PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

# INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : G06F 11/00

A3

(11) International Publication Number: WO 98/30957

(43) International Publication Date: 16 July 1998 (16.07.98)

(21) International Application Number: PCT/US98/08897

(22) International Filing Date: 5 January 1998 (05.01.98)

(30) Priority Data:
08/780,985 8 January 1997 (08.01.97) US

(71) Applicant: SYMANTEC CORPORATION [US/US]; 10201 Torre Avenue, Cupertino, CA 95014 (US).

(72) Inventor: NACHENBERG, Carey, S.; 19533 Citronia St., Northridge, CA 91324 (US).

(74) Agents: OKAMOTO, James, K. et al.; Fenwick & West LLP, Two Palo Alto Square, Palo Alto, CA 94306 (US).

(81) Designated States: CA, JP, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

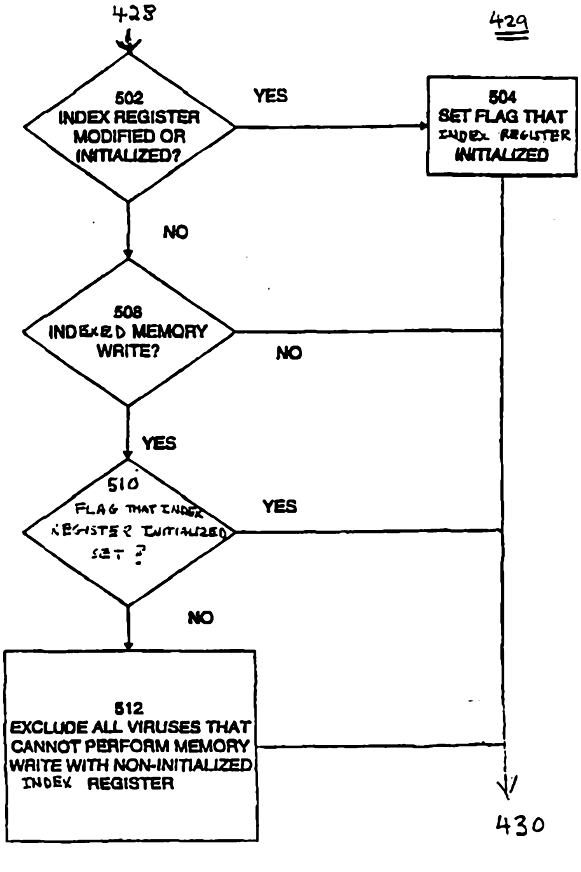
**Published**
*With international search report.*

(88) Date of publication of the international search report: 5 November 1998 (05.11.98)

(54) Title: POLYMORPHIC VIRUS DETECTION MODULE

(57) Abstract

A Polymorphic Anti-virus Module (PAM) (200) comprises a CPU emulator (210) for emulating the target program, a virus signature scanning module (250) for scanning decrypted virus code, and an emulation control module (220), including a static exclusion module (230), a dynamic exclusion module (240), instruction/interrupt usage profiles (224) for the mutation engines (162) of the known polymorphic viruses (150), size and target file types (226) for these viruses, and a table (228) having an entry for each known polymorphic virus (150). During emulation, the emulation control module (220) may observe use of a register-indirect memory write instruction using a register that has not been initialized. Such a random write can be used as an indication that the file is probably a data file and so is unlikely to harbor a virus.


428
429
502 INDEX REGISTER MODIFIED OR INITIALIZED?
YES
504 SET FLAG THAT INDEX REGISTER INITIALIZED
NO
508 INDEXED MEMORY WRITE?
NO
YES
510 FLAG THAT INDEX REGISTER INITIALIZED SET ?
YES
NO
512 EXCLUDE ALL VIRUSES THAT CANNOT PERFORM MEMORY WRITE WITH NON-INITIALIZED INDEX REGISTER
430

*FOR THE PURPOSES OF INFORMATION ONLY*

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| | |
|---|---|
| AL | Albania |
| AM | Armenia |
| AT | Austria |
| AU | Australia |
| AZ | Azerbaijan |
| BA | Bosnia and Herzegovina |
| BB | Barbados |
| BE | Belgium |
| BF | Burkina Faso |
| BG | Bulgaria |
| BJ | Benin |
| BR | Brazil |
| BY | Belarus |
| CA | Canada |
| CF | Central African Republic |
| CG | Congo |
| CH | Switzerland |
| CI | Côte d'Ivoire |
| CM | Cameroon |
| CN | China |
| CU | Cuba |
| CZ | Czech Republic |
| DE | Germany |
| DK | Denmark |
| EE | Estonia |
| ES | Spain |
| FI | Finland |
| FR | France |
| GA | Gabon |
| GB | United Kingdom |
| GE | Georgia |
| GH | Ghana |
| GN | Guinea |
| GR | Greece |
| HU | Hungary |
| IE | Ireland |
| IL | Israel |
| IS | Iceland |
| IT | Italy |
| JP | Japan |
| KE | Kenya |
| KG | Kyrgyzstan |
| KP | Democratic People's Republic of Korea |
| KR | Republic of Korea |
| KZ | Kazakstan |
| LC | Saint Lucia |
| LI | Liechtenstein |
| LK | Sri Lanka |
| LR | Liberia |
| LS | Lesotho |
| LT | Lithuania |
| LU | Luxembourg |
| LV | Latvia |
| MC | Monaco |
| MD | Republic of Moldova |
| MG | Madagascar |
| MK | The former Yugoslav Republic of Macedonia |
| ML | Mali |
| MN | Mongolia |
| MR | Mauritania |
| MW | Malawi |
| MX | Mexico |
| NE | Niger |
| NL | Netherlands |
| NO | Norway |
| NZ | New Zealand |
| PL | Poland |
| PT | Portugal |
| RO | Romania |
| RU | Russian Federation |
| SD | Sudan |
| SE | Sweden |
| SG | Singapore |
| SI | Slovenia |
| SK | Slovakia |
| SN | Senegal |
| SZ | Swaziland |
| TD | Chad |
| TG | Togo |
| TJ | Tajikistan |
| TM | Turkmenistan |
| TR | Turkey |
| TT | Trinidad and Tobago |
| UA | Ukraine |
| UG | Uganda |
| US | United States of America |
| UZ | Uzbekistan |
| VN | Viet Nam |
| YU | Yugoslavia |
| ZW | Zimbabwe |

# INTERNATIONAL SEARCH REPORT

Inter ınal Application No
PCT/US 98/08897

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G06F11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | NACHTENBERG C.S.: "A new technique for detecting polymorphic computer viruses a thesis submitted in partial satisfaction of the requirements for the degree master of science in computer science and engineering"<br>THESIS UNIVERSITY OF CALIFORNIA, 1995, XP000197628<br>cited in the application<br>pages I-V, 1 - 127<br>see paragraph 4.3.5<br>see page 57, line 1 - page 60, line 4<br>see page 66, line 11 - page 68, line 4<br>---<br>-/-- | 1,6,7 |

☒ Further documents are listed in the continuation of box C.

□ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

| | |
|---|---|
| Date of the actual completion of the international search<br>23 April 1998 | Date of mailing of the international search report<br>0 7 -08- 1998 |
| Name and mailing address of the ISA<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Authorized officer<br>Masche, C |

5

# INTERNATIONAL SEARCH REPORT

Inter    nal Application No
PCT/US 98/08897

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indioation,where appropriate, of the relevant passages | Relevant to olaim No. |
|---|---|---|
| A | MARSHALL G.: "Pest Control"<br>LAN MAGAZINE,<br>vol. 3, no. 6, June 1995,<br>page 55/56, 58, 61, 63/64, 67 XP000613971<br>see page 56, column 2, line 10 - page 58,<br>column 1, line 23<br>----- | 1 |

5