

EXHIBIT I



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(54) **METHOD AND SYSTEM FOR ADAPTIVE
RULE-BASED CONTENT SCANNERS FOR
DESKTOP COMPUTERS**

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(51) **Int. Cl.**
G06F 11/00 (2006.01)
G06F 21/00 (2006.01)
(52) **U.S. Cl.** **726/25; 726/22; 713/153**
(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
5,359,659	A	10/1994	Rosenthal	726/24
5,361,359	A	11/1994	Tajalli et al.	726/23
5,414,833	A *	5/1995	Hershey et al.	726/22
5,485,409	A	1/1996	Gupta et al.	726/25

(Continued)

FOREIGN PATENT DOCUMENTS

EP 1091276 4/2001

(Continued)

OTHER PUBLICATIONS

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

(Continued)

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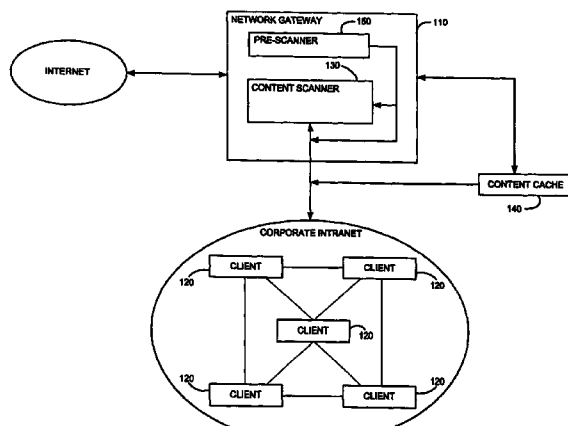
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(57) **ABSTRACT**

A security system for scanning content within a computer, including a network interface, housed within a computer, for receiving content from the Internet on its destination to an Internet application running on the computer, a database of rules corresponding to computer exploits, stored within the computer, a rule-based content scanner that communicates with said database of rules, for scanning content to recognize the presence of potential exploits therewithin, a network traffic probe, operatively coupled to the network interface and to the rule-based content scanner, for selectively diverting content from its intended destination to the rule-based content scanner, and a rule update manager that communicates with said database of rules, for updating said database of rules periodically to incorporate new rules that are made available. A method and a computer readable storage medium are also described and claimed.

25 Claims, 14 Drawing Sheets



U.S. PATENT DOCUMENTS

5,485,575	A	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.	703/27
5,606,668	A	2/1997	Shwed	726/13
5,623,600	A	4/1997	Ji et al.	726/24
5,638,446	A	6/1997	Rubin	705/51
5,675,711	A *	10/1997	Kephart et al.	706/12
5,692,047	A	11/1997	McManis	713/167
5,692,124	A	11/1997	Holden et al.	726/2
5,720,033	A	2/1998	Deo	726/2
5,724,425	A	3/1998	Chang et al.	705/52
5,740,248	A	4/1998	Fieres et al.	713/156
5,740,441	A *	4/1998	Yellin et al.	717/134
5,761,421	A	6/1998	van Hoff et al.	709/223
5,765,205	A	6/1998	Breslau et al.	711/203
5,784,459	A	7/1998	Devarakonda et al.	713/165
5,796,952	A	8/1998	Davis et al.	709/224
5,805,829	A	9/1998	Cohen et al.	709/202
5,832,208	A	11/1998	Chen et al.	726/24
5,832,274	A	11/1998	Cutler et al.	717/171
5,850,559	A	12/1998	Angelo et al.	713/320
5,859,966	A	1/1999	Hayman et al.	726/23
5,864,683	A	1/1999	Boebert et al.	709/249
5,881,151	A *	3/1999	Yamamoto	726/24
5,884,033	A *	3/1999	Duvall et al.	709/206
5,892,904	A	4/1999	Atkinson et al.	726/22
5,951,698	A	9/1999	Chen et al.	714/38
5,956,481	A	9/1999	Walsh et al.	726/23
5,963,742	A *	10/1999	Williams	717/143
5,974,549	A	10/1999	Golan	726/23
5,978,484	A	11/1999	Apperson et al.	705/54
5,983,348	A *	11/1999	Ji	726/13
5,987,611	A *	11/1999	Freund	726/4
6,088,801	A *	7/2000	Gresek	726/1
6,088,803	A *	7/2000	Tso et al.	726/22
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	726/23
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
6,917,953	B2	7/2005	Simon et al.	707/204
7,058,822	B2	6/2006	Ederly et al.	726/22
7,143,444	B2	11/2006	Porras et al.	726/30
7,210,041	B1 *	4/2007	Gryaznov et al.	713/188
7,308,648	B1	12/2007	Buchthal et al.	715/234
7,343,604	B2	3/2008	Grabarnik et al.	719/313
7,418,731	B2	8/2008	Touboul	726/22
2002/0059157	A1 *	5/2002	Spooner et al.	706/45
2002/0066024	A1 *	5/2002	Schmall et al.	713/200
2002/0073330	A1 *	6/2002	Chandnani et al.	713/200
2003/0014662	A1	1/2003	Gupta et al.	726/23
2003/0101358	A1	5/2003	Porras et al.	726/4
2004/0073811	A1 *	4/2004	Sanin	713/201
2004/0088425	A1 *	5/2004	Rubinstein et al.	709/230
2005/0050338	A1	3/2005	Liang et al.	713/188
2005/0172338	A1	8/2005	Sandu et al.	726/22
2006/0031207	A1	2/2006	Bjarnestam et al.	707/3
2006/0048224	A1	3/2006	Duncan et al.	726/22
2008/0066160	A1	3/2008	Becker et al.	726/4
2010/0195909	A1 *	8/2010	Wasson et al.	382/176

FOREIGN PATENT DOCUMENTS

EP 1132796 9/2001

OTHER PUBLICATIONS

International Search Report for Application No. PCT/IL05/00915, 4

Seventh IEEE Symposium on Reliable Distributed Systems, pp. 1-6, Oct. 1998.

Rubin, et al., "Mobile Code Security," *IEEE Internet*, pp. 30-34, Dec. 1998.

Schmid, et al. "Protecting Data From Malicious Software," *Proceeding of the 18th 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).

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., Retrieved from the Internet: http://www.codeguru.com/Cpp/Cpp/cpp_mfc/parsing/article.php/c4093/.

Power, James, "Lexical Analysis," 4 pp., May 14, 2006, Retrieved from the Internet: <http://www.cs.may.ie/~jpower/Courses/compilers/notes/lexical.pdf>.

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.owl.net.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.

"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.

Chang, Chia-Hsiang, "From Regular Expressions to DFA's Using Compressed NFA's," Oct. 1992, 243 pp., 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 SurfinGate™, 7 pp. "Release Notes for the Microsoft ActiveX Development Kit," Aug. 13, 1996, <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, Surfin Shield™," 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 SurfinShield™ 1.6 (formerly known s 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 SurfinShield™ 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

"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-archive/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.

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, Retrieved from the Internet: activex.adsp.or.jp/inetsdk/help/overview.htm.

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 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.ihs.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.

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.

Power, James, "Notes on Formal Language Theory and Parsing," National University of Ireland, pp. 1-40, 1999.

* cited by examiner

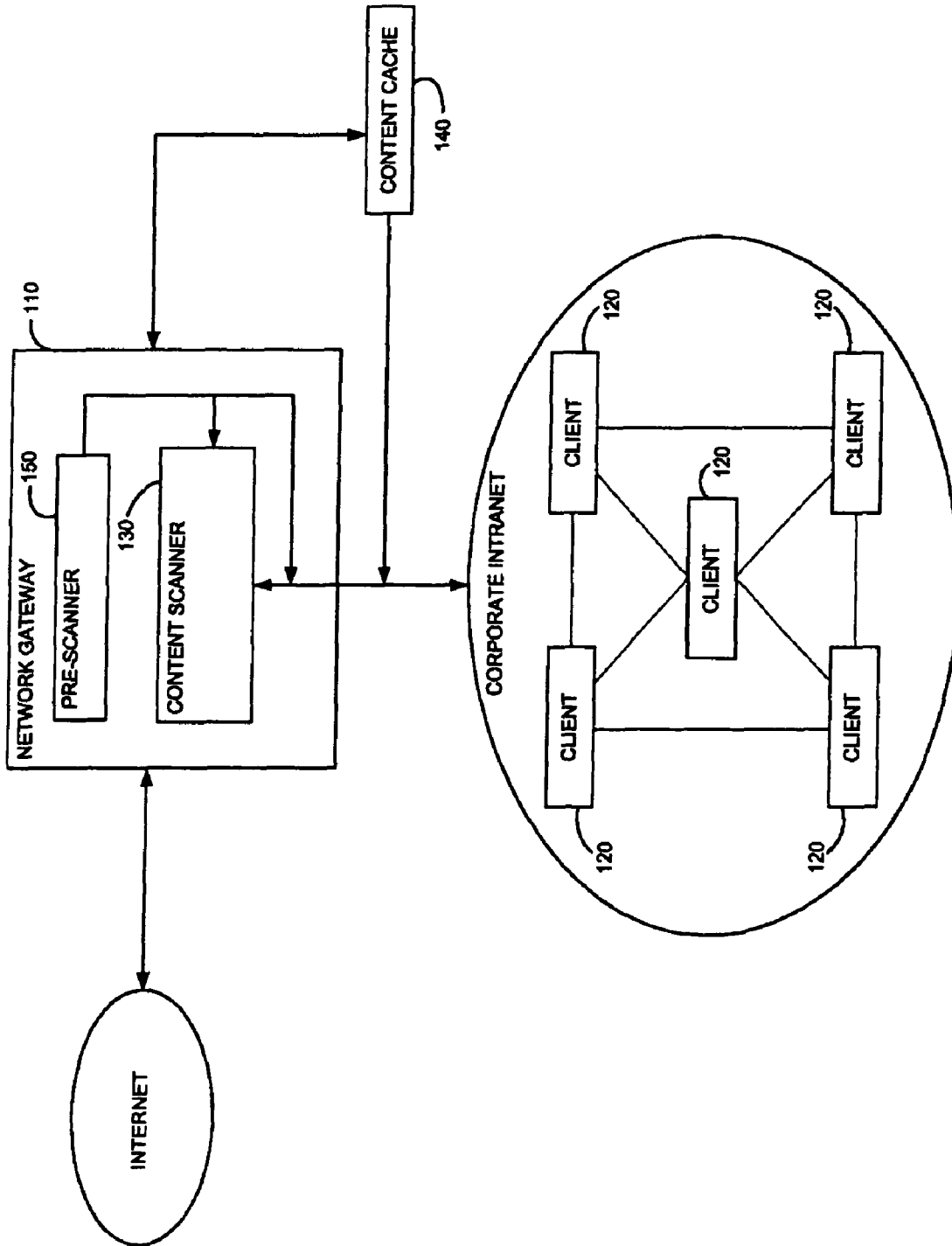


FIG. 1

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