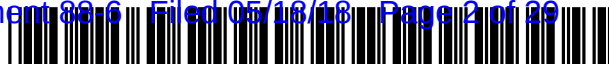


# EXHIBIT 6



US008677494B2

(12) **United States Patent**  
**Edery et al.**

(10) **Patent No.:** **US 8,677,494 B2**  
(45) **Date of Patent:** **\*Mar. 18, 2014**

(54) **MALICIOUS MOBILE CODE RUNTIME MONITORING SYSTEM AND METHODS**

(56) **References Cited**

(75) Inventors: **Yigal Mordechai Edery**, Pardesia (IL); **Nirmrod Itzhak Vered**, Goosh Tel-Mond (IL); **David R. Kroll**, San Jose, CA (US); **Shlomo Touboul**, Kefar-Haim (IL)

U.S. PATENT DOCUMENTS  
4,562,305 A 12/1985 Gaffney, Jr.  
5,077,677 A 12/1991 Murphy et al.  
(Continued)

(73) Assignee: **Finjan, Inc.**, Wilmington, DE (US)  
(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

FOREIGN PATENT DOCUMENTS  
EP 0636977 7/1994  
EP 1021276 7/2000  
(Continued)  
OTHER PUBLICATIONS

This patent is subject to a terminal disclaimer.

Zhong, et al., "Security in the Large: is Java's Sandbox Scalable?," *Seventh IEEE Symposium on Reliable Distributed Systems*, pp. 1-6, Oct. 1998.

(21) Appl. No.: **13/290,708**

(Continued)

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*Primary Examiner* — Christopher Revak  
(74) *Attorney, Agent, or Firm* — Bey & Cotropia PLLC

(65) **Prior Publication Data**  
US 2012/0117651 A1 May 10, 2012

(57) **ABSTRACT**  
Protection systems and methods provide for protecting one or more personal computers ("PCs") and/or other intermittently or persistently network accessible devices or processes from undesirable or otherwise malicious operations of Java TN applets, ActiveX™ controls, JavaScript™ scripts, Visual Basic scripts, add-ins, downloaded/uploaded programs or other "Downloadables" or "mobile code" in whole or part. A protection engine embodiment provides for monitoring information received, determining whether received information does or is likely to include executable code, and if so, causes mobile protection code (MPC) to be transferred to and rendered operable within a destination device of the received information. An MPC embodiment further provides, within a Downloadable-destination, for initiating the Downloadable, enabling malicious Downloadable operation attempts to be received by the MPC, and causing (predetermined) corresponding operations to be executed in response to the attempts.

**Related U.S. Application Data**

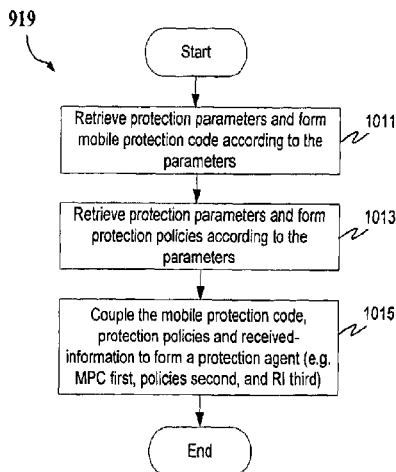
(63) Continuation of application No. 12/471,942, filed on May 26, 2009, now Pat. No. 8,079,086, which is a  
(Continued)

(51) **Int. Cl.**  
**H04L 29/06** (2006.01)  
**G06F 11/30** (2006.01)  
**G06F 15/16** (2006.01)

(52) **U.S. Cl.**  
USPC ..... **726/24**; 713/175

(58) **Field of Classification Search**  
None  
See application file for complete search history.

**18 Claims, 10 Drawing Sheets**



## US 8,677,494 B2

Page 2

## Related U.S. Application Data

continuation of application No. 11/370,114, filed on Mar. 7, 2006, now Pat. No. 7,613,926, which is a continuation of application No. 09/861,229, filed on May 17, 2001, now Pat. No. 7,058,822, which is a continuation-in-part of application No. 09/539,667, filed on Mar. 30, 2000, now Pat. No. 6,804,780, which is a continuation of application No. 08/964,388, filed on Nov. 6, 1997, now Pat. No. 6,092,194, said application No. 09/861,229 is a continuation-in-part of application No. 09/551,302, filed on Apr. 18, 2000, now Pat. No. 6,480,962, and a continuation of application No. 08/790,097, filed on Jan. 29, 1997, now Pat. No. 6,167,520.

(60) Provisional application No. 60/205,591, filed on May 17, 2000, provisional application No. 60/030,639, filed on Nov. 8, 1996.

(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,263,147 A 11/1993 Francisco et al.  
 5,278,901 A 1/1994 Shieh et al.  
 5,311,591 A 5/1994 Fischer  
 5,319,776 A 6/1994 Hile et al.  
 5,359,659 A 10/1994 Rosenthal  
 5,361,359 A 11/1994 Tajalli et al.  
 5,398,196 A 3/1995 Chambers  
 5,412,717 A 5/1995 Fischer  
 5,414,833 A 5/1995 Hershey et al.  
 5,440,723 A 8/1995 Arnold et al.  
 5,452,442 A 9/1995 Kephart  
 5,483,649 A 1/1996 Kuznetsov et al.  
 5,485,409 A 1/1996 Gupta et al.  
 5,485,575 A 1/1996 Chess et al.  
 5,524,238 A 6/1996 Miller et al.  
 5,572,643 A 11/1996 Judson ..... 709/218  
 5,579,509 A 11/1996 Furtney et al.  
 5,606,668 A 2/1997 Shwed  
 5,621,889 A 4/1997 Lermuzeaux et al.  
 5,623,600 A 4/1997 Ji et al.  
 5,623,601 A 4/1997 Vu  
 5,638,446 A 6/1997 Rubin  
 5,675,711 A 10/1997 Kephart et al.  
 5,692,047 A 11/1997 McManis  
 5,692,124 A 11/1997 Holden et al.  
 5,696,822 A 12/1997 Nachenberg  
 5,720,033 A 2/1998 Deo  
 5,724,425 A 3/1998 Chang et al.  
 5,740,248 A 4/1998 Fieres et al.  
 5,740,441 A 4/1998 Yellin et al.  
 5,761,421 A 6/1998 Van Hoff et al.  
 5,765,030 A 6/1998 Nachenberg et al.  
 5,765,205 A 6/1998 Breslau et al.  
 5,784,459 A 7/1998 Devarakonda et al.  
 5,796,952 A 8/1998 Davis et al.  
 5,805,829 A 9/1998 Cohen et al.  
 5,809,230 A 9/1998 Pereira  
 5,825,877 A 10/1998 Dan et al.  
 5,832,208 A 11/1998 Chen et al.  
 5,832,274 A 11/1998 Cutler et al.  
 5,850,559 A 12/1998 Angelo et al.  
 5,854,916 A 12/1998 Nachenberg  
 5,859,966 A 1/1999 Hayman et al.  
 5,864,683 A 1/1999 Boebert et al.  
 5,867,651 A 2/1999 Dan et al.  
 5,878,258 A 3/1999 Pizi et al.  
 5,881,151 A 3/1999 Yamamoto  
 5,884,033 A 3/1999 Duvall et al.  
 5,889,943 A 3/1999 Ji et al.  
 5,892,904 A 4/1999 Atkinson et al.  
 5,951,698 A 9/1999 Chen et al.

5,960,170 A 9/1999 Chen et al.  
 5,963,742 A 10/1999 Williams  
 5,964,889 A 10/1999 Nachenberg  
 5,974,549 A 10/1999 Golan  
 5,978,484 A 11/1999 Apperson et al.  
 5,983,348 A 11/1999 Ji  
 5,987,611 A 11/1999 Freund  
 6,070,239 A 5/2000 McManis  
 6,088,801 A 7/2000 Grecsek  
 6,088,803 A 7/2000 Tso et al.  
 6,092,194 A 7/2000 Touboul  
 6,125,390 A 9/2000 Touboul  
 6,154,844 A 11/2000 Touboul et al.  
 6,167,520 A 12/2000 Touboul  
 6,263,442 B1 7/2001 Mueller et al.  
 6,339,829 B1 1/2002 Beadle et al.  
 6,351,816 B1 2/2002 Mueller et al.  
 6,425,058 B1 7/2002 Arimilli et al.  
 6,434,668 B1 8/2002 Arimilli et al.  
 6,434,669 B1 8/2002 Arimilli et al.  
 6,480,962 B1 11/2002 Touboul  
 6,487,666 B1 11/2002 Shanklin et al.  
 6,519,679 B2 2/2003 Devireddy et al.  
 6,571,338 B1 5/2003 Shaio et al.  
 6,598,033 B2 7/2003 Ross et al.  
 6,643,696 B2 11/2003 Davis et al.  
 6,732,179 B1 5/2004 Brown et al.  
 6,804,780 B1 10/2004 Touboul  
 6,917,953 B2 7/2005 Simon et al.  
 7,058,822 B2 6/2006 Edery et al.  
 7,143,444 B2 11/2006 Porras et al.  
 7,210,041 B1 4/2007 Gryaznov et al.  
 7,308,648 B1 12/2007 Buchthal et al.  
 7,343,604 B2 3/2008 Grabarnik et al.  
 7,418,731 B2 8/2008 Touboul  
 7,613,926 B2 11/2009 Edery et al.  
 7,647,633 B2 1/2010 Edery et al.  
 8,079,086 B1 \* 12/2011 Edery et al. .... 726/24  
 2003/0014662 A1 1/2003 Gupta et al.  
 2003/0074190 A1 4/2003 Allison  
 2003/0101358 A1 5/2003 Porras et al.  
 2004/0073811 A1 4/2004 Sanin  
 2004/0088425 A1 5/2004 Rubinstein et al.  
 2005/0050338 A1 3/2005 Liang et al.  
 2005/0172338 A1 8/2005 Sandu et al.  
 2006/0031207 A1 2/2006 Bjarnestam et al.  
 2006/0048224 A1 3/2006 Duncan et al.  
 2008/0066160 A1 3/2008 Becker et al.  
 2010/0195909 A1 8/2010 Wasson et al.

## FOREIGN PATENT DOCUMENTS

EP 1091276 4/2001 ..... G06F 1/00  
 EP 1132796 9/2001  
 JP 08-263447 10/1996  
 WO 95/27249 10/1995  
 WO 95/33237 12/1995  
 WO 98/21683 5/1998  
 WO 2004/063948 7/2004  
 WO WO 2004/063948 7/2004 ..... G06F 17/30

## OTHER PUBLICATIONS

Rubin, et al., "Mobile Code Security," *IEEE Internet*, pp. 30-34, Dec. 1998.  
 Schmid, et al. "Protecting Data From Malicious Software," *Proceeding of the 18<sup>th</sup> Annual Computer Security Applications Conference*, pp. 1-10, 2002.  
 Corradi, et al., "A Flexible Access Control Service for Java Mobile Code," *IEEE*, pp. 356-365, 2000.  
 International Search Report for Application No. PCT/IB97/01626, 3 pp., May 14, 1998 (mailing date).  
 International Search Report for Application No. PCT/IL05/00915, 4 pp., dated Mar. 3, 2006.  
 Written Opinion for Application No. PCT/IL05/00915, 5 pp., dated Mar. 3, 2006 (mailing date).

(56)

**References Cited**

## OTHER PUBLICATIONS

International Preliminary Examination Report for Application No. PCT/IB01/01138, 2 pp., dated Dec. 19, 2002.

Sitaker, Kragen, "Rapid Genetic Evolution of Regular Expressions" [online], *The Mial Archive*, Apr. 24, 2004 (retrieved on Dec. 7, 2004), 5 pp., Retrieved from the Internet: <http://www.mail-archive.com/kragen-tol@canonical.org/msg00097.html>.

"Lexical Analysis: DFA Minimization & Wrap Up" [online], Fall, 2004 [retrieved on Mar. 2, 2005], 8 pp., Retrieved from the Internet: <http://www.owlnet.rice.edu/~comp412/Lectures/L06LexWrapup4.pdf>.

"Minimization of DFA" [online], [retrieved on Dec. 7, 2004], 7 pp., Retrieved from the Internet: <http://www.cs.odu.edu/~toida/nerzic/390teched/regular/fa/min-fa.html>.

"Algorithm: NFS -> DFA" [online], Copyright 1999-2001 [retrieved on Dec. 7, 2004], 4 pp., Retrieved from the Internet: [http://rw4.cs.uni-sb.de/~ganimal/GANIFA/page16\\_e.htm](http://rw4.cs.uni-sb.de/~ganimal/GANIFA/page16_e.htm).

"CS 3813: Introduction to Formal Languages and Automata—State Minimization and Other Algorithms for Finite Automata," 3 pp., May 11, 2003, Retrieved from the Internet: <http://www.cs.msstate.edu/~hansen/classes/3813fall01/slides/06Minimize.pdf>.

Watson, Bruce W., "Constructing Minimal Acyclic Deterministic Finite Automata," [retrieved on Mar. 20, 2005], 38 pp., Retrieved from the Internet: [http://www.win.tue.nl/~watson/2R870/downloads/madfa\\_algs.pdf](http://www.win.tue.nl/~watson/2R870/downloads/madfa_algs.pdf).

Chang, Chia-Hsiang, "From Regular Expressions to DFA's Using Compressed NFA's," Oct. 1992, 112 pp., [http://www.cs.nyu.edu/web/Research/Theses/chang\\_chia-hsiang.pdf](http://www.cs.nyu.edu/web/Research/Theses/chang_chia-hsiang.pdf).

"Products," Articles published on the Internet, "Revolutionary Security for a New Computing Paradigm" regarding SurfingGate™, 7 pp.

"Release Notes for the Microsoft ActiveX Development Kit," Aug. 13, 1996, [activex.adsp.or.jp/inetsdk/readme.txt](http://activex.adsp.or.jp/inetsdk/readme.txt), pp. 1-10.

Doyle, et al., "Microsoft Press Computer Dictionary," Microsoft Press, 2d Edition, pp. 137-138, 1993.

Finjan Software Ltd., "Powerful PC Security for the New World of Java™ and Downloadables, SurfingShield™," Article published on the Internet by Finjan Software Ltd., 2 pp. 1996.

Finjan Software Ltd., "Finjan Announces a Personal Java™ Firewall for Web Browsers—the SurfingShield™ 1.6 (formerly known as SurfingBoard)," Press Release of Finjan Releases SurfingShield 1.6, 2 pp., Oct. 21, 1996.

Finjan Software Ltd., "Finjan Announces Major Power Boost and New Features for SurfingShield™ 2.0," Las Vegas Convention Center/Pavillion 5 P5551, 3 pp., Nov. 18, 1996.

Finjan Software Ltd., "Finjan Software Releases SurfingBoard, Industry's First JAVA Security Product for the World Wide Web," Article published on the Internet by Finjan Software Ltd., 1 p., Jul. 29, 1996.

Finjan Software Ltd., "Java Security: Issues & Solutions," Article published on the Internet by Finjan Software Ltd., 8 pp. 1996.

Finjan Software Ltd., Company Profile, "Finjan—Safe Surfing, The Java Security Solutions Provider," Article published on the Internet by Finjan Software Ltd., 3 pp., Oct. 31, 1996.

"IBM AntiVirus User's Guide, Version 2.4," International Business Machines Corporation, pp. 6-7, Nov. 15, 1995.

Khare, R., "Microsoft Authenticode Analyzed" [online], Jul. 22, 1996 [retrieved on Jun. 25, 2003], 2 pp., Retrieved from the Internet: <http://www.xent.com/FoRK-archiv/smmer96/0338.html>.

LaDue, M., Online Business Consultant: Java Security: Whose Business is It?, Article published on the Internet, Home Page Press, Inc., 4 pp., 1996.

Microsoft, "Microsoft ActiveX Software Development Kit" [online], Aug. 12, 1996 [retrieved on Jun. 25, 2003], pp. 1-6, Retrieved from the Internet: [activex.adsp.or.jp/inetsdk/help/overview.htm](http://activex.adsp.or.jp/inetsdk/help/overview.htm).

Microsoft® Authenticode Technology, "Ensuring Accountability and Authenticity for Software Components on the Internet,"

Microsoft Corporation, Web Page Article "Frequently Asked Questions About Authenticode," last updated Feb. 17, 1997, printed Dec. 23, 1998, URL: <http://www.microsoft.com/workshop/security/authcode/signfaq.asp#9>, pp. 1-13.

Okamoto, E., et al., "ID-Based Authentication System for Computer Virus Detection," *IEEE/IEE Electronic Library online, Electronics Letters*, vol. 26, Issue 15, ISSN 0013-5194, Jul. 19, 1990, Abstract and pp. 1169-1170, URL: <http://iel.ihp.com:80/cgi-bin/iel.cgi?se...2ehts%26ViewTemplate%3ddocview%5fb%2ehts>.

Omura, J. K., "Novel Applications of Cryptography in Digital Communications," *IEEE Communications Magazine*, pp. 21-29, May 1990.

Zhang, X. N., "Secure Code Distribution," *IEEE/IEE Electronic Library online, Computer*, vol. 30, Issue 6, pp. 76-79, Jun. 1997.

D. Grune, et al., "Parsing Techniques: A Practical Guide," John Wiley & Sons, Inc., New York, New York, USA, pp. 1-326, 2000.

Scott, et al., "Abstracting Application-Level Web Security," *ACM*, pp. 396-407, 2002.

ThunderByte Antivirus for Windows.

InterScan VirusWall from Trend Micro.

VirusSafe from Eliashim.

Intel LANProtect from Intel.

The Java Security Manager from Sun Microsystems.

McAfee Web Shield.

McAfee WebScan.

McAfee VirusScan.

McAfee NetShield.

Dr. Solomon's Antivirus Toolkit for Windows 95.

Dr. Solomon's Antivirus Toolkit for Windows NT.

Dr. Solomon's WinGuard.

Dr. Solomon's Virus Guard.

Dr. Solomon's Virus Shield.

Dr. Solomon's Virex.

Dr. Solomon's "Merlin" Anti-Virus Engine.

Dr. Solomon's iMcAfee "Olympus" Anti-Virus Engine.

ActiveX Web Tutorial.

Java FAQ (1995-1998).

Norton AntiVirus TU for Windows@95 User's Guide. Published by Symantec in 1995. (179 pages).

Jaeger, et al., "Building Systems that Flexibly Control Downloadable Executable Content," *Proceedings of the Sixth USENIX UNIX Security Symposium*, Jul. 1996. (19 paQes).

Rasmusson, Andreas and Jansson, Sverker, "Personal Security Assistance for Secure Internet Commerce," Sep. 16, 1996. (12 pages).

Bharat et al. *Migratory Applications* Nov. 15, 1995. (10 oaoes).

Dean, Drew, et al., "Java Security: From HotJava to Netscape and Beyond," 1996 IEEE Symposium on Security and Privacy, May 6, 1996. (11 pages).

Sterbenz, Andreas, An Evaluation of the Java Security Model, • IEEE, Dec. 1996. f13pages).

Fritzing, J. Steven, et al., *Java Security*, • Sun Microsystems, Dec. 1996 (7 paQes).

Bank Joseoh A. "Java Security," Dec. 8, 1995. (14 paoes).

Claunch, "Java Blocking," <http://groups.google.com/group/muc.lists.firewalls/msg/2a5ec02e00a37071>. Sep. 25, 1996. Accessed date: May 10, 2011. (2 paces).

Chappell, •Understanding ActiveX and OLE: A Guide for Developers and Managers (Strategic Technology), Sep. 1, 1996, Microsoft Press. (91 pages).

Crosbie, et al., "Active Defense of a Computer System Using Autonomous Agents". Feb. 15, 1995. (14 pages).

"Trend Micro's Virus Protection Added to Sun Microsystems Netra Internet Servers," *Business Wire*, Oct. 1, 1996, available at <http://www.cs.indiana.edu/~kinzler/pubs/viruswall.html>.

"Symantec Announces Norton Antivirus 2.0 for Windows NT," Symantec Corporation press release, Sep. 16, 1996, available at [http://www.symantec.com/about/news/release/article.jsp?prid=19960916\\_01](http://www.symantec.com/about/news/release/article.jsp?prid=19960916_01).

"Dark Avenger Mutation Engine No Threat to Protected PCs," McAfee, Inc. press release, May 11, 1992, available at <http://>

(56)

**References Cited**

## OTHER PUBLICATIONS

"Dark Avenger Mutation Engine No Threat to Protected PCs," McAfee, Inc. press release, May 11, 1992, available at <http://securitydigest.org/virus/mirror/www.phreak.org/virus1/1992/vin105.191>.

Gryaznov, D.O., "Scanners of the Year 2000: Heuristics," Proceedings of the Fifth International Virus Bulletin Conference, pp. 225-234 (1995), available at <http://vxheavens.com/lib/adgOO.html>.

"Symantec Announces Norton Internet Email Gateway at Internet World—Booth # 369 on Dec. 11, 12, and 13," Symantec Corporation press release, Dec. 11, 1996, available at [http://iwww.symantec.com/about/news/release/article.jsp?prid=19961211\\_03](http://iwww.symantec.com/about/news/release/article.jsp?prid=19961211_03).

"Presenting Java," by John Dec. (1995).

"The Java Language Specification" by Gosling, et al. (1996).

"The Java Programming Language," by Ken Arnold and James Gosling (1996).

"The Java Virtual Machine Specification," by Tim Lindholm and Frank Yellin (1997).

"Computer Viruses and Artificial Intelligence," by David Stang (Sep. 1995).

"Java Security and a Firewall Extension for Authenticity Control of Java Applets," by Magnus Johansson (Jan. 29, 1997).

"Static Analysis of Programs With Application to Malicious Code Detection," by Raymond Lo (1992).

File History for U.S. Patent No. 6,804,780.

"Virus Detection Alternatives," by Patrick Min (Jul. 1992).

"Dynamic Detection and Classification of Computer Viruses Using General Behaviour Patterns," by LeCharlier, et al. (Sep. 1995).

The Giant Black Book of Computer Viruses by Mark Ludwig (1995).

HotJava: The Security Story.

The Java Filter.

"A Java Filter," by Balfanz, et al.

"Improved JavaScript and Java Screening Function," by Claunch (May 4, 1996).

"New Version of Java, JavaScript, ActiveX Screening," by Claunch (Jul. 3, 1996).

"A Toolkit and Methods for Internet Firewalls," by Ranum, et al.

"Identifying and Controlling Undesirable Program Behaviors," by Maria King.

"PACLI's: An Access Control List Approach to Anti-Viral Security," by Wichers, et al.

Endrijonas, Janet, Rx PC The Anti-Virus Handbook. Published in the U.S. in 1993 by TAB Books, a division of McGraw-Hill, Inc. (201 paQes).

"Secure Code Distribution," by X. Nick Zhang (Jun. 1997).

IBM AntiVirus User's Guide (Nov. 15, 1995).

"Breadth of Runtime Environments and Security Make Java a Good Choice for the Internet" (1996).

Omura, Jim K., "Novel Applications of Cryptography in Digital Communications," IEEE Communications Magazine, pp. 21-29, May 1990.

Okamoto, E., et al., "ID-Based Authentication System for Computer Virus Detection," IEEE/IEE Electronic Library online, Electronics Letters, vol. 26, Issue 15, ISSN 0013-5194, Jul. 19, 1990, Abstract and pp. 1169-1170, URL: <http://iel.ihs.com:80/cgibin/iel.cgi?se...2ehts%26View%3ddocview%5fb%2ehts>.

IBM AntiVirus User's Guide Version 2.4, International Business Machines Corporation, pp. 6-7, Nov. 15, 1995.

Leach, Norvin, et al., "IE 3.0 Applets Will Earn Certification," PC Week, vol. 13, No. 29, 2 pp., Jul. 22, 1996.

"Finjan Software Releases SurfinBoard, Industry's First JAVA Security product for the World Wide Web," Article published on the Internet by Finjan Software Ltd., 1 p., Jul. 29, 1996.

"Powerful PC Security for the New World of JAVATM and Downloadables, Surfin Shield™," Article published on the Internet by Finjan Software Ltd., 2 pp. 1996.

Microsoft® Authenticode Technology, "Ensuring Accountability and Authenticity for Software Components on the Internet,"

Finjan Announces a Personal Java™ Firewall for Web Browsers—the SurfinShield™ 1.6 (formerly known as SurfinBoard), Press Release of Finjan Releases SurfinShield 1.6, 2 pp., Oct. 21, 1996. Company Profile, "Finjan-Safe Surfing. The Java Security Solutions Provider." Article published on the Internet by Finjan Software Ltd., 3 pp., Oct. 31, 1996.

"Finjan Announces Major Power Boost and New Features for SurfinShield™ 2.0," Las Vegas Convention Center/Pavilion 5 P5551, 3 pp., Nov. 18, 1996.

"Java Security: Issues & Solutions," Article published on the Internet by Finjan Software Ltd., 8 pp., 1996.

"Products," Article published on the Internet, 7 pp.

Mark LaDue, "Online Business Consultant: Java Security: Whose Business Is It?," Article published on the Internet, Home Page Press, Inc., 4 pp., 1996.

Web Page Article, "Frequently Asked Questions About Authenticode," Microsoft Corporation, last updated Feb. 17, 1997, printed Dec. 23, 2998, URL: <http://www.microsoft.com/workshop/security/authcode/signfaq.asp#9>, pp. 1-13.

Zhang, X.N., "Secure Code Distribution," IEEE/IEE Electronic Library online, Computer vol. 30, Issue 6, pp. 76-79, Jun. 1997.

Binstock, Andrew, "Multithreading, Hyper-Threading, Multiprocessing: Now, What's the Difference?," <http://www.intel.com/cd/ids!dcvdoQcr!asmo-na/enfl/20456.htm>, Pacific Data Works, LLC, downloaded Jul. 7, 2008, 7 pp.

VirexPC Version 2.0 or later from Microcom.

AntiVirus Kit From 1 stAide Software.

FluShot+ Series of Products by Ross Greenberg.

Symantec Antivirus of the Mac version 3.0 or later.

"Synthesizing Fast Intrusion Prevention/Detection Systems From High-Level Specifications," by Sekar, et al. (1999).

Art of Computer Virus Research and Defense b Peter Szor (Feb. 2005).

"Process Execution Controls as a Mechanism to Ensure Consistency," by Eugen Bacic (1990).

"Process Execution Controls: Revisited," by Bacic (1990).

"A Flexible Access Control Service for Java Mobile Code," by Corradi, et al. (2000).

"Java Security: Issues & Solutions" (1996).

"Microsoft Authenticode analyzed," by Rohit Khare (Jul. 22, 1996).

"Java Security: Whose Business Is It?" by Mark LaDue (1996).

Microsoft Authenticode Technology (Oct. 1996).

"Mobile Code Security," by Rubin, et al.

"Protecting Data From Malicious Software," by Schmid, et al.

"Security in the Large: Is Java's Sandbox Scalable?" by Zhong, et al. (Apr. 1998).

"A Domain and type Enforcement UNIX Prototype," by Badger, et al. (Jun. 1995).

"Heuristic Anti-Virus Technology," by Frans Veldman.

"Standards for Security in Open Systems," by Warwick Ford (1989).

"Secure File Transfer Over TCP/IP," by Brown, et al. (Nov. 1992).

"Standards in Commercial Security," by Nick Pope.

"X.400 Security Features," by Tony Whyman.

"Using CASE Tools to Improve the Security of Applications Systems," by Hosmer, et al. (1988).

"Miro: Visual Specification of Security," by Heydon, et al. (Oct. 1990).

"An Evaluation of Object-Based Programming with Visual Basic," by Dukovic, et al. (1995).

"Visual Basic 5.0 Significantly Improved," by W. Dennis Swift (Jun. 1997).

"Development of an Object Oriented Framework for Design and Implementation of Database Powered Distributed Web Applications With the DEMETER Project as a Real-Life Example," by Goschka, et al. (1997).

Detecting Unusual Program Behavior Using the Statistical Component of the Nextgeneration Intrusion Detection Expert System (NIDES), by Anderson, et al. (May 1995).

"A Generic Virus Scanner in C++," by Kumar, et al. (Sep. 17, 1992).

"A Model for Detecting the Existence of Software Corruption in Real Time," by Voas, et al. (1993).

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