The claims recite a “means for generating ... at least one substream,” which as explained above is an instance of a data structure that, when populated, will identify data units within the main stream. The additional phrase—“each substream for containing data units only from the main stream”—states the intended purpose of a substream rather than its structure. In my opinion, the software that populates the substream, such as the examples cited by Apple, are not required to generate the substream

72. In addition, even if the function of the “means for generating ... at least one substream” is construed to include populating a substream data structure, I disagree with Apple’s assertion that “using a data structure that can be examined and to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation,” is required to perform that function.

73. I also disagree with Apple’s assertion that the only ways of performing that function is “run[ning] a search of a stream using a boolean attribute-and keyword expression or a ‘chronological expression.’” The specifications, for example, also describe the use of a filter to select the data units in a substream. *See, e.g.*, ‘227 patent, col. 3, line 62-col. 4, line 2, col. 5, lines 6-10, 11-13. The specifications also describe other ways of selecting data items in a substream. *See, e.g.*, ‘227 patent, col. 8, lines 26-30.

74. I also disagree with Apple's construction, to the extent it may be read to imply that substreams must have the same data structure as, *e.g.*, the main streams.

**t. "means for receiving data units from other computer systems"**

75. Claim 1 of the '227 patent recites "means for receiving data units from other computer systems." The structure in the specifications that corresponds to this limitation is computer hardware and executable code that receives data units from other computer systems over a network connection. One of ordinary skill in the art would understand that any type of networked connection over which data units can be received is within the scope of the specifications. *See, e.g.*, '227 patent, col. 2, line 62 - col. 3, line 12; col. 3, line 62 - col. 4, line 5; col. 4, lines 8-10, 39-40; col. 5, lines 8-11; col. 6, lines 8-11; col. 11, lines 44-56; col. 12, lines 38-40, 51-52; col. 13, lines 17-18; col. 13, line 65 - col. 14, line 10; col. 14, lines 17-21, 37-51.

76. I understand that Apple asserts that the corresponding structure for this limitation is "computer hardware and software for receiving data from other computer systems through electronic mail, World Wide Web, the Internet, or copying from streams in another computer system." I disagree that the corresponding structure is limited to the specific networked connections identified by Apple. For example, the Mirror Worlds Patents also specifically mention receiving data units "from a client computer" ('227, col. 3, lines 11-12). More generally, the Mirror Worlds Patents provide that documents "can be created indirectly through the transfer operation" ('227, col. 4, lines 39-40, col. 11, lines 48-49) and that "every document send [sic] to a person" is included in the main stream ('227, col. 4, lines 8-10), from which it follows that receipt of a document over any type of networked connection is contemplated.



**u. “means for generating data units by the computer system”**

77. Claim 1 of the ‘227 patent recites “means for generating data units by the computer system.” The structure in the specifications that correspond to this limitation is executable code that creates data units. One of ordinary skill in the art would understand that any type of executable code that creates data units is within the scope of the specifications. *See, e.g.,* ‘227 patent, col. 4, lines 2-5; col. 4, lines 6-30; col. 4, lines 35-51; col. 5, lines 11-13; col. 5, lines 44-52; col. 5, line 53 - col. 6, line 7; col. 6, lines 8-11; col. 11, lines 44-56; col. 14, lines 17-21; col. 14, lines 37-51.

78. I understand that Apple asserts that the corresponding structure for this limitation is “computer hardware running conventional UNIX applications such as emacs, xv, and ghostview ..., or software that creates documents by either cloning an existing document and adding it to the main stream, or creating a new empty document and adding it to the main stream.” I disagree that the corresponding structure is limited to the specific examples identified by Apple. For example, the Mirror Worlds Patents also specifically mention that “users can continue to use the same conventional document types, viewers and *editors*,” from which it follows that any conventional “editor,” including other conventional word processing programs and any other program that is used to edit documents, is contemplated by the specifications. *See* col. 4, lines 4-5. The specifications also refer to “every document created,” including, but not limited to “pictures, correspondence, bills, movies, voice mail and software programs,” and many other types of documents. Software for generating those types of documents is also contemplated by the specifications. *See, e.g.,* col. 4, lines 6-30. Indeed, all types of software that generate data units are within the scope of the specifications. In addition, Apple’s inclusion of

the phrase "... and adding it to the main stream" is redundant, because the main stream's content has already been recited earlier in the claim.

**v. "means for selecting a timestamp to identify each data unit"**

79. Claim 1 of the '227 patent recites "means for selecting a timestamp to identify each data unit." If this term is interpreted as a means-plus-function limitation, then the corresponding structure is executable code that selects a timestamp for a data unit based on the present time or a time designated by the user. The '227 patent describes selecting a timestamp based on the present time at col. 4, lines 35-47, col. 7, lines 60-63. It also describes selecting a timestamp based on a time selected by a user at col. 7, lines 8-10 and 39-63, and col. 11, lines 57-64., and Figures 1, 4 and 5. The '227 patent still further describes selecting a timestamp for a data unit using agent software. In one particular example, a software agent determines an appropriate meeting time in the future. '227 patent, col. 10, lines 52-67. Figures 1, 4 and 5 of the '227 patent depict a user-adjustable time display shown in the upper right corner of Figure 1 and shown in further detail in Figures 4 and 5. Figure 4 also shows one example of how a present timestamp can be selected.

80. I also understand that Apple asserts that there is no structure in the specifications corresponding to this term. I disagree. As explained in the preceding paragraph, the '227 patent in fact describes structure for selecting a timestamp.

81. To the extent that Apple is arguing that the '227 patent does not disclose structure for *generating* a timestamp, I disagree. Generating a timestamp based on a particular time was well known, as explained above in connection with the term "timestamp to identify each data unit." In addition, persons of ordinary skill in the art understood that a timestamp may be based on information in addition to a date and time value. For example, the time resolution of

a clock may be insufficient to generate a unique date and time for each event and data units received from other computers may be associated with the same date and time value as data units created on the receiving computer. In addition, a user may select the same date and time value for more than one data unit. In any event, the function recited in this limitation is “selecting a timestamp to identify each data unit”, not generating the timestamp.

**w. “means for associating each data unit with at least one chronological indicator having the respective timestamp”**

82. Claim 1 of the ‘227 patent recites “means for associating each data unit with at least one chronological indicator having the respective timestamp.” One of ordinary skill in the art would not construe this term as a means-plus-function limitation, because the chronological indicator is a data structure. The association between a data unit and a chronological indicator is contained in the structure of the chronological indicator itself, or in another portion of the main stream’s data structure. Thus, this element is referring to structure.

83. I understand that Apple asserts that this term is a means-plus-function limitation. While I disagree, if it is interpreted in that manner, then the corresponding structure would be executable code implementing the main stream. The main stream is a data structure comprised of other data structures, including chronological indicators. Those data structures embody the association of each data unit with at least one chronological indicator.

84. I also understand that Apple asserts that the structure corresponding to this term is “computer hardware and software that associates a separate chronological indicator with every document received or generated by the computer system and puts the uniquely identifying timestamp for that document into the chronological indicator.” I disagree. If this term is interpreted as a means-plus-function limitation, the function is clearly associating each data unit with at least one chronological indicator having the respective timestamp. The function is

achieved by including in the data structure for the main stream (which includes the data structure of the chronological indicators within it) the association between each data unit and at least one chronological indicator. Apple's position departs from the plain claim language.

- x. **“means for associating each data unit with at least one chronological indicator having a respective timestamp which identifies the data unit”**

85. Claim 25 of the '227 patent recites “means for associating each data unit with at least one chronological indicator having a respective timestamp which identifies the data unit.” This term is identical to the term discussed immediately above from claim 1 of the '227 patent, except that it recites “a respective timestamp *which identifies the data unit,*” instead of simply “a respective timestamp.” However, claim 1 also specifies means for selecting a timestamp “to identify each data unit.” Accordingly, this term is no different from the term discussed immediately above and the comments there apply here too.

- y. **“means for including each data unit according to the timestamp in the respective chronological indicator in the main stream”**

86. Claims 1 and 25 of the '227 patent recite “means for including each data unit according to the timestamp in the respective chronological indicator in the main stream.” The structure in the specifications that corresponds to this limitation is executable code implementing the main stream. The main stream is a data structure comprising chronological indicators, which are also data structures. One way of including each data unit in the main stream according to the timestamp in the respective chronological indicator is via an index on the time-based information in the timestamp. The use of an index is described in the '227 patent at, for example, at col. 14, lines 5-6. The '227 patent also explains that “as each document is presented to the operating system, the document is placed according to a time indicator in the sequence of documents already stored relative to the time indicators of the stored documents. '227, col. 1, lines 6-10;

*see also* col. 7, lines 39-63. One of ordinary skill in the art would understand that there are various techniques for placing an item in a sequence of items. An index is one common technique for doing so.

87. I understand that Apple asserts that the structure corresponding to this term is “computer hardware and software that adds every document received or generated by the computer system into a main stream according to the uniquely identifying timestamp in the document’s chronological indicator using a data structure that can be examined and to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation.” I disagree, especially insofar as Apple identifies a data structure that is “to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation.” Those characteristics of the data structure are not necessary to perform the recited function. I also do not agree with Apple’s construction of “timestamp” for the reasons explained above.

**z. “means for maintaining the main stream and the substreams as persistent streams”**

88. Claims 1 and 25 of the ‘227 patent recite “means for maintaining the main stream and the substreams as persistent streams.” The structure in the specifications that correspond to this limitation is executable code that dynamically updates the main stream and executable code that dynamically updates substreams. The specifications describe persistent substreams as those allowed by a user to persist “until destroyed by the user.” While they persist, they operate dynamically and may collect new documents. *See, e.g.*, ‘227 patent, col. 5, lines 1-13. With respect to the main stream, the ‘227 patent explains that “every document created and every document send [sic] to a person is stored in the main stream.” ‘227, col. 4, lines 8-10. With respect to persistent substreams, the ‘227 patent explains that the substream “will collect new

documents that match the search criteria as documents arrive from outside the operating system or as the user creates the document” and that “[t]his dynamic operation provides automatic monitoring of information because the substream not only organizes the documents as received but also filters for incoming information.” ‘227 patent, col. 5, lines 1-8. The ‘227 patent also describes a specific implementation of persistent streams utilizing interrupts (*i.e.*, “block-at-the-end”). *See* ‘227 patent, col. 13, lines 50-64.

89. I understand that Apple asserts that the structure for maintaining the main stream as a persistent stream is “computer hardware and software that adds every document received or generated by the computer system into a main stream according to the uniquely identifying timestamp in the document’s chronological indicator using a data structure that can be examined and to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation.” I disagree. The function of the term “means for maintaining ...” is maintaining the main stream and the substreams as persistent streams. Apple’s proposal contains aspects that are not part of performing the recited function and, in some cases, relate to other claim terms—for example, Apple’s inclusion of “according to the uniquely identifying timestamp in the document’s chronological indicator” is not related to maintaining a stream as a persistent stream.

90. Also, I do not agree with Apple that the structure for this limitation should be limited to the specific example described in the ‘227 patent at col. 13, lines 50-64—in particular that the stream must be implemented “using a data structure that can be examined and to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation,” as Apple asserts. As explained above, the ‘227 patent describes the process of implementing a persistent main stream and persistent substreams. For example, for the main

stream, the '227 patent explains that “every document created and every document send [sic] to a person is stored in the main stream,” and, for substreams, the patent explains that the substream “filters for incoming information” that is to be added to the substream. '227, col. 4, lines 8-10 and col. 5, lines 1-8. In my opinion, the preceding is a sufficient description of the process of maintaining the main stream and substreams as persistent streams. The specific items cited by Apple (*e.g.*, a data structure that can be examined and to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation) are not required.

**aa. “means for displaying alternative versions of the content of the data units”**

91. Claim 6 of the '227 patent recites “means for displaying alternative versions of the content of the data units.” One of ordinary skill in the art would not construe this term as a means-plus-function limitation, since this term simply refers to and covers the display of alternative versions. “Means for displaying” are implicitly part of a computer system, and “alternative versions of the content of the data units” signifies what it says in plain language.

92. I understand that Apple asserts that this term is a means-plus-function limitation. While I disagree, if it is interpreted in that manner, then the corresponding structure would be browse cards/glance views.

93. I also understand that Apple asserts that the structure corresponding to this term is “computer hardware and software that displays the X Window System window shown in Fig. 1, including specifically the alternative version of a document shown as 100, which was created using ‘header stripping’ to identify the first non-trivial words in a document, or using complex analysis that identifies the ‘most important’ words, pictures, and/or sounds in the document.” I disagree. The means for *displaying* the alternative versions is simply the browse cards/glance

views, as shown, for example, in Figure 1 of the '227 patent. How that alternative version was *created*, which Apple purports to include in its identification of corresponding structure, is not relevant to *displaying* the alternative version.

**bb. “means for archiving a data unit associated with a timestamp older than a specified time point while retaining the respective chronological indicator and/or a data unit having a respective alternative version of the content of the archived data unit”**

94. Claim 9 of the '227 patent recites “means for archiving a data unit associated with a timestamp older than a specified time point while retaining the respective chronological indicator and/or a data unit having a respective alternative version of the content of the archived data unit.” One of ordinary skill in the art would not construe this term as a means-plus-function limitation, because the claim term itself sets forth the required, structural steps—namely, (1) archiving a data unit associated with a timestamp older than a specified time point, and (2) retaining the respective chronological indicator and/or a data unit having a respective alternative version of the content of the archived data unit. The plain language of the claim expresses clearly the actions to be taken.

95. I understand that Apple asserts that this term is a means-plus-function limitation. While I disagree, if it is interpreted in that manner, then the corresponding structure would be computer hardware and executable code implementing archiving of data units. An example of archiving is described in the '227 patent at, for example, col. 10, lines 16-33.

96. I also understand that Apple asserts that the structure corresponding to this term is “computer hardware and software that monitors remaining disk space, and when available space is low, automatically moves all documents older than some date from immediately accessible storage to cheaper, long-term storage, after asking the user to insert diskettes or other storage media if necessary.” I disagree. The '227 patent describes archiving data units “older than some



date d” (‘227 patent, col. 10, lines 16-18)—*i.e.* data units “associated with a timestamp older than a specified time point,” as recited in claim 9. The structure identified by Apple however, includes language relating to archiving documents based on available disk space. That is not required to perform the function recited in this term. Also, as explained above for the term “archiving,” archiving is an activity that was well understood by persons of ordinary skill in the art, and does not require “moving” rather than “copying.”

**cc. “means for operating on any of the streams using a set of operations selected by a user”**

97. Claim 10 of the ‘227 patent recites “means for operating on any of the streams using a set of operations selected by a user.” One of ordinary skill in the art would not construe this term as a means-plus-function limitation, because the claim itself recites the structure for performing the recited function. The set of user selectable operations, recited in the claim, is the structure for operating on any of the streams.

98. I understand that Apple asserts that this term is a means-plus-function limitation. While I disagree, if it is interpreted in that manner, then the corresponding structure would be executable code implementing user selectable operations on streams. User-selectable operations on streams are shown, for example, in Figures 1 (including, *e.g.*, the New, Clone, Freeze, Xfer Print and Find operations) and Figures 2 and 3 (including, *e.g.*, the Summarize, Archive, Remove, and Rename operations). User-selectable operations are also described in the ‘227 patent at, for example, col. 4, lines 31-67; col. 5, lines 20-42, col. 8, lines 11-25 and col. 9, lines 13-18.

99. I also understand that Apple asserts that the structure corresponding to this term is “computer hardware running software which is capable of performing any of the “new,” “clone,” “transfer,” “find,” “summarize,” “copy, merge, print, and freeze operations on a stream.” I

disagree. The means for operating on a stream using a set of operations selected by a user is not limited to the particular operations mentioned in the ‘227 patent. One of ordinary skill in the art would understand that the claimed means are the user-interface elements that enable a user to select operations on the stream—not the particular operations themselves.

**dd. “means to generate substreams from existing substreams”**

100. Claim 11 of the ‘227 patent recites “means to generate substreams from existing substreams.” The structure in the specifications that corresponds to this limitation is executable code implementing incremental substreams. This feature is described in the ‘227 patent at, for example, col. 7, lines 13-30 (“Semantically, this incremental substreaming amounts to a boolean ‘and’ of each new query with the previous substream’s query.”).

101. I understand that Apple asserts that the structure corresponding to this term is “computer hardware running software that runs a search of a substream using a Boolean attribute-and-keyword expression or a ‘chronological expression’ and generates another stream having the results of the search, using a data structure that can be examined and to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation.” I disagree. Apple identifies structure that is not required to perform the recited function. For example, “using a data structure that can be examined and to the extent possible manipulated by many processes simultaneously, and that supports the block-at-the-end operation.” That is not part of the structure for this term.

**ee. “means for generating a data unit comprising an alternative version of the content of another data unit”**

102. Claim 12 of the ‘227 patent recites “means for generating a data unit comprising an alternative version of the content of another data unit.” If this term is construed as a means-plus-function term, then the corresponding structure would be executable code implementing

alternative versions of data units. This feature is described in the '227 patent at, for example, col. 4, lines 35-39 and col. 6, lines 53-59 (describing the Clone operation) and col. 11, lines 49-50 (describing generating cloned documents as email reply messages).

103. I understand that Apple asserts that the structure corresponding to this term is “computer hardware and software that creates an alternative version of a document for use in archiving that remains in the computer system when the another document has been archived.” I disagree. This term is not limited to or tied to archiving. *See, e.g.*, '227 patent, col. 4, lines 35-39, col. 6, lines 53-59, and col. 11, lines 49-50.

**ff. “means for associating the alternative version data unit with the chronological indicator of the another data unit”**

104. Claim 12 of the '227 patent recites “means for associating the alternative version data unit with the chronological indicator of the another data unit.” If this term is construed as a means-plus-function term, then the corresponding structure would be executable code implementing alternative versions of data units. For example, a data unit generated by the Clone operation may be an alternative version data unit, comprising information associating that data unit with the chronological indicator of the original data unit. This feature is described in the '227 patent at, for example, col. 4, lines 35-39 and col. 6, lines 53-59 (describing the Clone operation) and col. 11, lines 49-50 (describing generating cloned documents as email reply messages).

105. I understand that Apple asserts that the structure corresponding to this term is “computer hardware and software that takes the chronological indicator associated with the another document and associates it with the alternative version data unit for use in archiving.” I disagree. Contrary to Apple’s position, this term is not limited to or tied to archiving. *See, e.g.*, '227 patent, col. 4, lines 35-39, col. 6, lines 53-59, and col. 11, lines 49-50.

**gg. “means for representing one or more data units of a selected stream on a display device as document representations ... the order of appearance of each data representation on the display device determined by the timestamp of the respective data unit”**

106. Claim 25 of the ‘227 patent recites “means for representing one or more data units of a selected stream on a display device as document representations ... the order of appearance of each data representation on the display device determined by the timestamp of the respective data unit.” The structure in the specifications that correspond to this limitation is the graphical stream view. This feature is shown in, for example, Figure 1 of the ‘227 patent.

107. I understand that Apple asserts that the structure corresponding to this term is “computer hardware and software that displays the X Windows System window shown in Fig. 1 and creates the necessary document representations.” I disagree. The function recited in this term relates to *representing* data units on a *display device* in a certain way related to the order of appearance. The graphical stream view itself, as displayed, for example, in Figure 1, is the means for performing that function.

**hh. “means for selecting which data units are represented on the display device by selecting one of the document representations and displaying document representations corresponding to data unit having timestamps within a range of a timepoint”**

108. Claim 25 of the ‘227 patent recites “means for selecting which data units are represented on the display device by selecting one of the document representations and displaying document representations corresponding to data unit having timestamps within a range of a timepoint.” If this term is construed as a means-plus-function term, then the corresponding structure would be the graphical stream view. The graphical stream view, as shown, for example, in Figure 1 of the ‘227 patent provides various means for selecting a document representation (which determines a timepoint), including a scroll bar, a cursor, a

pointer and a user-adjustable clock. *See, e.g.*, ‘227 Patent, Figs. 1, 4, 5; col. 3, lines 7-10; col. 6, lines 7-36; col. 7, lines 39-63; col. 9, lines 46 - col. 10, line 2; col. 14, lines 11-16. The graphical stream view then displays document representations within a range of the timepoint—for example, Figure 1 displays a range of document representations that comprise a segment of the entire stream.

109. I also understand that Apple asserts that there is no structure in the specifications corresponding to this term. I disagree. As just explained, the graphical stream view is the corresponding structure for this term.

- ii. **“means for selecting one or more of the document representations with a pointing device so that the data units represented by the selected document representations are further displayed with a second document representation comprising an alternative version of the respective data unit”**

110. Claim 25 of the ‘227 patent recites “means for selecting one or more of the document representations with a pointing device so that the data units represented by the selected document representations are further displayed with a second document representation comprising an alternative version of the respective data unit.” If this term is construed as a means-plus-function term, then the corresponding structure would be the graphical stream view. The graphical stream view, as shown, for example, in Figure 1 of the ‘227 patent provides various means for selecting document representations, including a scroll bar, a cursor, a pointer and a user-adjustable clock. *See, e.g.*, ‘227 Patent, Figs. 1, 4, 5; col. 3, lines 7-10; col. 6, lines 7-36; col. 7, lines 39-63; col. 9, lines 46 - col. 10, line 2; col. 14, lines 11-16. The graphical stream view then displays an alternate version of a selected document—for example, the browse card/glance view 100 as shown in Fig. 1.

111. I understand that Apple asserts that the structure corresponding to this term is “computer hardware, including a mouse and a video display screen, and software that (1) creates a 'glance' view of documents using header-stripping to include the first non-trivial words of the document, or using complex analysis to include the most important words, pictures and/or sounds, (2) receives input from the mouse and displays a mouse pointer on the display device so that the user can slide the mouse pointer over the displayed document representations; and (3) that displays the glance view of a document in response to the mouse pointer selecting that document by touching its document representation.” I disagree. As just explained, the graphical stream view is the corresponding structure for this term. Moreover, the creation of the glance view is a result of the action, not part of the corresponding structure. In addition, the selection of a document representation is not limited to, for example, the mouse and mouse pointer structure identified by Apple.

**jj. “document organizing facility”**

112. Claims 1, 8, 16 and 25 of the ‘427 patent recite the term “document organizing facility.” One of ordinary skill in the art would understand that the term refers to software that organizes documents. More specifically, in the software context, one of ordinary skill in the art would understand that the term “facility” refers to a software module or set of modules.

113. I understand that Apple argues that the term “document organizing facility” should be construed as a means-plus-function limitation. I disagree. As explained above, I believe that one of ordinary skill in the art would understand that the term “document organizing facility” connotes structure—namely, software that organizes documents. As such, in my opinion, this element does not simply recite a means for performing a function without the recital

of structure, which, I understand, must be the case for an element to be construed as a means-plus-function element.

### **III. THE APPLE PATENT**

#### **A. TECHNOLOGY OVERVIEW**

114. Apple's U.S. Patent No. 6,613,101 ("the Apple Patent or "the '101 patent") relates to a specific implementation of a so-called "desktop" metaphor in which folders (or directories) are replaced with "piles" that mimic physical piles of paper on a desk. In other words, a pile, as described in the '101 patent, is simply another way of presenting the contents of a folder to users. As described in the '101 patent, a "graphical iconic representation" of a pile is an icon depicting the entire pile.

#### **B. LEVEL OF ORDINARY SKILL IN THE ART**

115. Based on my experience, it is my opinion that a person of ordinary skill in the art of the Apple Patent would have a bachelor's degree in computer science, computer engineering or the equivalent, and 3-5 years of experience in the field of computer operating systems, or a post-graduate degree in computer science, computer engineering or the equivalent, and 1-2 years of experience in the field of computer operating systems.

#### **C. CLAIM CONSTRUCTION AND ANALYSIS**

##### **a. "means for displaying a graphical iconic representation of a collection of said first plurality of documents"**

116. Claim 5 of the '101 patent recites "means for displaying a graphical iconic representation of a collection of said first plurality of documents." The structure in the specification that corresponds to this limitation is executable code that displays the icon representing a collection of documents (*i.e.*, pile). This feature is described in the Apple patent at, for example, col. 6, line 65-col. 9, line 53; col. 13, lines 28-54; col. 3, lines 45-65 and the

following portions of the file history of U.S. Patent No. 6,243,724: Appeal Brief dated 3/20/96, pp. 6, 33, 34, 37; Appellant's Reply Brief, 6/28/96, p. 2; Decision on Appeal, 10/29/99, pp. 2, 23

- b. “means for displaying a first indicia of a first document of said collection by selecting a first position from said graphical iconic representation”**

117. Claim 5 of the '101 patent recites “means for displaying a first indicia of a first document of said collection by selecting a first position from said graphical iconic representation.” The structure in the specification that correspond to this limitation is executable code that initiates browsing of a pile after the cursor has been positioned over the iconic graphical representation of the collection of documents (pile) for a predetermined period of time and displays a first indicia of a first document of the collection (pile) by selecting a first position on the icon representing the collection. This feature is described in the Apple patent at, for example, col. 3, lines 22-26; col. 9, line 54 - col. 13, line 54; col. 16, line 65 - col. 17, line 2; and col. 27, lines 15-56; and shown in Figs. 4a-4f; 16.

- c. “means for displaying in series a second indicia of a second document and a third indicia of a third document by positioning said cursor first on a second position on said graphical iconic representation next on a third position on said graphical iconic representation”**

118. Claim 5 of the '101 patent recites “means for displaying in series a second indicia of a second document and a third indicia of a third document by positioning said cursor first on a second position on said graphical iconic representation next on a third position on said graphical iconic representation.” The structure in the specification that correspond to this limitation is executable code that displays in series a second indicia of a second document and a third indicia of a third document by positioning a cursor first on a second position on the icon representing the collection (pile) and next on a third position on the icon representing the collection (pile). This feature is described in the Apple patent at, for example, col. 3, lines 22-26; col. 9, line 54 - col.



13, line 54; col. 16, line 65 - col. 17, line 2; and col. 27, lines 15-56; and shown in Figs. 4a-4f; 16.

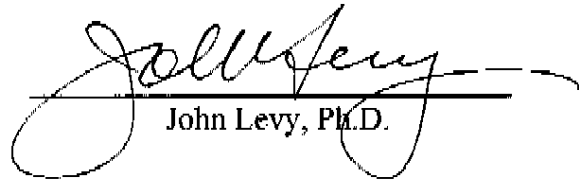
**d. “a graphical iconic representation of a collection of said first plurality of documents”**

119. Claims 1, 5 and 9 of the ‘101 patent recite “a graphical iconic representation of a collection of said first plurality of documents.” One of ordinary skill in the art would understand that this term refers to a small static picture representing a collection of documents. This feature is described in the Apple patent at, for example, ‘101, col. 6, line 65 - col. 7, line 1 (referring to “*graphical representations (e.g. icons) of the piles (or collections of documents) of the present invention*”; col. 7, lines 35-37 (referring to “a static graphical representation [of a pile], such as a typical icon used in computer systems having graphical interfaces”); *see also* col. 6, line 65 - col. 9, line 53; col. 13, lines 28-54; col. 13, line 55 - col. 14, line 22; col. 3, lines 45-65; as well as other portions of the Apple patent that generally relate to and describe the representation of piles; and the following portions of the file history of U.S. Patent No. 6,243,724: Appeal Brief dated 3/20/96, pp. 6, 33, 34, 37; Appellant’s Reply Brief, 6/28/96, p. 2; Decision on Appeal, 9/12/97, pp. 2 and 23. An icon is a common term in the art and refers to a small picture that is intended to represent something in a graphical user interface. *See, e.g., The Free On-line Dictionary of Computing*; retrieved September 22, 2009 (defining “icon” as “A small picture intended to represent something (a file, directory, or action) in a graphical user interface.”).

120. I understand that Apple proposes that this term be construed to mean “a collection of two or more document icons displayed together.” I disagree. Apple’s proposed construction overlooks the fact that the claim recites an “iconic representation” of a “collection ... of documents”—in other words, there must be an icon representing the collection. That requirement is missing from Apple’s construction.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on November 27, 2009 at Point Reyes Station, California.



John Levy, Ph.D.

**CERTIFICATE OF SERVICE**

I hereby certify that a copy of the foregoing document is being served this 27th day of November 2009 via email upon counsel for Apple at the following address:

[Mirror.Worlds.Apple.Service@weil.com](mailto:Mirror.Worlds.Apple.Service@weil.com).

/s/ Richard H. An

## John Levy, Ph.D. – Litigation Support Experience

### Summary of experience:

*Engaged as an expert* in 35 cases

*Court testimony* in six cases

*Deposition* in six cases

*Expert reports/declarations* in 9 cases

*Neutral advisor to Federal District Court* in 3 cases

Note: underlined engagements are currently active

### 2008-2009:

#### Mirror Worlds v. Apple 6:08-CV-88 LED

Patents related to stream-based information management

Role: expert for plaintiff Mirror Worlds

Status: pending

*Stroock & Stroock & Lavan, New York*

Joseph Diamante 212 806-5472

Ken Stein 212 806-5491

#### Xpoint Technologies v. Intel et al. 09-CV-0026 SLR

Patents related to recovery system for computers

Role: expert for plaintiff Xpoint Technologies

Status: in discovery

*Bernstein Litowitz Berger & Grossman, New York*

Chad Johnson 212 554-1396

*Sughrue Mion, Washington, DC*

William Mandir 202 663-7959

#### Synchrome Technology v. Pioneer Electronics (USA) et al. 1:09cv443

Patents related to tape backup device interfacing

Role: expert for plaintiff Synchrome Technology

Status: pending

*Steptoe & Johnson, Washington, DC*

R. Whitney Winston 202 429-3018

#### Convolve v. Compaq 00 Civ. 5141 (JSM)

Patents and trade secrets related to hard disk drive management

Role: testifying expert for defendant Compaq (HP); **expert report; deposition**

Status: MSJ filed

*Bartlit Beck Herman, Chicago*

Chris Landgraff 312 494-4477

Brian O'Donoghue 312 494-4402

#### Network Appliance v. Sun Microsystems 3:07-cv-06053-EDL

Patents related to storage networks

Role: expert for defendant Sun Microsystems; **testimony at tutorial and Markman hearing**

Status: Markman hearing completed

*DLA Piper, Washington, DC & Reston, VA*

Clayton Thompson 703 773-4143

**CCCC v. Intel**, C 05-01766 RMW (HRL)

Patent related to cache coherency in multiple-bus systems

Role: expert for defendant Intel, **expert report** for claim construction,  
**testimony** at tutorials in 2006 and 2008

Status: Motion for Summary Judgment granted with respect to non-infringement

*Morrison & Foerster, San Francisco, Palo Alto & Los Angeles*

Jim Bennett 415 268-7169

Karl Kramer 650 813-5775

Hector Gallegos 213 892-5255

**Chamberlain v. Overhead Door** 08-CV-3806

Patent related to garage door operator

Role: expert for defendant Overhead Door

Status: settled; **expert report & deposition**

*Latham & Watkins, Chicago*

Ken Schuler 312 876-7700

Kevin May 312 876-7677

**OPTi v. AMD et al.** 2:07-cv-278 TJW

Patents related to low-pin-count bus for PC

Role: consulting expert for defendant AMD

Status: pending

*Ropes & Gray, Palo Alto*

Gabrielle Higgins 650 617-4015

**PC Doctor v. Ultra-X**, CV06-1729 (GAF)

Patent related to USB bus testers

Role: expert for defendant Ultra-X

Status: settled

*Tingley Piontkowski, San Jose*

Bruce Piontkowski 408 283-7000

**McCabe v. Dell** CV06-7811 GAF

**Carideo v. Dell** C06-1772 JLR

Class actions related to putative PC failures

Role: consulting expert for defendant Dell

Status: unknown

*Reeves & Brightwell, Austin, TX*

Kim Brightwell 512 334-4502

**Ecompare v. Priceline.com** C07-00236 JW

Trade secrets related to software technology

Role: expert for defendant Priceline.com; **expert declaration**

Status: settled

*Sedgwick Detert Moran & Arnold, Los Angeles*

James Nelson 213 615-8084

**ProMOS Technologies v. Freescale Semiconductor** C06-788 (JJF)

Patents related to cache memories

Role: consulting expert on invalidity for defendant Freescale

Status: settled

*Jones Day, Cleveland, OH*

F. Drexel Feeling 216 586-7199

**Griffin v. Dell Canada** 06-CV-309738 CP

Class action related to putative computer failures

Role: expert for defendant Dell Canada; **expert declaration, deposition**; inspection of units

Status: pending

*Gowling Lafleur Henderson, Toronto*

Malcolm Ruby 416 862-4314

**Hitachi Global Storage Technologies v. Samsung Electronics** 9:06-cv-276 RHC

Patents related to hard disk design

Role: expert for plaintiff HGST; **expert declaration for claim construction**

Status: settled

*McDermott, Will & Emery, Washington, DC*

Michael Connelly 202 756-8037

**2006 - 2007:**

**Pub Util Dist No. 1 of Snohomish County, WA v. Black & Veatch Construction**

J A M S Arbitration no. 1160015776

Contract dispute related to design and installation of hardware and software

Role: **testimony** and **expert report** for respondent Black & Veatch

Status: arbitration ruling issued

*Husch & Eppenberger, Kansas City*

Leonard Wagner 816 283-4634

John Power 816 283-4651

**EchoStar v. TiVo**, 5:05-cv-81-DF-CMC

Patents related to video stream storage

Role: expert for plaintiff EchoStar

Status: patent re-exam pending

*Morrison & Foerster, Palo Alto*

Marc Pernick 650 813-5718

**2005-2006:**

**Gateway v. HP**, 04-cv-0613-B

Patent related to disk drive reserve area

Role: expert for defendant Hewlett-Packard

Status: settled; HP received \$47 million in cross-license agreement  
involving this patent and many others

*DLA Piper Rudnick Gray Cary, Palo Alto*

Brent Yamashita 650 833-2348

**LG Electronics v. FIC**, 2002 HC C No. 02150

(European) patent on memory controller

Role: expert for defendant FIC

Status: **expert report & rebuttal report** completed

*NautaDutilh NV, Amsterdam, The Netherlands*

Charles Gielen [Charles.Gielen@nautadutilh.com](mailto:Charles.Gielen@nautadutilh.com)

Maaïke de Jong [Maaïke.deJong@nautadutilh.com](mailto:Maaïke.deJong@nautadutilh.com)

**Chang v. SBC**, San Francisco Superior Unlimited Action No. CGC-04-434039

Personal injury suit on behalf of an ASIC design engineer

Role: testifying expert for plaintiff Chang, **deposition**

Status: settled

*Meisel & Krentsa, San Francisco,*

Andrew Meisel 415 788-2035

**SEC matter regarding Quovadx, Inc.**, HO-9822

Role: consultant related to software industry practice for beta test sites

Status: **expert declaration** submitted as part of response to Wells Notice

*Wilson, Sonsini, Goodrich & Rosati, Palo Alto*

Jared Kopel 650 493-9300

**[individual v. a major PC manufacturer]**

Potential class action suit related to alleged PC failures

Role: consultant for defendant [name withheld]; testing of PC units

Status: settled

*Morgan Lewis & Bockius, Philadelphia*

Barry McCoy 215 963-5896

**Measurement Computing v. National Instruments**, 03-10107REK (D. Mass)

Patent related to industrial control computer systems

Role: consultant for plaintiff Software

Status: settled

*Cesari & McKenna, Boston*

Martin O'Donnell 617 951-3046

Mike Reinemann 617 951-3060

**Micron v. Motorola**, A04-CA-007, A04-CA-390-LY

Patent related to ATA interface

Role: consultant for defendant Motorola

Status: settled

*Merchant & Gould, Atlanta & Minneapolis*

George Jordan 404 954-5088

Tom Strouse 612 336-4606

**Seagate Technology v. Atmel Corp.**, Santa Clara County Superior Court CV809883

Product liability related to putative EEPROM chip failures in disk drives

Role: expert for defendant Atmel; data-mining in failure analysis database; repair center visit

Status: settled

*Farella Braun + Martel, San Francisco, CA*

Nan Joesten 415 954-4415

Bob Holtzapfel 415 954-4939

## 2003-2004:

### **F5 Networks v. Radware, Inc.**, C03-688P

Patent related to web servers, cookies, http protocol, networking

Role: neutral expert (technical advisor to Court); tutorial for Court; attended Markman hearing

Status: settled after Markman hearing

*U.S. District Court, Western District of Washington, Seattle*

Hon. Marsha Pechman

### **Matsushita Kotobuki Electronics v. Maxtor & Quantum**, C03-05860 JF

Patents and trade secrets related to hard disk manufacturing

Role: expert for plaintiff MKE; factory visit to identify trade secrets

Status: settled; plaintiff received cash and patent rights in settlement

*Weil, Gotshal & Manges, New York* – Salvatore Romanello 212 310-8454

*Dewey Ballantine, New York* – Allan Garcia 212 259-6196

### **LG Electronics v. FIC et al.**, C01-01594 CW, C01-00326 CW

Patents on memory controller and multiprocessor cache

Role: testifying expert for defendants FIC and Asustek

Status: **expert report & deposition** completed; favorable ruling on summary judgment

*Squire, Sanders & Dempsey, Palo Alto*

Ronald LeMieux 650 320-1821 (Paul, Hastings, Janofsky & Walker)

Marc Sockol 650 815-2602 (Sheppard Mullin Richter & Hampton)

### **LG Electronics v. FIC et al.**, C01-01375 CW

Patents on memory controller and multiprocessor cache

Role: testifying expert for defendant Compal

Status: **expert report & deposition** completed; favorable ruling on summary judgment

*Orrick, Herrington & Sutcliffe, Menlo Park*

Kai Tseng 650 614-7688

Rowena Y. Young 650 614-7370

### **Brookhaven Typeset Services v. Adobe** C01-20813-RMW

Alleged misappropriation of software trade secrets and copyright infringement

Role: neutral expert (technical advisor to Court); report on “meet & confer” session

Status: pending

*U.S. District Court, Northern District of California, San Jose*

Hon. Ronald Whyte

### **Oak Technologies v. UMC**, 97-20959 RMW, C 97-21126 RMW

Patent on CD ROM controller chip

Role: neutral expert (technical advisor to Court); review of proposed Markman order

Status: pending

*U.S. District Court, Northern District of California, San Jose*

Hon. Ronald Whyte



**(no cases from 1989 to 1999)**

**1988:**

**NEC v. Intel Corp**, C-84-20799-WPG

Alleged copyright infringement of on-chip microcode

Role: consultant, **extensive pre-trial preparation** for plaintiff NEC

Status: completed; NEC won on 3 of 4 points regarding copyright

*Skjerven, Morrill, McPherson, Franklin & Friel, Santa Clara, CA*

Alan McPherson

**1986:**

**Seattle Computer Products v. Microsoft**

King County Superior Court, State of Washington 86-2-02195-7

Contract dispute involving sale and licensing of DOS operating system

Role: testifying expert for plaintiff SCP; **deposition** and **trial testimony**

Status: settled during jury deliberation; plaintiff received settlement of \$925,000

*Bogle & Gates, Seattle, WA*

J. Peter Shapiro *J.P.Shapiro@comcast.net*

**1978:**

**Digital Equipment Corp v. Microcomputer Systems Corp**

Patents on peripheral controller bus

Role: **percipient witness** as inventor for plaintiff Digital, **deposition** and **trial testimony**

U.S. District Court, Northern District of California, San Francisco

*Cesari & McKenna, Boston*

Martin O'Donnell 617 951-3046

## **Other Consulting Engagements – John Levy, Ph.D.**

### **American Automobile Association** (AAA of Northern California, Nevada & Utah)

Consulting on business and management issues related to IT projects and Agile software development

Mark Williams, Director, Market Capabilities - Sales & Market Development 415 565-2680

Craig Butler, VP, eBusiness 415 241-3277

### **Aceurity, Inc.** (semiconductor design & marketing for high-definition video consumer devices)

Consulting on intellectual property, business partnerships, hard disk storage, general business issues

Vijay Desai, CEO & CMO 510 673-7863

Pankaj Patel, CTO 408 888-3441

### **Reactrix Systems, Inc.** (designs and manufactures interactive video display systems)

Consulting on intellectual property strategy, evaluation of patent applications and competitive technology

Matthew Bell, Chief Scientist 650 400-6288

Peter Bardwick, CFO 415 385-4523

### **Pure Digital Technologies, Inc. [now part of Cisco Consumer Products]**

(designs and manufactures the Flip digital video camera)

Evaluation of patent applications and search for further patentable inventions;

Consultation for VP-Engineering on product development process and engineering organization

John Furlan, VP-Engineering 650-888-9942

Andre Neumann-Loreck, VP-Operations/Manufacturing 415 519-3954

### **Veritas Software Corporation**

Independent audit of a Cisco/IBM Storage Area Network software product, to determine compliance with a Cisco/Veritas contractual agreement

*Latham & Watkins, Chicago*

David Nelson 312 876-7700

### **Solidus Networks dba Pay By Touch**

Patent portfolio evaluation preparatory to an acquisition

Steve Zelinger (in-house counsel) 650 438-3434

## **JOHN LEVY, Ph.D.**

505 Mesa Road, Suite 1, P.O. Box 1419, Point Reyes Station, CA 94956  
415 663-1818 <http://johnlevyexpert.com> [info@johnlevvexpert.com](mailto:info@johnlevvexpert.com)

### **SUMMARY OF EXPERIENCE**

Dr. Levy is a technical leader in the computer, software and hard disk industry with over thirty years experience; his Ph.D. in Computer Science is from Stanford University.

His areas of expertise include:

- Bus design – system bus - local area network – LAN – bus bridge
- Standards - ATA – ATAPI – IDE - 1394 FireWire I-Link - SCSI - Futurebus
- Computer design – CPU – multiprocessor – cache – memory controller
- Hard disk - storage networks – SAN – NAS
- Internet protocol – http – cookies
- Software - firmware - embedded systems
- Operating systems - file systems – input/output – I/O controller
- Simulation - performance - benchmark

He is an inventor on seven patents and has authored several published technical papers. He has been disclosed as an expert witness in over 30 cases, has testified in deposition and at trial. He has been a technical advisor to two Federal District Court judges.

### **PROFESSIONAL EXPERIENCE**

**1999 to Present John Levy Consulting**  
**& 1982 to 1992 Management Consultant**

Management of engineering of computers, software and storage devices.  
General business consulting for small firms, both for-profit and nonprofit.  
Expert witness in intellectual property and contract dispute cases.

**1993 to 1998**                      **Quantum Corporation**  
Director, Systems Engineering

Hired and managed an engineering organization of 27 people; Made Quantum a leader in hard disk interface technology - ATA/33, /66, SCSI-160M; Developed software/hardware tools for firmware & system validation; Led disk drive performance enhancements in caching, system performance modeling & simulation, Windows 98/NT software drivers.

**1979 to 1982**                      **Apple Computer, Inc.**  
Engineering Supervisor

Hardware & firmware development of local area network, Lisa development team; design of hardware/firmware interpreter for Pascal p-machine.

## **JOHN LEVY, Ph.D.**

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415 663-1818 <http://johnlevyexpert.com> [info@johnlevyexpert.com](mailto:info@johnlevyexpert.com)

**1977 to 1979**                    **Tandem Computer, Inc.**  
Senior Engineer

Advanced development of next-generation multi-processor systems;  
work on rollback-recovery in distributed databases.

**1972 to 1977**                    **Digital Equipment Corp.**  
Consulting Engineer

Development of computer hardware & operating system software; I/O subsystems  
development; bus design for high-speed I/O channels and for minicomputer  
systems.

### **EDUCATION**

Ph.D., Computer Science, Stanford University, 1973

M.S., Electrical Engineering, California Institute of Technology, 1966

B. Engineering Physics, Cornell University, 1965

**LITIGATION RELATED EXPERIENCE** – Please see separate summary

### **PUBLICATIONS**

"If Extreme Programming is Good Management, What Were We Doing Before?"  
*EDN Magazine*, November 13, 2003.

"Twelve Things to Ask Your Software Development Team,"  
*ComputerWorld Online*, September 22, 2003.

"A File Structure for Non-Erasable Media," with Wayne Wang,  
*Ninth IEEE Symposium on Mass Storage Systems*, pp. 72-76, 1988.  
[also published as "An Operating System-Independent WORM File System" in  
*Software for Optical Storage*, Meckler Corp., 1989, pp. 23-54]

"Small Image Retrieval System," with Wayne Wang,  
*Ricoh Technical Report No. 16*, pp. 93-95, 1987.

"Buses, the Backbone of Computer Structures," chapter 11 of  
*Computer Engineering*, ed. by Bell et al., Digital Press, 1978.

"Computing with Multiple Microprocessors," (Ph.D. Thesis)  
*Stanford Linear Accelerator Center Report No. 161*, 1973

## JOHN LEVY, Ph.D.

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415 663-1818 <http://johnlevyexpert.com> [info@johnlevyexpert.com](mailto:info@johnlevyexpert.com)

### U.S. PATENTS

<u>Patent Number</u>	<u>Year Issued</u>	<u>Title</u>
4,245,303	1981	Memory for Data Processing System with Command and Data Buffering
4,229,791	1980	Distributed Arbitration Circuitry for Data Processing System
4,232,366	1980	Bus for a Data Processing System with Overlapped Sequences
4,045,781	1977	Memory Module with Selectable Byte Addressing for Digital Data Processing System
4,007,448	1977	Drive for Connection to Multiple Controllers in a Digital Data Secondary Storage Facility
3,999,163	1976	Secondary Storage Facility for Data Processing Systems
3,911,400	1975	Drive Condition Detecting Circuit for Secondary Storage Facilities in Data Processing Systems

### PROFESSIONAL AFFILIATIONS & AWARDS

Association for Computing Machinery

Institute of Electrical and Electronics Engineers – Computer Society  
National Lecturer on bus design

Forensic Expert Witness Association

### UNIVERSITY-LEVEL TEACHING

#### University of San Francisco, Fromm Institute

2008 & 2006	The Digital Revolution in the Home
2009, 2007, 2005	Computers - the Inside Story
2006	High Tech Business in the Era of Globalization

#### San Francisco State University

1980-81	Computer Input/Output Architecture, upper-division course
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## **MATERIALS CONSIDERED IN PREPARING THIS DECLARATION**

1. United States Patent No. 6,006,227 (“the ‘227 patent”)
2. United States Patent No. 6,638, 313 (“the ‘313 patent)
3. United States Patent No. 6,725,427 (“the ‘427 patent”)
4. United States Patent No. 6,768,999 (“the ‘999 patent)
5. United States Patent No. 6,613,101 (“the ‘101 patent”)
6. Prosecution history for the ‘227 patent, including the references cited therein
7. Prosecution history for the ‘313 patent, including the references cited therein
8. Prosecution history for the ‘427 patent, including the references cited therein
9. Prosecution history for the ‘999 patent, including the references cited therein
10. Prosecution history for the ‘101 patent, including the references cited therein
11. Prosecution history for reexamination of the ‘227 patent, including the references cited therein
12. Prosecution history for reexamination of the ‘313 patent, including the references cited therein
13. Prosecution history for the reexamination of ‘427 patent, including the references cited therein
14. Prosecution history for the reexamination of ‘999 patent, including the references cited therein
15. Joint Claim Construction and Pre-Hearing Statement Pursuant to Patent Rule 4-3 as well as the extrinsic evidence cited therein
16. Apple’s P.R. 4-2 Disclosures
17. Mirror Worlds’ Preliminary Claim Construction and Extrinsic Evidence
18. Mirror Worlds’ Amended Disclosure of Asserted Claims and Preliminary Infringement Contentions under Patent Rule 3-1 and Disclosures Under Patent Rule 3-2 (including exhibits)
19. Defendant’s Amended Invalidity Contentions (including exhibits)
20. Apple Inc.’s Patent Local Rule 3-1 Disclosure of Asserted Claims and Preliminary Infringement Contentions

21. United States Patent No. 6,243,724

22. <http://linuxmanpages.com/man1/tar.1.php> and  
[http://linux.about.com/od/commands/l/blcmdl1\\_tar.htm](http://linux.about.com/od/commands/l/blcmdl1_tar.htm)

23. Information regarding ARJ