EXHIBIT 4

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US007613926B2

(12) United States Patent

Edery et al.

(54) METHOD AND SYSTEM FOR PROTECTING A COMPUTER AND A NETWORK FROM HOSTILE DOWNLOADABLES

- Inventors: Yigal Mordechai Edery, Pardesia (IL);
 Nimrod Itzhak Vered, Goosh Tel-Mond (IL); David R. Kroll, San Jose, CA (US); Shlomo Touboul, Kefar-Haim (IL)
- (73) Assignee: Finjan Software, Ltd, Netanya (IL)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 659 days.
 This patent is subject to a terminal disclaimer.
- (21) Appl. No.: 11/370,114
- (22) Filed: Mar. 7, 2006

(65) **Prior Publication Data**

US 2006/0149968 A1 Jul. 6, 2006

Related U.S. Application Data

- (63) Continuation of application No. 09/861,229, filed on May 17, 2001, now Pat. No. 7,058,822, and 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
- 6.480,962.
 Provisional application No. 60/205,591, filed on May 17, 2000.

(2006.01)

(51) Int. Cl. *G06F 21/24*

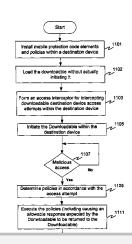
	G06F 11/30	(2006.01)
	H04L 9/00	(2006.01)
	G06F 15/16	(2006.01)
)		712/15

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

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,077,677 A 12/1991 Murphy et al. 706/62



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(45) **Date of Patent:** *Nov. 3, 2009

5,359,659 A 10/1994 Rosenthal 726/24

(Continued)

FOREIGN PATENT DOCUMENTS

EP	1091276	4/2001
EP	1132796	9/2001

OTHER PUBLICATIONS

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

(Continued)

Primary Examiner—Christopher A Revak (74) Attorney, Agent, or Firm—King & Spalding LLP

(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 JavaTM applets, ActiveXTM controls, JavaScriptTM scripts, Visual Basic scripts, add-ins, downloaded/uploaded programs or other "Downloadables" or "mobile code" in whole or part. A protection engine embodiment provides, within a server, firewall or other suitable "re-communicator," for monitoring information received by the communicator, 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, more suitably by forming a protection agent including the MPC, protection policies and a detected-Downloadable. 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, more suitably in conjunction with protection policies.

30 Claims, 10 Drawing Sheets

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US 7,613,926 B2

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U.S. PATENT DOCUMENTS

5,361,359	Α	11/1994	Tajalli et al 726/23	
5,414,833	Α	5/1995	Hershey et al 726/22	
5,485,409	Α	1/1996	Gupta et al 726/25	
5,485,575	А	1/1996	Chess et al 714/38	
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 726/13	
5,623,600	11	4/1997	Ji et al	
5,638,446	A	6/1997	Rubin	
5,675,711	A	10/1997	Kephart et al 706/12	
5,692,047	A	11/1997	McManis 713/167	
5,692,124	А	11/1997	Holden et al 726/2	
5,720,033	Α	2/1998	Deo 726/2	
5,724,425	А	3/1998	Chang et al 705/52	
5,740,248	Α	4/1998	Fieres et al 713/156	
5,740,441	Α	4/1998	Yellin et al 717/134	
5,761,421	Α	6/1998	van Hoff et al 709/223	
5,765,205	Α	6/1998	Breslau et al 711/203	
5,784,459	Α	7/1998	Devarakonda et al 713/165	
5,796,952	Α	8/1998	Davis et al 709/224	
5,805,829	Α	9/1998	Cohen et al 709/202	
5,832,208	Α	11/1998	Chen et al 726/24	
5,832,274	Α	11/1998	Cutler et al 717/171	
5,850,559	Α	12/1998	Angelo et al 713/320	
5,859,966	A	1/1999	Hayman et al	
5,864,683	Ā	1/1999	Boebert et al	
5,881,151	A	3/1999	Yamamoto 726/24	
5,884,033	Ā	3/1999	Duvall et al	
5,892,904	A	4/1999	Atkinson et al	
5,951,698	A	9/1999	Chen et al	
5,956,481	Ā	9/1999	Walsh et al	
5,963,742	A	10/1999	Williams	
			Golan	
5,974,549	A	10/1999	Apperson et al 705/54	
5,978,484	A	11/1999	Ji	
5,983,348	A	11/1999	Freund 726/4	
5,987,611	A	11/1999		
6,088,801	A	7/2000	Grecsek	
6,088,803	A	7/2000	Tso et al	
6,092,194	A *	7/2000	Touboul 726/24	
6,154,844	A *	11/2000	Touboul et al 726/24	
6,167,520	A	12/2000	Touboul	
6,339,829	B1	1/2002	Beadle et al 726/15	
6,425,058	B1	7/2002	Arimilli et al 711/134	
6,434,668	B1	8/2002	Arimilli et al 711/128	
6,434,669	B1	8/2002	Arimilli et al 711/128	
6,480,962	B1 *	11/2002	Touboul 726/22	
6,487,666	B1	11/2002	Shanklin et al 726/23	
6,519,679	B2	2/2003	Devireddy et al 711/114	
6,598,033	B2	7/2003	Ross et al 706/46	
6,732,179	B1 *	5/2004	Brown et al 709/229	
6,804,780	B1 *	10/2004	Touboul 713/181	
6,901,519	B1 *	5/2005	Stewart et al 726/24	
6,917,953	B2	7/2005	Simon et al 707/204	
7,058,822	B2 *	6/2006	Edery et al 726/22	
7,093,135	B1 *	8/2006	Radatti et al 713/188	
7,210,041	B1	4/2007	Gryaznov et al 713/188	
7,343,604	B2	3/2008	Grabarnik et al 719/313	
7,418,731	B2	8/2008	Touboul 726/22	
2004/0073811	Al	4/2004	Sanin	
2004/0088425	Al	5/2004	Rubinstein et al 709/230	
2005/0172338	Al	8/2005	Sandu et al	
2006/0031207	Al	2/2006	Bjarnestam et al	

OTHER PUBLICATIONS

Rubin, et al., "Mobile Code Security," IEEE Internet, pp. 30-34, Dec. 1998.Schmid, et al. "Protecting Data From Malicious Software," Proceedings of the 18th Annual Computer Security Applications Conference, pp. 1-10, 2002.

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).

International Search Report for Application No. PCT/IB01/01138, 4 pp., Sep. 20, 2002 (mailing date).

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

Gerzic, Amer, "Write Your Own Regular Expression Parser," Nov. 17, 2003, 18 pp.

Power, James, "Lexical Analysis," 4 pp., May 14, 2006

Sitaker, Kragen, "Rapid Genetic Evolution of Regular Expressions" [online], The Mial Archive, Apr. 24, 2004 (retrieved on Dec. 7, 2004), 5 pp.

"Lexical Analysis: DFA Minimization & Wrap Up" [online], Fall, 2004 [retrieved on Mar. 2, 2005], 8 pp.

"Minimization of DFA" [online], [retrieved on Dec. 7, 2004], 7 pp. "Algorithm: NFS -> DFA" [online], Copyright 1999-2001 [retrieved on Dec. 7, 2004], 4 pp.

"CS 3813: Introduction to Formal Languages and Automata-State Minimization and Other Algorithms for Finite Automata," 3 pp., May 11.2003

Watson, Bruce W., "Constructing Minimal Acyclic Deterministic Finite Automata," [retrieved on Mar. 20, 2005], 38 pp

Chang, Chia-Hsiang, "From Regular Expressions to DFA's Using Compressed NFA's," Oct. 1992, 243 pp.

"Products," Articles published on the Internet, "Revolutionary Security for a New Computing Paradigm" regarding SurfinGate™, 7 pp. "Release Notes for the Microsoft ActiveX Development Kit," Aug. 13, 1996, 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, Surfin Shield[™]," Article published on the Internet by Finjan Software Ltd., 2 pp. 1996.

Finjan Sofrtware Ltd., "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.

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

Finjan Software Ltd., "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. 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.

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

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

Moritz, R., "Why We Shouldn't Fear Java," Java Report, pp. 51-56, Feb. 1997.

Microsoft, "Microsoft ActiveX Software Development Kit" [Online], Aug. 12, 1996 [retrieved on Jun. 25, 2003], pp. 1-6.

Microsoft® Authenticode Technology, "Ensuring Accountability and Authenticity for Software Components on the Internet," Microsoft Corporation, Oct. 1996, including Abstract, Contents, Introduction, and pp. 1-10.

Microsoft Corporation, Web Page Article "Frequently Asked Ques-

US 7,613,926 B2

Page 3

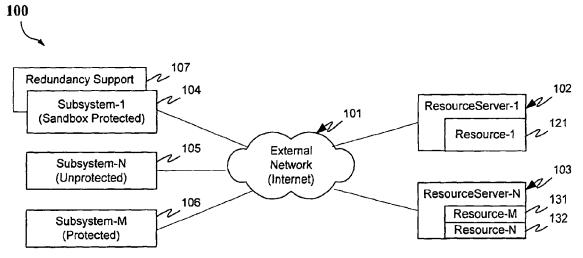
Okamoto, E., et al., "ID-Based Authentication System for Computer Virus Detection," *IEEE/IEE Electronic Library online, Electronics Letters*, vol. 26, Issue 15, ISSN 0013-5194, Jul. 19, 1990, Abstract and pp. 1169-1170.

Omura, J. K., "Novel Applications of Cryptography in Digital Communications," *IEEE Communications Magazine*, pp. 21-29, May 1990. Schmitt, D.A., ".EXE files, OS-2 style," *PC Tech Journal*, vol. 6, No. 11, p. 76(13), Nov. 1988.

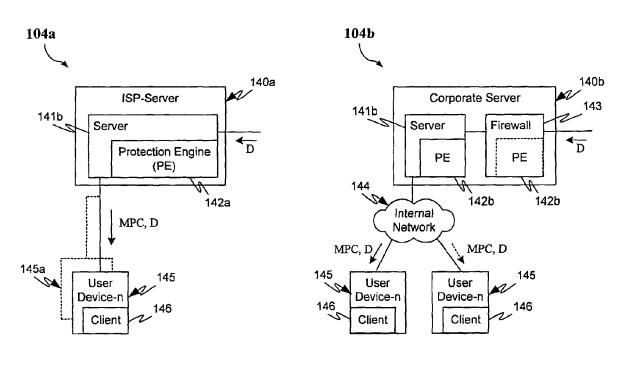
Zhang, X. N., "Secure Code Distribution," *IEEE/IEE Electronic Library online, Computer*, vol. 30, Issue 6, pp. 76-79, Jun. 1997. D. Grune, et al., "Parsing Techniques: A Practical Guide," John Wiley & Sons, Inc., New York, New York, USA, pp. 1-326, 2000.

* cited by examiner











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