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VIRUS BULLETIN

THE INTERNATIONAL PUBLICATION ON COMPUTER VIRUS PREVENTION, RECOGNITION AND REMOVAL

IN THIS ISSUE:

• **Windows on the world.** This month sees *VB's* first comparative review of anti-virus software for *Windows NT*: of the thirteen products which were included in the tests, how many made the grade? Turn to p.8 to find out.

• **SEXY.EXE…** September saw yet another virus posted to an Internet newsgroup, with a variant of Boza appearing in several sex-related groups. See p.3 for details.

• **Two for the price of one?** A scanner with an integrity checker; an integrity checker with a scanner – *Integrity Master*, from *Stiller Research*, could be viewed either way. Our reviewer puts the product through its paces; see p.21.

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EDITORIAL

Windows NT: The OS for Generation X

One of my most peculiar childhood memories revolves around having to wear the most extraordinarily outsize clothes. It's a strange thing, but there it is. My mother could often be heard uttering a kind of mantra: 'Oh, he'll grow into it'. It seemed bizarre to me at the time, possessed as I was with that curious logic children have; now, of course, that I'm relatively grown up, it makes perfect sense.

It's a generally recurring theme, actually – buying things larger than you need them in anticipation of 'growing into them'. And now that I've actually gone out and asked, what should have been obvious is made clear – everyone else's parents did this to them as well. And it seems that the parents did the right thing; we did indeed grow into the clothes, and it was cheaper in the long run. However, for the seemingly endless months it took to grow, we looked slightly silly.

"the level of investment in anti-virus software for Windows NT products is unprecedented"

And so it has been with *Windows NT*, an operating system which has been waiting over two years for hardware to catch up with it. *Microsoft* must have been spending the time looking at computers, pursing their corporate lips, and saying 'Oh, they'll grow into it'. All this time, *Windows NT* has been looking peculiar as users have struggled to run it on 486s with 16MB of memory, as they fought to fit its vast number of files onto paltry little hard drives with less than half a Gigabyte of space, and as they complained bitterly about its poor performance as a workstation operating system when compared to the unstable, insecure, thoroughly inelegant, but considerably faster, *Windows 3.1*.

To be fair to *Microsoft*, their baby has been on a serious diet: the bloated monstrosity which was *NT 3.1* had slimmed down considerably by the age of *3.5*, and by the time it had become *3.51*, it was so much smaller that one review published at the time even called it 'svelte'. Nonetheless, it is the remarkable increase in the 'average' level of hardware (how anyone can ever claim to be able to work out the average level of computer hardware I'll never know) that has really made the difference. The clothes finally fit; *NT* has come of age.

In the same way that corporates are said to be holding off from *Windows 95* until they can check out *Windows NT 4.0*, friends who visit many companies in the course of their work report that a surprisingly large number of corporates which are currently using *NetWare 3*, and are in a position to expand to *NetWare 4*, are also stalling. They want to look at *NT* as well. *Microsoft* finds itself with *NT* attacking both ends of the market: on the workstation side, it will take huge lumps out of *95's* market, and as for the servers… well, isn't it the logical choice with *95* on the clients?

However, fear not: these opinions are shared by the manufacturers of the *NT* anti-virus products I tested recently (the results of these tests are published in this issue; see p.8). They are all too aware, it appears, of the importance of turning out a slick *NT* product – the level of investment in anti-virus software for *Windows NT* products is unprecedented; never before has one operating system been regarded as presenting so much of a make-or-break opportunity to the manufacturers.

Although it is not quite yet a case of 'will the last *NetWare* user please turn out the lights', any company which does not produce an *NT* anti-virus solution which is, at the very least, equal to their *NetWare* offering will probably find themselves in dire straits before too long.

Producing a decent *NT* product is not a question of a simple port job, although a port can act as a stop-gap – almost every company will get to their final product via a quick and dirty port of whatever they have for *Windows 3.1* or *Windows 95*. However, customers should not settle for this type of half-way house for too long, not with so many possibilities for elegant solutions and useful features just waiting to be implemented. In addition, of course, competitors will be there, champing at the bit to sell their brand-new, all-singing, all-dancing, *NT* protection system.

The computer-using community has finally caught up with *NT*: all types of software manufacturer, not just those involved in anti-virus software, should by now be running at full pelt to catch them. After all, it'd be terrible to get left behind, wouldn't it?

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NEWS

Sexy Boza?

On 14 September 1996, a file infected with a variant of the Boza virus was posted to numerous sex-related Internet newsgroups. The relevant messages, posted by a user masquerading as love@your.kid, contain a UUENCODEd file which, when extracted, produces a file called SEX.EXE or SEXY.EXE. This file contains Boza.c, the version of the virus published in *VLAD* magazine [*see VB February 1996, p.15*]. The subject lines of the offending messages are:

```
Great FTP listing - sex.exe [01/01]
Child sex jpg's and info where to get it. -
sexy.zip [01/01]
Child sex ftp listing - sex.exe [01/01]
```

This variant is not really a virus – it is labelled as 'intended' by anti-virus researchers, meaning it is supposed to be a virus, but does not replicate. However, it is likely that the intended virus will do damage files it attempts to infect.

It is interesting to note the nature of the newsgroups targeted: again, as with Kaos4 in July 1994 (alt.binaries.pictures.erotica) and, more recently, Hare (alt.sex, although Hare was also posted to other, non-sex-related, groups), the sender has specifically selected newsgroups which users will usually be reluctant to admit to reading. The aim is clearly to make it difficult to establish a source for the infection.

The culprit has not yet been identified, but examination of the message headers seems to indicate a user of tiac.net, an ISP called *The Internet Access Company* in north-east USA ▮

Stop Press: Irina

VB has received information about a supposedly dangerous virus, Irina, which spreads through the Internet: the rumours started with a press release from *Penguin Books*, publicising the imminent launch of an interactive novel written by Stephen Baxter, *Irina*, which is set on the World-Wide Web.

Guy Gadney, *Penguin's* project manager for the novel, stated: 'We are keen to quash the rumours about this supposed virus: the publicity material we sent out was in two parts, the second of which stated quite clearly that *Irina* was not, and had nothing to do with, a virus. By this time, the damage had been done.' *VB* readers are advised to ignore any messages they receive warning them of the virus ▮

VB '96

As the October issue of *Virus Bulletin* goes to proof, staff are congregating in Brighton to prepare for the annual *Virus Bulletin* conference. A full report on the proceedings will appear in the next edition, and readers are reminded that the 1996 proceedings are now available; price £50 + p&p, from *VB* offices ▮

Prevalence Table – August 1996

Virus	Type	Incidents	Reports
Concept	Macro	46	17.3%
Form	Boot	29	10.9%
AntiEXE.A	Boot	20	7.5%
Parity_Boot.B	Boot	15	5.6%
Hare.7610	Multi	14	5.3%
Junkie	Multi	13	4.9%
Ripper	Boot	13	4.9%
AntiCMOS.A	Boot	12	4.5%
Empire.Monkey.B	Boot	11	4.1%
NYB	Boot	8	3.0%
Quandary	Boot	5	1.9%
Sampo	Boot	5	1.9%
Tentacle	File	5	1.9%
WelcomB	Boot	5	1.9%
Natas.4744	Multi	4	1.5%
AntiCMOS.B	Boot	3	1.1%
Burglar.1150	File	3	1.1%
Empire.Monkey.B	Boot	3	1.1%
EXEBug.A	Boot	3	1.1%
Imposter	Macro	3	1.1%
Unashamed	Boot	3	1.1%
Edwin	Boot	2	0.8%
Feint	Boot	2	0.8%
Stealth_Boot.C	Boot	2	0.8%
Stoned.Angelina	Boot	2	0.8%
Stoned.Spirit	Boot	2	0.8%
Stoned.Stonehenge	Boot	2	0.8%
Telefonica	Multi	2	0.8%
Wazzu	Macro	2	0.8%
Other [1]		27	10.2%
Total		266	100%

[1] The Prevalence Table includes one report of each of the following viruses: AntiDMV, Boot.437, Bug70, Bye, Carnevale.1972, Cascade.?, Colors, Die Hard.4000, Emhaka.749, Freddy.2.1, Galya.500, Havoc.3072, IVP.2385, Jackal, Jumper.B, Manzon, Stoned.Standard, Nuclear, One_Half.3544, Raajat.871, Rhubarb, Satria, She_Has, Stoned.NoInt, TaiPan.?, Tequila, and V-Sign.

Correction

Following the news story entitled 'Pricey Ludwig' in the September 1996 edition of *Virus Bulletin*, Eugene Spafford points out that the so-called 'source code' for the Internet Worm presented by Mark Ludwig is not in fact the complete original source, but a partial decompilation of the code created from the binary executable file; the distinction being that the full original code is commented more completely and contains sections of code which have been disabled ▮

IBM PC VIRUSES (UPDATE)

The following is a list of updates and amendments to the *Virus Bulletin Table of Known IBM PC Viruses* as of 21 September 1996. Each entry consists of the virus name, its aliases (if any) and the virus type. This is followed by a short description (if available) and a 24-byte hexadecimal search pattern to detect the presence of the virus with a disk utility or a dedicated scanner which contains a user-updatable pattern library.

Type Codes

- **C** Infects COM files
- **D** Infects DOS Boot Sector (logical sector 0 on disk)
- **E** Infects EXE files
- **L** Link virus
- **M** Infects Master Boot Sector (Track 0, Head 0, Sector 1)
- **N** Not memory-resident
- **P** Companion virus
- **R** Memory-resident after infection

Amazon Queen.467
CER: An appending, 467-byte variant of the AmazonQueen.468 virus [*see VB September 1995*] which installs itself in the Interrupt Vector Table. It contains the plain-text messages: 'Amazon Queen...v1.0', 'WHY?' and 'LoRD Zer0'.
```
Amazon Queen.467    E800 005D 81ED 0300 0E1F 06B4 ACCD 213C 3075 0B2E 3B9E CF01
```

Ambulance.2124
CER: An appending, 2124-byte virus which marks all infected files with the characters 'GK' located at the end of code. The payload triggers about 40 minutes after the last occurrence of Int 09h or Int 13h and contains a picture of an ambulance moving across the screen.
```
Ambulance.2124      B8FF DDCD 2180 FCCC 7507 3CC0 7203 E9CE 00B8 0935 CD21 2E89
```

Antiwin.2320
ER: An appending, 2320-byte virus containing the encrypted text: 'Use registered copies of MS Windows Greetings from MrStrange, Kiev T.G.Shevchenko University' and 'DRWEAIDSMSCAANTIAVP WEB SCANMSAVVSAFGUARADINKRNLDOSXWSWADSWAWIN3 >Antiwin<, (c) by MrStrange.'.
```
Antiwin.2320        2E89 8414 08B8 0A08 03C6 A304 008C 0E06 009C 580D 0001 509D
```

Baran.3294
CER: A polymorphic, appending, 3294-byte virus containing the text: 'Gwadera to baran !'. All infected files have their time-stamp set to 62 seconds. The following template detects the virus in memory only.
```
Baran.3294          2E8C 062C 02B8 FE4B CD21 3D01 FE75 4D90 2E89 1630 02FC 33C0
```

Baran.4968
CER: A polymorphic, appending virus containing the text: 'Unknown destroyer v1'. The following template detects the virus in memory only.
```
Baran.4968          2E8C 1E3A 03B8 FE44 CD21 FC3D 01FE 754B 2E89 163E 0390 33C0
```

Creeper.478
CR: An appending, 478-byte virus containing the encrypted text: 'TORMENTOR'. Its code includes a payload which overwrites the contents of the first hard disk.
```
Creeper.478         0500 0189 84AA FEB4 40B9 DE01 8BD6 CD21 B800 4233 C933 D2CD
```

Gerd.798
CN: An overwriting, 798-byte virus containing encrypted messages: 'HA! HA! HA! Your computer is infected now by the most likely and non-dangerous virus! Please enjoy it! Your MBR may now be corrupted...', '*.COM', 'C:\DOS' and 'General error reading drive C: Abort, Retry, Ignore, Fail?'.
```
Gerd.798            B440 8B1E 9005 BA92 05B9 1E03 90CD 21B4 3E8B 1E90 05CD 21C7
```

Holera.1488
CER: An appending (EXE) and prepending (COM), 1488-byte virus containing the encrypted messages: 'COMMAND.COM NCMAIN.EXE EXE COM TXT CPP' and 'Special for MIEM'.
```
Holera.1488         50B4 FECD 2158 81FB 9619 7402 F9C3 F8C3 E8ED FF73 2750 5351
```

Httm.572
CR: An encrypted, appending, 572-byte virus containing the text: 'this one is unTBSCANable: die you loosy MOTHERFUCKER! [HtTM]' and 'March '94'.
```
Httm.572            EA31 0450 B8EB 0458 EBFB EAA7 03C1 50B8 EB04 58EB FBEA E2E9;
```

Httm.580
CR: An encrypted, appending, 580-byte variant of the above virus. It contains the same text and can be detected with the same pattern.

IVP.737
CEN: An encrypted, appending, 737-byte, fast, direct infector containing the text: 'TESTN/AHallo', '[IVP]' and '*.com *.exe'.
```
IVP.737             8D9E 1601 B9B9 022E 8A27 2E32 A6E5 032E 8827 43E2 F2C3 ??
```

JTTP.3423
ER: An appending, 3423-byte virus, containing plain-text messages: 'F-PROT.EXE TBSCAN.EXE TBAV.EXE TBCLEAN.EXE SCAN.EXE CLEAN.EXE VIRSTOP.EXE MSAV.EXE VSAFE.EXE CPAV.EXE FSP.EXE VDEFEND.EXE', 'THE PREDATOR presents the J.TTPOG Virus (c) 1996 SWEDEN!!!!!' and 'THE PREDATOR presents J.TTPOG VIRUS (c) 1996/03/15 SWEDEN And says HI..'.
```
JTTP.3423           B409 CD21 58EB 1A90 3D00 4B75 14E8 AC01 E846 0073 06E8 0E00
```

Nostardamus.3072
CER: A stealth, polymorphic, multiply-encrypted, appending, 3072-byte virus containing the text: 'EMME v3.0 KILLER'. All infected files have their time-stamp set to 30 seconds. The following pattern detects the virus in memory.
```
Nostardamus.3072    3DFF 6C75 03B0 4BCF 80FC 5B75 0CE8 AD03 7204 2EA3 0E00 CA02
```

Konkoor.3072

ER: A prepending, 3072-byte virus with plain-text messages: 'Incorrect DOS version' and 'SCAN CLEAN VSHIELD FINDVIRU FV386 FV86 CLEANBOO VIVERIFY CERT MSAV GUARD TDUMP MZK' and the encrypted text: 'Konkoor v2.0 - Crack Master -Last Days Of 1995 What Was The First Iranian Virus ? 1. Abbas ??? (Was it Iranian ?) 2. Roohi 3. TDD - Konkoor v1.0 4. None Of Above -= This is The Last One If You Solve Copyright Problem =-Choose the correct answer...'. Infected files' time stamps are set to 2 seconds.

```
Konkoor.3072        8C0E 9000 E8A8 0181 F966 0675 03E9 8000 B44A 2E8B 1E82 002E
```

Nostardamus.3584

CER: A stealth, polymorphic, multiply-encrypted, appending, 3584-byte virus containing the text: '=Unlimited Grief=-', 'COMEXEOVLOVRPROSCAEXTWEBARJRARLHAZIPCOMWINCHK', 'Kiev'96', 'EMME 3' and 'Killer'. All infected files have their time-stamp set to 30 seconds. The following pattern detects the virus in memory only.

```
Nostardamus.3584    3DFF 6C75 03B0 4BCF 80FC 3C74 0580 FC5B 750C E84D 0372 042E
```

Salman.2000

EN: An encrypted, appending, 2000-byte virus containing the text: '*.exe', 'C:\ .. chklist.ms chklist.cps c:\signature.dat SCAN.EXECLEAN.EXENAV.EXEPACRUN.EX', 'Kill Salman Rushdie and Taslima Nasrin !' and 'Kill them !!!'.

```
Salman.2000         501E 0E0E 1F07 BE00 04BF D007 B9D0 03FC AC34 03AA E2FA E970
```

Shift.2010

CER: An appending, 2010-byte virus containing the text: 'Your computer is infected by SHIFT VIRUS' and 'This virus is dedicated to PCC, and was written by an PCC student. ALEX'. The virus reinfects infected files.

```
Shift.2010          9C3D 4F48 7454 80FC 3D74 0780 FC4E 7402 EB15 2E80 3ECA 0501
```

SillyComp.219

ENP: A simple, 219-byte companion virus which infects one file at a time, but only in subdirectories.

```
SillyComp.219       B43C B102 CD21 8BD8 BA00 01B1 DBB4 40CD 21B4 3ECD 21EB 13B4
```

Tanpro.749

CER: A prepending, 749-byte virus containing plain-text messages: 'Screen Shaker 5th' and '(c)tanpro'94'.

```
Tanpro.749          B440 2E8B 1E22 012E 8B0E 2401 BAED 03CD 21B4 3E2E 8B1E 2201
```

Teraz.2717

CER: An appending, 2717-byte virus which uses some anti-tracing tricks to hide itself in memory. It may reside above 640K. All infected files have their time-stamp set to 2 seconds.

```
Teraz.2717          B834 FFCD 213D 9837 9074 06E8 6A0A E83B 0A0E 1F80 3EC0 0701
```

Timish.2132

CER: An encrypted, prepending (COM) and appending (EXE), 2132-byte virus containing the text: 'commandcomexe' and 'Greetings from Timishoara ! Call 0040-61-13821' (the latter displayed inside a double frame).

```
Timish.2132         0600 5E33 FF0E 1FB9 5408 FCF3 A406 B878 0050 CB0E 1FE8 5205
```

Tucuman.828

ER: An appending, 828-byte virus containing the plain-text message: 'UTN-FRT Tucumán, Argentina by Mr. Bithead - 1995'. All infected files have their time-stamp set to 32 seconds.

```
Tucuman.828         B8CD 4BCD 213D 4BCD 7510 8D9E 3804 2EFF 7702 2EFF 3733 C033
```

V.1468

CER: A stealth, appending, 1468-byte virus. While infecting COMMAND.COM the virus overwrites the last 1468 bytes (which are usually filled with zeros). All infected files have their time-stamp set to 62 seconds. The virus can be detected using a template for the V.1458 virus [*see VB, June 1996*].

VCL.523

CN: An encrypted, appending, 523-byte, direct infector containing the text: '*.* *.COM' and '[VCL]'. The virus uses one of two decryption procedures that can be used to detect infected files.

```
VCL.523             8DB6 0E01 B9F8 0081 34?? ??46 46E2 F8C3
VCL.523             8DBE 0E01 B9F8 0081 35?? ??47 47E2 F8C3
```

Werewolf.678

EN: An encrypted, 678-byte, direct infector containing the text: 'Home Sweap Home (C)1994-95 WereWolf' and '*.MS *.CPS ANT*.DAT'.

```
Werewolf.678        4781 FF94 0272 F4C3 E8ED FFC6 0698 02B8 CD21 C606 9802 81EB
```

Werewolf.1152

CER: A stealth, appending, 1152-byte virus containing the text: 'SCREAM (C)1996 WereWolf' and 'CLEAN AVP TB V SCAN NAV IBM FINDV GUARD FV CHKDS F-'.

```
Werewolf.1152       80F4 1174 A280 F403 749D 80F4 5C74 9880 F401 7493 80F4 0475
```

Werewolf.1168

CER: A stealth, appending, 1168-byte virus containing the text: 'SCREAM! (C)1995-96 WereWolf' and 'CLEAN AVP TB V SCAN NAV IBM FIND VGUARD FV CHKDS F-'.

```
Werewolf.1168       B857 02B2 0DCD 21E8 6600 8CC0 8D76 432E 807E 3F45 751A 0510;
```

WhiteLion.942

CER: An appending, 942-byte virus containing the encrypted text: 'WHITE LION Silent worrior in the jungle of softwares'.

```
WhiteLion.942       33D2 B4FF CD21 80FE FF75 03E9 9700 8BC5 488E D8A1 0300 B93B
```

Xuxa.1984

CER: A stealth, encrypted, appending, 1984-byte virus containing the text: 'XUXA PARK 2.0 ■ By Hades ■ Todo el mundo esta feliz ?', 'TBF-ZIRJCHKCHKLIST.MS', 'ANTI-VIR.DAT' and 'COMEXE'. All infected files have their time-stamp set to 38 seconds.

```
Xuxa.1984           BEA3 0700 7434 2E8A 96A1 078D B659 00B9 4807 2ED2 0452 EB01
```

Zibbert.1268

CER: An appending, 1268-byte virus containing the text: 'C:\COMMAND.COM \COMMAND.COM'. Starting from July, on every Tuesday and Thursday, characters 'a' and 'A' are replaced with spaces when sent to a printer.

```
Zibbert.1268        B860 35CD 2181 FB34 1274 03E9 C903 E90A 0350 5351 521E 0657
```

Zibbert.1315

CER: An appending, 1315-byte variant of the above virus.

```
Zibbert.1315        B860 35CD 2181 FB34 1274 03E9 F803 E939 0350 5351 521E 0657
```

VIRUS ANALYSIS

Cracking the Crackers

Eugene Kaspersky

The Nutcracker story continues apace: the author of this particular family of viruses is still hard at work. Despite the fact that he is under investigation by the authorities, more and more new creations appear, all signed by Nutcracker. We can only hope that he suffers the same fate as that which befell the Black Baron.

A README.TXT file, in which the author promises not to release any more new viruses, comes with some of the viruses I have seen from this family. He never keeps his word, however, and new variants of Nutcracker appear amazingly quickly.

Created in several styles, called Nutcracker.ABn, each of the viruses contains something new. AB1 and AB2 both have new polymorphic engines and a new infection technique which makes disinfection of infected files extremely difficult. At present, seventeen distinct AB2 viruses are known!

Other family members have new stealth algorithms and any number of other tricks; all described in *VB*, February 1996, p.9. Three viruses in yet another style appeared a couple of months ago: AB0, dangerous, memory-resident, stealth, boot sector viruses.

New Techniques

Most boot viruses hook Int 13h or Int 40h to intercept disk access requests and to enable their infection and stealth routines to receive control and do their work. The exception is Nutcracker.AB0; it uses Int 15h instead.

On standard AT and PS systems, the BIOS Int 13h handler contains a call to Int 15h, AX=9000h/9100h, and the Int 40h handler contains a call to Int 15h, AX=9001h/9101h. These are called, respectively, the Device Busy and Device Post calls and signify that the BIOS is performing a read/write operation on a disk. Multi-tasking systems can then hook these to allow other tasks to execute whilst the I/O request is completed.

The virus makes use of this PC feature by hooking Int 15h. It will therefore receive control whenever the disks are accessed: first the system will call Int 13h, which itself issues an Int 15h which has been hooked by the virus; then Nutcracker takes control.

On Disks

On a floppy disk, the virus occupies the boot sector and five sectors on the hidden track at the end of the diskette. When a system is booted from an infected diskette, the virus is loaded and run from the boot sector. It then reads the body of its code from the end of the floppy, and jumps into it. The original boot sector is then read to the standard boot code address (0000:7C00h), and control returns there when infection is complete.

The virus loads from hard disk in a fashion which, although slightly unusual, has been seen in previous virus analyses [*see analysis of Hare; VB, August 1996, p.11*]. When a Nutcracker virus infects a disk, it stores the body of its own code in an extra track at the end of the disk, and then modifies the Partition Table held in the MBR so that the active partition record (i.e. the partition from which the operating system, under normal circumstances, is loaded) points to this area.

Thus, it is not actually necessary for the virus to modify any of the *code* in the Master Boot Sector, merely the Partition Table stored there. Hence attempting to clean the virus with the traditional FDISK /MBR will have no effect, as this leaves the Partition Table intact.

"anti-virus researchers must be careful when experimenting with the virus, lest it destroy their work"

Installation

When the body of the virus is executed, if it was loaded from a diskette, it first checks to see if the hard disk is already infected. It does this by examining the Partition Table to obtain the disk address of the boot sector of the active partition, which it then loads.

If the virus is already present on the disk, that sector will be the first of the virus body. Nutcracker compares 12 bytes of the sector with its own code to establish whether or not this is the case. If the hard disk is not already infected, Nutcracker then infects it.

The virus next hooks Int 08h (System Timer), Int 15h, and Int 40h (Relocated BIOS Diskette Handler). The technique of hooking Int 08h is a standard one, used by many viruses which need to watch the system to wait until DOS has loaded before hooking more interrupts – this is exactly what Nutcracker is doing. Once DOS is loaded, it hooks Int 15h and Int 21h.

The Int 21h hook is only temporary, and is used to allow the virus to move its TSR (Terminate and Stay Resident) code once DOS is loaded. It waits for the first call to Int 21h, AX=4B00h (Load and Execute): when it sees this, it

allocates a block of system memory, moves the resident code there, corrects all of its interrupt hooks to point to the new copy, and finally releases Int 21h.

The memory allocation is performed with calls to the HMA memory manager. If HMA is available, memory is taken from that area; otherwise, it merges its newly-allocated block with the highest allocated block.

Interrupts

Nutcracker hooks Int 15h somewhat indirectly; it writes CD7Eh (a call to Int 7Eh) over the first two bytes of the Int 15h handler, and then hooks Int 7Eh.

This handler checks for four Int 15h functions – AX=9000h, 9001h, 9100h, and 9101h. When a matching call is made, the virus passes control to its infection and stealth routines as appropriate. In addition, if a write is made to the hard disk's MBR, the virus immediately reinfects it.

The Int 40h handler is used to allow the virus to infect floppy diskettes when I/O requests are sent destined for one of the floppy drives.

Infecting Disks

Other than the details given above, there are still a couple of things to mention about infection. When the Nutcracker virus is about to infect a diskette, it hooks Int 1Eh; and when it is about to infect a hard disk, it hooks Int 76h (Hard Disk Controller Complete). The hook is released as soon as infection is complete.

In addition, the virus uses port-level access to hard disks in an attempt to avoid anti-virus detection.

Triggers

These Nutcracker viruses have several payloads – if a floppy disk is accessed when the system timer value ANDed with F07Fh is zero, the virus displays a bouncing ball on the screen (much like the PingPong virus).

In addition, the viruses use an Int 15h hook to monitor Int 15h, AH=4Fh (Keyboard Intercept). If Ctrl-Alt-Del is pressed whilst the bouncing ball is being displayed [*after all, what else is a user likely to do when he sees a ping-pong ball on his screen? Ed.*], the virus may (depending on the system timer) erase sectors from the hard drive.

Nutcracker also monitors the system for programs writing the virus' own code out to disk; if it spots such activity, and the program performing the writing is not the virus itself, it will erase sectors on the hard drive. Therefore, anti-virus researchers must be careful when experimenting with the virus, lest it destroy their work.

In addition, if a read error occurs whilst loading from an infected disk, or if the virus is already in memory, it decrypts and displays a message similar, but not identical to, the standard DOS error message:

```
Non-system disk or disk error. Replace and
press strike any key when ready.
```

Finally, On 7 April, the virus decrypts and displays the following message:

```
_S_U_P_E_R_U_N_K_N_O_W_N_ was done by Lord
Nutcracker(AB0).
```

Nutcracker.AB0

Aliases: None known.

Type: Memory-resident boot infector with stealth functionality.

Infection: Boot sectors of floppy disks; MBR of hard drive.

Self-recognition in Sectors:
Compares 12 bytes of its own code with the code in the sector.

Self-recognition in Memory:
Temporarily sets the byte at address 0000:0087 (address of Int 21h handler) to 7Bh, and then checks that byte whilst loading from an infected disk.

Hex Patterns in Sectors and in Memory:

Nutcracker.AB0.a and Nutcracker.AB0.c:

```
2BDB FA8E D3BC 007C 8EC4 FBB9
???? BA?? ??FC 3680 3E87 007B
7411 BF03 002A E4CD 13B8 0502
CD13 730B 4F75 F2BE 8E7C E807
```

Nutcracker.AB0.b:

```
2BDB FA8E D3BC 007C 8EC4 FBB9
???? BA?? ??FC BF03 002A E4CD
13B8 0502 CD13 730B 4F75 F2BE
487C E807 00CD 19EA 9700 007C
```

Intercepts:
Int 08h, to hook other interrupts and call trigger routine.
Int 15h, to hook Int 13h and call infection and stealth routines.
Int 1Eh, temporarily, whilst infecting floppy disks.
Int 21h, temporarily, to move its TSR code.
Int 40h, to infect floppy disks.
Int 76h, temporarily whilst infecting the MBR.

Trigger: Erases hard drive sectors, launches a PingPong-like jumping ball, and displays a message. See analysis for more details.

Removal: Under clean system conditions, identify and replace infected floppy boot sectors, and fix the Partition Table in the MBR of the hard drive.

COMPARATIVE REVIEW

NT: The Next Generation?

Windows NT is an operating system whose time has very definitely come – the average level of PC hardware is perfectly up to the task of running it, and many organisations are holding off from upgrading to *Windows 95* until they've had the chance fully to evaluate *NT 4.0*, the latest version of *Windows NT*. The corporate prices of the two are not that dissimilar, nor are the hardware requirements.

However, at this point in time, the major use for *Windows NT* is as a server operating system – it has been making inroads into the market domination of *Novell's NetWare*. It offers easy scalability to platforms other than *Intel*-based PCs – if your network outgrows your Pentium server, why not upgrade it to a *DEC* Alpha?

Newfangled Testing

Not all that long ago, reviewing anti-virus products could be done adequately with a single 386 with a couple of MB of memory, a tiny hard disk, a VGA monitor, and some out-dated 90MB Bernoulli disks. Those days are gone. I once ran *Windows NT* on a 386/25 with 10MB of memory and a slow 80MB hard disk, but after therapy I have almost managed to block it from my mind – it is not an experience I want to repeat.

The system used for this review was of a higher specification: readers should refer to the Technical Details at the end of the review. *Windows NT Server 3.51* (the shipping version at the time the products were submitted) was used, and Service Pack Four was applied. The network used consisted of the *NT* server, a *NetWare 3.12* server, and three DOS clients. This allowed testing of most aspects of product functionality.

Testing

The test-sets have expanded since the last comparative, in July 1996 – the In the Wild file and Boot Sector sets have been brought up to date with the June WildList, and include all viruses from the top section of the list which could be replicated. The Standard test-set has been expanded, but the Polymorphic set remains unchanged from the July review.

It was also decided, following that comparative, to run the products in a mode such that they scan all files, rather than just those which match a product's default extension list. This is done because there is no requirement that documents are named .DOC.

The make-up of the speed sets is listed in the Technical Details section at the end of the review; all products are run on a fresh installation of *Windows NT* with no other software running apart from Program Manager. As *Windows NT* is an operating system which is fully multi-tasking, it can be difficult to reproduce speed figures unless great care is taken. In all cases, the anti-virus product was the foreground application, and the system's tasking configuration was set to the default, 'Best Foreground Application Response Time'. Tests were performed immediately following a reboot.

Also in the Technical Details section is a WWW address for a document describing in detail the calculation system used. This lays out the entire system in more depth than is possible in the pages of *VB*, and includes worked examples.

Resident Software

Only four of the products submitted – those from *Cheyenne, Intel, McAfee*, and *S&S* – were supplied with on-access components. These parts of the products were not tested to the same extent as the conventional scanner; however, they were tested for basic functionality – to ensure that they detected files opened and executed, and boot sectors on floppy disks accessed, and that files on all types of filing system (local and remote) were checked.

The final test was to stress the on-access scanner on the server for several hours, continually opening and closing files both on the server itself and from client machines in a basic attempt to provoke some form of slip on the part of the software. Performance Monitor was used to check for memory leaks after this test.

Alwil AVAST! (Build 349)

ItW Boot	100.0%	Standard	100.0%
ItW File	100.0%	Polymorphic	100.0%
ItW Overall	100.0%		

This Czech product continues to go from strength to strength: the most obvious thing to say here is that it found all the test viruses. Every one. Impressive, to say the least.

On other fronts, the product's front-end is… well, different. There is liberal (even over-enthusiastic) use of expandable list selectors: in tandem with a non-resizable base window, this makes things difficult to use. Rather than presenting the user with the more conventional list of drives and offering to scan them, if the user wishes to scan a particular object or group of objects, he must create a new job. The user is introduced quickly to the fairly advanced concept of creating and

	Clean Floppy		Infected Floppy		Clean Hard Disk	
	Scan Time (min:sec)	Data Rate (KB/s)	Scan Time (min:sec)	Data Rate (KB/s)	Scan Time (min:sec)	Data Rate (KB/s)
Alwil AVAST!	1:00	16.2	1:34	12.5	7:07	449.0
Cheyenne InocuLAN	1:03	15.5	1:24	14.0	5:12	614.5
Cybec VET	0:52	18.7	1:17	15.2	2:13	1441.6
DataFellows F-PROT	1:04	15.2	1:36	12.2	4:04	785.8
ESaSS ThunderBYTE	1:02	15.7	1:50	10.7	3:01	1059.3
H+BEDV AntiVir	0:54	18.0	1:06	17.8	3:07	1025.3
Intel LANDesk	1:01	16.0	1:25	13.8	4:06	779.4
McAfee NetShield	1:05	15.0	1:28	13.3	3:38	879.5
Norman Virus Control	0:58	16.8	1:22	14.3	3:01	1059.3
S&S Dr Solomon's AVTK	1:05	15.0	1:45	11.2	3:03	1047.7
Sophos SWEEP	1:03	15.5	1:24	14.0	5:10	618.5
Stiller Integrity Master	0:53	18.4	1:40	11.7	3:15	983.3
Symantec Norton AV	1:01	16.0	1:22	14.3	2:03	1558.8

managing his own custom list of scan jobs, but it is considerably more awkward than with some other products to start the product and scan a particular directory or drive.

When creating a new scan job, the user is guided through the process by a series of dialogs which could be said to make up a wizard; the system is easy to learn, but becomes slightly irritating as the user becomes more experienced.

Despite these gripes, the interface is elegantly done, and can be used intuitively. This is perhaps just as well: whilst the supplied product was in English, the help file was in Czech!

In addition to a scanner, an integrity checker is supplied, with which a user may take a snapshot of executables on his system and check that they have not changed.

It is worth noting that the top-notch detection rates do come with a price-tag; the scanner was by far the slowest when it came to scanning the clean hard disk – a data rate of just under 450KB/s will result in long scan times. However, in the real world there is no such thing as an anti-virus product which is lightning fast and offers excellent detection.

Cheyenne InocuLAN (v1.01)

ItW Boot	97.5%	Standard	91.1%
ItW File	97.2%	Polymorphic	85.2%
ItW Overall	97.4%		

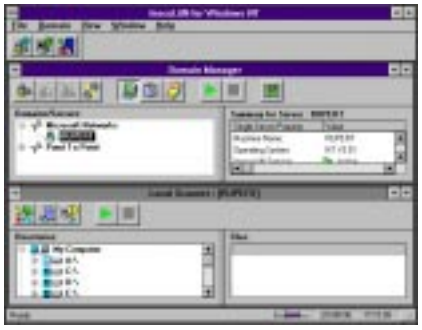
One always expects both pretty and powerful things from *Cheyenne*: the current release of *InocuLAN* for *Windows NT* does not disappoint. It is at the high end of the functionality range, offering sophisticated domain management features and real-time scanning, along with the expected scheduled and on-demand functionality.

The product presents itself as an MDI, with three main windows: the Domain Manager, the Service Manager, and the Local Scanner. The simplest, the Local Scanner, allows selection and scanning of local drives and visible network drives and their directories. The usual options are available, but a scan configuration cannot be saved for use in the next session. Information and reports from previous scans can be examined and manipulated as desired.

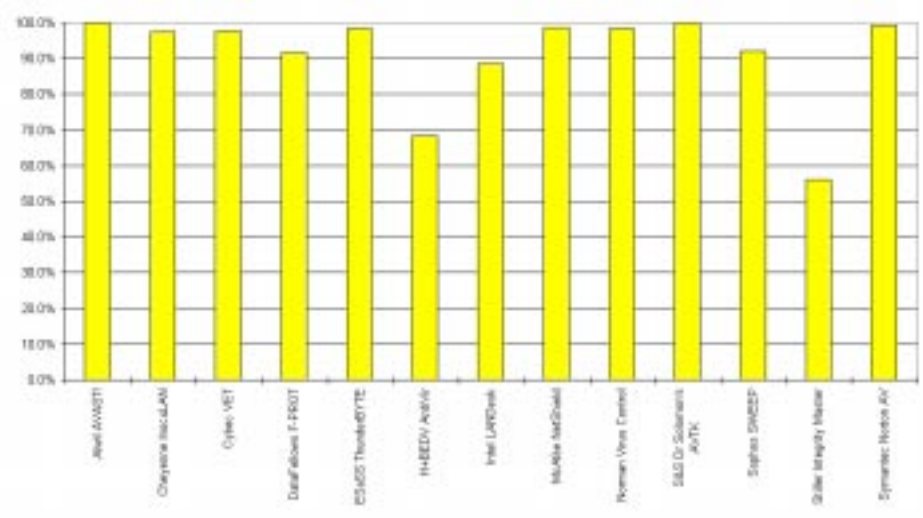
The Service and Domain Manager dialogs are somewhat confusing – the Domain Manager allows the user to examine a 'Summary View' of the *InocuLAN* machines on the network, which is extraordinarily similar to the view presented by the Service Manager, although identical icons (a red square and a green arrow) on the toolbars of the respective windows have completely different effects. It is easy to become confused as to what is on view, hence to know what effect pressing a button will have. There was also evidently an error at installation – one of the help files was not available.

The Domain Manager is more powerful – it allows viewing of relevant event log entries and reports from machines across the network, and scheduled jobs to be created, configured, and modified on any such machine. It also contains the controls for the real-time scanning component, which is configurable on a per-machine basis – the choice is between scanning files being placed onto the server, files being copied off the server, both, or neither. A user can also modify the extension list and the detection action.

In stress testing, the real-time scanner held up well, with no detectable memory instability over the period of the test. There was, however, a serious anomaly: when a session on the *NT* server accessed a file on the *NetWare* server, the monitor did not check it – a definite omission and hole in the protection.



Results Against the In the Wild Test-set



Detection rates were good but not excellent: the product missed 100% In the Wild detection, failing to detect Chance.B and Pasta in the In the Wild Boot Sector set, and Ph33r.1332, Desperado.1403.C, and Major.1644 in the In the Wild File set. Scores in the other test-sets were good: the improvement we have come to expect from *InocuLAN* is continuing.

Cybec VET (v9.0.5)

ItW Boot	97.5%	Standard	87.9%
ItW File	98.0%	Polymorphic	87.8%
ItW Overall	97.8%		

Cybec's VET for NT is a fairly simple product in comparison with some others in this review – even the ability to schedule a pattern of scans is missing, placing the product towards the bottom end of the features scale.

In fairness, there is a 32-bit command-line scanner, which can be used in conjunction with *NT's* built-in scheduling service. Running *VET* in this fashion, however, means it cannot check the boot sectors of the machine in question, leaving a fairly serious gap in protection.

The interface is easy to use, though different in style from many others in this review – the user is presented with a standard MDI in which he may view the drive/directory structure of the machine (the browser), and the report file for *VET's* current session. Simple scanning is performed by selecting the drive, directory or file to be scanned, and clicking on the *VET* icon, or using the RHB context-sensitive menu. However, it is not clear why *Windows* Cut/Copy/Paste options are available on selected objects in the browser: pasting into the report window simply enters the filename, and into other *Windows* applications, had the same results.

As to scanning options, *VET* is different from the other products tested in that, when presented with an infected file, it disinfects it by default without confirmation from the user, and without creating a backup. This does have advantages (fewer decisions for users to make) but it requires placing a fair amount of trust in the developer's ability to write disinfectors which work correctly every time. The action can be changed if desired.

VET is impressively quick: it was the fastest product in the floppy tests, but *NAV* beat it narrowly in the clean hard drive scan timings. As to detection, *VET* is above average; getting just under 100% on the In the Wild sets (missing Pasta and Stoned.Spirit on the In the Wild Boot sector set and Werewolf.1500.B, Desperado.1403.C, and a sample of Sayha on the ItW files). Combined with very creditable Standard and Polymorphic results, the final result gets better all the time.

DataFellows F-PROT Professional (v2.23)

ItW Boot	80.0%	Standard	92.3%
ItW File	100.0%	Polymorphic	50.4%
ItW Overall	91.5%		

F-PROT for NT's heritage is clear – it is remarkably similar to *F-PROT for Windows* and for *Windows 95* (even the icon reads 'F-PROT Professional for Windows'). This said, the interface is perfectly usable, consisting of the traditional menu and button bars, beneath which is a task selection area. Tasks are created and modified using buttons beneath this area.

Any task listed can be scheduled to occur at any time, and to repeat at almost any interval: the Schedule dialog is positively alive with boxes to select. Unfortunately, scheduling is handled by a user-level application placed into the Startup group on installation, so scheduled scans do not fire if no-one is logged on. It is necessary to save the settings explicitly, or they will not take effect; also, there appears to be a bug in this area of the program, and saved tasks are lost between sessions, making scheduling something of a problem.

	ItW Boot		ItW File		ItW Overall	Standard		Polymorphic	
	Number	Percent	Number	Percent	Percent	Number	Percent	Number	Percent
Alwil AVAST!	80	100.0%	342	100.0%	100.0%	511	100.0%	10000	100.0%
Cheyenne InocuLAN	78	97.5%	332	97.2%	97.4%	431	91.1%	8854	85.2%
Cybec VET	78	97.5%	336	98.0%	97.8%	403	87.9%	9042	87.8%
DataFellows F-PROT	64	80.0%	342	100.0%	91.5%	446	92.3%	5553	50.4%
ESaSS ThunderBYTE	80	100.0%	332	97.5%	98.5%	477	95.8%	9943	98.3%
H+BEDV AntiVir	52	65.0%	227	70.6%	68.3%	230	63.2%	4504	45.0%
Intel LANDesk	60	75.0%	335	98.2%	88.4%	330	77.4%	8299	77.2%
McAfee NetShield	80	100.0%	332	97.7%	98.7%	439	91.2%	7303	67.3%
Norman Virus Control	80	100.0%	332	97.5%	98.5%	477	95.8%	9943	98.3%
S&S Dr Solomon's AVTK	80	100.0%	342	100.0%	100.0%	509	99.6%	10000	100.0%
Sophos SWEEP	65	81.3%	342	100.0%	92.1%	505	99.2%	9498	93.7%
Stiller Integrity Master	0	0.0%	332	97.3%	56.1%	496	98.0%	4769	44.5%
Symantec Norton AV	80	100.0%	337	98.6%	99.2%	403	87.4%	5734	56.8%

The product has remote updating features which utilise a shared communication directory on the server, allowing clients to install updates when a new version is available – the solution is not as sophisticated as *Cheyenne's*, but it works well, provided all machines access the same shared drive.

F-PROT is the first product described here to suffer from failure to detect boot sector viruses on diskettes not readable by the operating system [*see The BPB Problem, p.12*]. This failure damages the boot sector score quite severely. The In the Wild file score is perfect, as we have come to expect from this product.

ESaSS ThunderBYTE (v7.04)

ItW Boot	100.0%	Standard	95.8%
ItW File	97.5%	Polymorphic	98.3%
ItW Overall	98.5%		

This product bears a remarkable resemblance to another – *ESaSS* and *Norman* have a 'strategic alliance' [*see VB, May 1995, p.3*],

which goes some way towards explaining why their products are so similar.

ThunderBYTE for Windows NT (*TBAVNT*) uses a drive-selection window beneath the expected button and menu bars; the only surprise comes when you notice the floating button bar. Mentioned in the *Norman* product's section of the *Windows 95* comparative earlier this year [*see VB, June 1996, p.12*], this is a natty little idea, but a little too crowded and confusing for comfort.

The product uses 'styles' to save scan settings for repeated use, or for use as part of a scheduled scan configuration: these are administered adequately, if not, perhaps, entirely intuitively.

For example, this reviewer was expecting to be able to set up a scan manually and then save it as a style. This is not, however, the case: the configuration must be set up from within the style dialog, and it is not possible to ask it to scan only a certain subdirectory tree from a style, only drives and combinations of drives.

Scheduling is available on any defined style via the *TBAV* Scheduler, enabling a number of scans to trigger daily, weekly or monthly (the time granularity is 15 minutes). A user-level application performs scheduling, so the user must be logged on for the scan to take place.

TBAV is always mentioned in *Virus Bulletin* DOS comparatives as being very fast; however, *Windows NT* does not allow the type of low-level disk access that *TBAV* for DOS uses to give it such speed, hence the product is not as far ahead as usual. Nevertheless, it still manages to fall in the top half of the speed figures.

Detection is a respectable 98.5%: the product missed some samples of Imposter, and all those of Wazzu and Werewolf.1500.B. Polymorphic detection is very good indeed, as is to be expected from a product which 'contains' *Norman* technology.

H+BEDV AntiVir (v1.07.4)

ItW Boot	65.0%	Standard	63.2%
ItW File	70.6%	Polymorphic	45.0%
ItW Overall	68.3%		

AntiVir is the product of *H+BEDV*, a German company based near Lake Constance, close to the German/Austrian border. Its scanner has performed well in previous *VB* DOS scanner comparatives. *AntiVir for Windows NT* is a new product, only available in German; fortunately, *VB* boasts a German speaker.

The product is basic in functionality, offering the standard on-demand windowed scanner and scheduled scanner functionality – scheduling is provided by a user-mode application, meaning scans cannot be carried out without a user logged on, and the application running.

The scanner interface is a standard drive selection box, with buttons to select all the drives of the various types, and a button bar along the top of the window to allow various commonly-needed tasks to be run. Simple, but nonetheless functional.

Detection rates not nearly as good as could be hoped: just over 68% of ItW viruses detected is not sufficient to form adequate protection, and results in the other categories are equally uninspiring.

Intel LANDesk Virus Protect

ItW Boot	75.0%	Standard	77.4%
ItW File	98.2%	Polymorphic	77.2%
ItW Overall	88.4%		

LANDesk Virus Protect shuns the conventional interface, and opts for something different. Unfortunately, in this case it doesn't entirely work. When the user starts the application, he is presented with a status display detailing the progress of the various scan types. Above this display is a button bar with icons to control various aspects of the product. The icons are misleading and somewhat confusing: in the end, it proved to be easier to use the menus.

When performing an on-demand scan, the user is required to use a frustrating series of dialogs and directory selectors to choose the area he wishes to scan (it is not possible to save these settings). To make matters trickier still, the directory selection window contains important components which are invisible in certain colour configurations – the test server is set up to use the colour scheme 'Black Leather Jacket'. It took some time to discover what to do with this almost entirely blank dialog box…

The scheduler uses the built-in *NT* schedule service (it even remembers to start the service and set it to automatic start if this has not already been done – a nice touch) to allow scans when no one is logged on, and to allow scans not to be affected by the currently logged on user. Selection of areas is flexible, but has the same problems as the on-demand selection dialogs described above.

The product offers a powerful notification component, with, amongst others, standard message boxes, paging, email, and very configurable SNMP. The notification configuration, however, is shared between all the different scan types.

A real-time scanning component, which is configured from within the main interface, is also included. The choices to be made are whether or not to scan either incoming or outgoing files (or both), which extensions to check, and what is to happen when a virus is detected. Sensible defaults are, of course, provided.

No problems were encountered during the stress testing, but, in common with the *Cheyenne* product, *Intel* could not check files which were loaded from a *NetWare* drive mounted on the *NT* server.

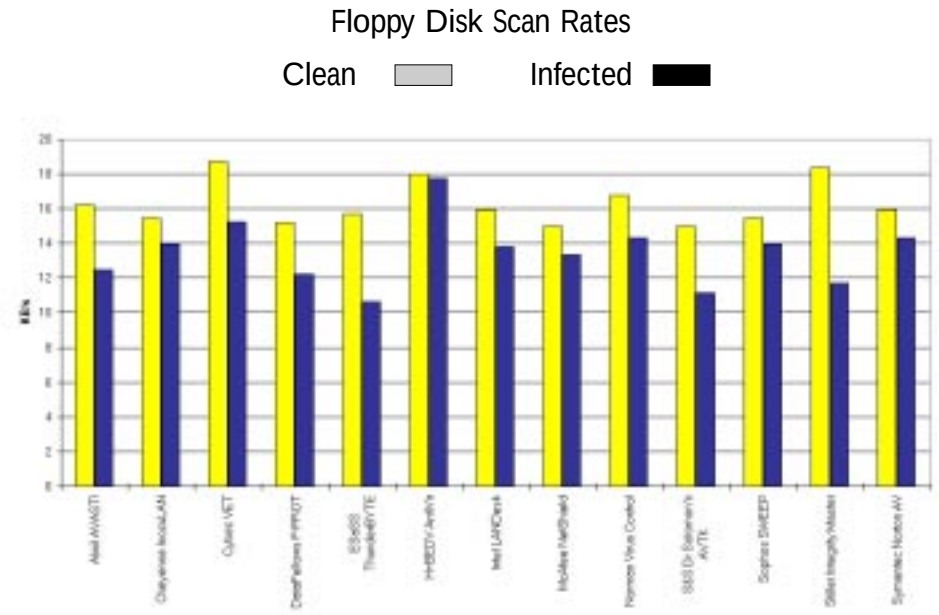
The BPB Problem

Every diskette contains, in the boot sector, a table of data which describes its layout – the table is called the BIOS Parameter Block, or BPB. The operating system uses this information to work out how to retrieve data from a diskette.

When a boot sector virus infects a diskette, it needs to write a new boot sector containing its code (or, in most cases, a loader for the rest of its code, stored elsewhere on the disk). It can do this by loading in the current boot sector and overwriting the in-memory image before writing it back, or it can construct an entirely new boot sector in memory, which it can then write out.

In the course of creating the new sector, the virus may need to create a new BPB. If it does this incorrectly, the infected diskette will not be readable by operating systems, which will notice the incorrect BPB and complain. However, the disk will still be infectious; the BIOS is still able to load the boot sector at power on and execute it.

Older viruses make this mistake – they either do not know about, or did not bother to take into account, various disk formats, and some do not simply refuse to infect media they do not understand, but infect with an invalid BPB.



In terms of speed, *LANDesk* is towards the low end of those products tested – a statement which holds equally true for its detection results. Things really hit rock bottom, however, with the simply staggering 21 false positives! Dearie me.

McAfee NetShield (v2.5.1)

ItW Boot	100.0%	Standard	91.2%
ItW File	97.7%	Polymorphic	67.3%
ItW Overall	98.7%		

McAfee ships two *Windows NT* anti-virus solutions: *ViruScan for NT Workstation*, and *NetShield for NT Server*. As expected, each product only installs on the version of *NT* for which it is designed. [*Recent research reveals the true difference between NT Server and Workstation – two registry entries… Ed.*]

The product tested was *NetShield*: it presents itself as a simple list display underneath the expected menu and button bars. This displays available tasks; double clicking on one of these brings up a window displaying the statistics associated with that task. RHB context-sensitive menus are attached to the tasks, making it easy to start, stop or modify the task. For those who prefer buttons to menus, these options are available from the button bar at the top of the window.

Any of the tasks defined can be scheduled to be started at various times on various days, and repeated after given time intervals. They will be fired even if no one is logged on, as they are controlled by the *NetShield* services. The only problem encountered with these was that if a scan of a mounted *NetWare* drive was scheduled, it would trigger but fail to scan anything, regardless of whether anyone was logged on at the time. This is a minor failing, but still significant.

New tasks can be defined by creating a default scan, then modifying its parameters to meet requirements, or by using the Scan Wizard, which guides a novice through the process; it's nice to have both options for novices and expert users in the same product. All configuration options can also be applied to remote *NT* servers running *NetShield* – the user chooses a machine to configure from a selection box on the button bar.

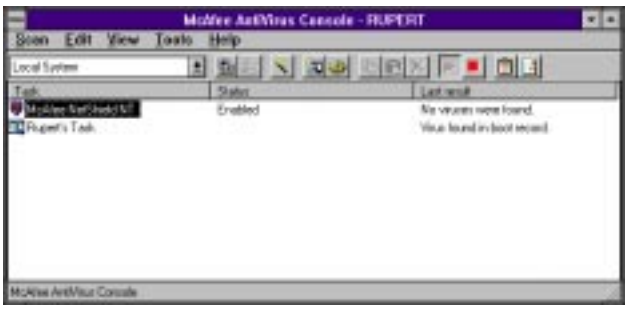
Sophisticated alert functions are built in, managed by the AlertManager service. Numerous methods of notification are supported, including pager, network message, printed log, email, and SNMP.

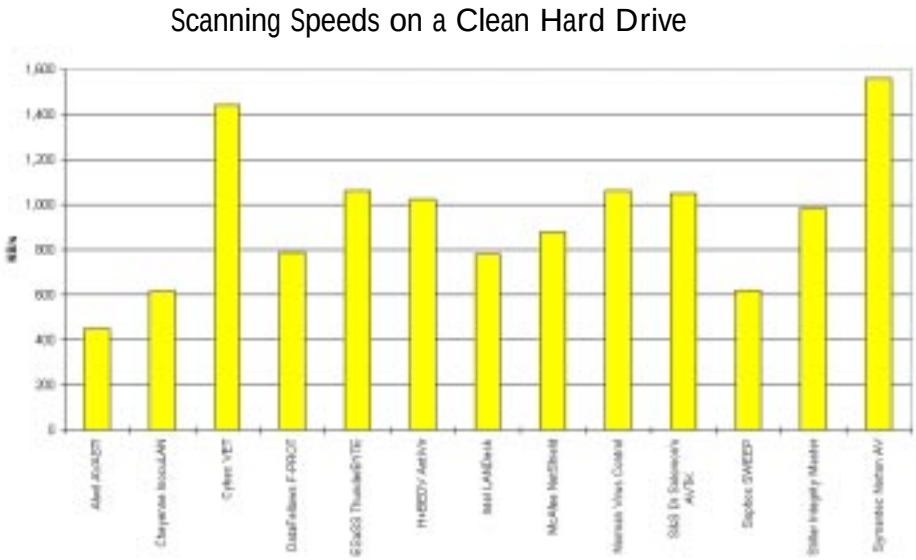
'Forwarding' offers the ability to create a centralised server on which all the alerts for the entire *NT* domain are sent – very useful for those with large networks. Complete control is also available over what is written to the Application Event Log, right down to editing the messages.

Real-time protection is managed from the main window: the administrator may configure the resident system to scan in/outbound files, to take a particular action when a virus is found, to decide what to do with log file entries, and which files to exclude. There were no problems in the stress test, and the resident software dealt correctly with *NetWare* drives.

Non-administrative users are allowed to disable the on-access component – on the face of it, it would seem that this should be a system-wide decision, made only by the administrator. However, when a non-administrative user requested the properties dialog for the on-access component, a message box popped up stating 'Couldn't connect to the specified computer on the command line: /NOSPLASH / SERVER "RUPERT"' [*Rupert is a VB test-server. Ed.*]. Also, users may delete tasks created by other users, including those with higher privileges.

The only thing missing from this product, apart from better security functionality, is the capability to perform centralised and remote updating of other machines on the network from the central server. In the detection tests, the product performed well, only missing out on 100% In the Wild due to missing samples of some of the macro viruses.





Norman Virus Control (v3.52/2.27)

ItW Boot	100.0%	Standard	95.8%
ItW File	97.5%	Polymorphic	98.3%
ItW Overall	98.5%		

Much of the functionality of this product has already been described when discussing *ESaSS TBAVNT* earlier in this review – refer to that section for further details.

The only apparent difference between the two installations (apart from the different product name…) is that *NVC* installs with a 'Book on Viruses' help file: whilst this is informative, it is also very out of date. Virus prevalence figures for 1992, anyone?

Detection figures for *Norman Virus Control* are slightly better than those for *ESaSS ThunderBYTE*: the same good score against the Polymorphics, a better result in the Standard test-set, and the same on the In the Wild test-sets.

S&S Dr Solomon's AVTK (v7.62)

ItW Boot	100.0%	Standard	99.6%
ItW File	100.0%	Polymorphic	100.0%
ItW Overall	100.0%		

Dr Solomon's Anti-Virus Toolkit (*AVTK*) is well-known for its top-notch detection. They have a well-established graphical user interface, used on their products across the *Windows* range (*3.1*, *95*, and *NT*). This in itself is fairly disappointing: *95* and *NT* each offer opportunities to enhance the interface in some fairly radical ways. However, the consistency is a bonus.

The Toolkit offers the usual drive selection box, accompanied by menu options to configure the scanner and integrity checker.

Curiously, it is necessary to go to the 'advanced' dialog on the scan selection screen in order to specify which subdirectory to scan: this is not obvious, and is inconvenient, apart from the fact that selecting a directory is not an advanced setting.

Scheduling functionality is provided by a separate user-level application. The application passes settings to the *Dr Solomon's* Schedule service: this allows jobs to trigger whether or not a user is logged on, and without the need for a user-level application to be left running at all times.

The real-time component, WinGuard for NT, permits on-access scanning of files locally on the server and remotely from client machines. It does not distinguish between incoming and outgoing files, but does offer selection of the types of objects to be checked.

WinGuard held up well under the stress tests: it did not appear to leak memory or cause undue problems on the server. It also intercepted file access successfully from *NetWare* volumes mounted on the server.

A nice feature of WinGuard is its ability to be controlled from a Control Panel applet, as opposed to from a section of the main interface. There is a certain symmetry to this – after all, the Control Panel should be used for exactly this type of thing. In common with other such systems, only administrators may modify the settings.

In speed tests, this product clocks in towards the top end of the speed scale, just breaking the 1MB/s barrier on the clean hard drive of the particular machine used for testing. Detection is also very impressive, with the product missing

only the two samples of Positron across all test-sets, meaning that it scored 100% in those all-important In the Wild tests.

Sophos SWEEP (v2.87)

ItW Boot	81.3%	Standard	99.2%
ItW File	100.0%	Polymorphic	93.7%
ItW Overall	92.1%		

SWEEP for Windows NT presents itself as an area selection window beneath the menu and button bars. Lit icons represent the areas chosen for scanning, and simply pressing the 'Go' icon starts the scan of those areas. A progress bar indicates how the current task is getting on, and a text display at the bottom contains messages.

Cleverly, everything beneath the button bar is actually a property page – the first for immediate (on-demand) scans, the second for scheduled scans. Switching between views allows a user to configure and execute either type of scan, and the application is nicely multi-threaded to allow, say, configuration of scheduled scans whilst an immediate scan is in progress.

Configuration is easy and intuitive, although some scan option pages are curiously designed. Scheduled scans may be configured to run on any combination of the days of the week, and at any number of times on those days. There are other scheduled scan configurations which are specific to particular jobs, and this allows different scheduled jobs to have different configurations.

If one scheduled job fires when another is still in progress, the new job is held until the one currently executing has finished, but an immediate scan can, of course, run concurrently with a scheduled one.

Scheduling is managed by the *SWEEP* service, which can be configured to log on as a given user to allow network resources to be scanned – the default is to log on as system, in which case network scheduled scans are not possible.

There is no functionality covering the administration of multiple computers, and no on-access scanner as yet. In terms of the interface, support for context-sensitive RHB menu support would be welcome, and more expected as *Windows NT* moves towards the *Windows 95* interface.

The product is among the slower of those tested, and hits the BPB [*see panel p.12*] problem on scanning diskettes. This aside, *SWEEP* had no other problems with the In the Wild test-set, and Standard and Polymorphic scores are also very good.

Stiller Research Integrity Master (v3.02a)

ItW Boot	0.0%	Standard	98.0%
ItW File	97.3%	Polymorphic	44.5%
ItW Overall	56.1%		

This is an intriguing submission for the *Windows NT* comparative, in that it's not actually a native *Windows NT* product, but one for DOS. However, as usual, we did not state that submitted products had to be native *NT* solutions, and we take what we get.

Integrity Master has a DOS character-mode user interface, which is described and illustrated more fully in this month's standalone review on p.21. Whilst it is usable and functional, it's not really quite what a *Windows NT* user is looking for…

As expected, the product does not offer built-in scheduling, but as it can be driven from the command-line, it is possible to schedule scans using the *NT* scheduler. Of course, *NT*-specific features are absent.

One significant problem is that the product cannot check boot sectors from within the *Windows NT* environment: *NT* does not allow the appropriate level of disk access, so the product does not try. This is much more elegant than having the *NT* error box pop up. When used under DOS, the product does detect 74 of the 80 boot sector viruses; however, the problems under *NT* are rather serious in this regard, and as far as could be ascertained cannot be avoided without the presence of some *NT*-specific component.

Despite the very reasonable detection in other areas (though the Polymorphic set was a low point), it's difficult to recommend such a product for use in an *NT* environment any more – after all, *NT* has been around for over two years now; it's time to ask for more.

Symantec Norton AntiVirus (26/07/96)

ItW Boot	100.0%	Standard	87.4%
ItW File	98.6%	Polymorphic	56.8%
ItW Overall	99.2%		

Norton AntiVirus for Windows NT is available for free download from the *Symantec* Internet site; be prepared for a long wait, however: it's a 1.9MB self-extracting executable. Once unpacked, a standard setup program installs the software without problems. It is keen to perform some form of on-line registration; fortunately, however, it is possible to skip this process.

The product presents itself as a standard drive-selection box surrounded by buttons to perform various tasks; amongst other things, you may select to scan all floppy drives, all hard drives, or all network drives. Interestingly, although the *NT* server was connected correctly to a *NetWare 3.12* server, and the *NetWare* volume was mapped onto a drive letter on the *NT* server, the selection box did not include that drive letter! It was only possible to scan the drive in question by choosing from the options available in the 'Scan' menu.

The scheduler is decidedly basic – it only offers the ability to scan all the hard drives at a certain time on one day a week. On the plus side, however, as it is executed by the system scheduler, jobs are fired even when no-one is logged on.

For some reason, the scanning speed, whilst only average on the floppy disk tests, was the fastest of the group on the clean hard drive test; unfortunately, it encountered one false positive in this test.

As far as detection is concerned, the product continues to inch towards 100% detection against the In the Wild test-sets, this time missing out only on one sample of Desperado.1403.C and all of those of Nuclear.B. A little more work on the detection of other viruses in the other test-sets would set this work off nicely. Unfortunately, the one false positive suffered is a definite minus.

Comments

The development cycle of a *Windows NT* anti-virus product is clear indeed; under normal circumstances, it appears to run like this:

- Stage One: port of *Windows 3.1* product, with bolt-on user-level scheduler
- Stage Two: compatibility with *NT* built-in schedule service
- Stage Three: virus scanning engine installs as a service to permit greater independence from the system and the currently-logged-on user
- Stage Four: real-time scanning file system filter, domain management facilities, centralised updating and reporting

Clearly the exact stages will vary per product, and many products will go through sub-stages on the way, but by and large this is how it works. Every product in this test falls almost exactly into one or other of these categories; the similarities in the development paths are remarkable.

Of the product components, the most technically difficult is the on-access scanner: what is easy under DOS and not overly difficult under *Windows* and *Windows 95* is extremely tricky under *Windows NT*. On the whole, the four products that include this functionality do it well: *Cheyenne* and *Intel* failed to check files accessed on a mounted *NetWare* volume, but neither would crash, even under extreme levels of file traffic. *McAfee's* system is the easiest and most flexible to control, however.

The domain management features are a slightly different matter: *Cheyenne* and *McAfee* approach the same problem from different angles, and consequently reach solutions which appear completely different. *Cheyenne's* is probably more powerful at this point, but *McAfee's* is far easier to use.

Conclusions

So, when it comes to the crunch, who has the edge? In the opinion of this reviewer, *McAfee* and *Sophos* vie for the position of having the most user-friendly interface, but this is an aspect of products in which it is often a matter of preference for each individual user. They are both very easy to use and understand without needing to resort to the manual; *McAfee's*, however, has more of the neat little touches that make people sit up and take notice.

Detection rates are a different matter: only *AVAST!* and *Dr Solomon's AVTK* manage 100% on the In the Wild Overall score, and both of these products do extremely well on the other sets as well (*AVAST!* missed nothing, and the *AVTK* missed only one sample) – on this basis, the recommendation should be one of these two; however, it seems a shame that neither feels right in the *NT* environment. They are in many ways inelegant solutions.

The gestation of these products is very much still underway: none is complete at this point in time; right now, I would recommend *McAfee* as the best all-rounder. If only its detection was a little better, there would be no contest at all.

Technical Details

Hardware used: *Compaq ProLinea 590*, 16MB RAM, 2.1GB disk and a 270MB *SyQuest* removable drive.

Software: *MS Windows NT Server 3.51* with Service Pack Four applied (the current release at the time of product submission).

Speed test-sets:
Clean Floppy: 43 COM/EXE files, occupying 997,023 bytes, on a 1.44MB diskette. Infected Floppy: the same files, infected with Natas.4744, occupying 1,201,015 bytes, on a 1.44MB diskette. Clean Hard Disk: 3250 COM/EXE files, occupying 196,338,487 bytes, spread across 65 directories on a single NTFS partition.

Other technical information:
After reviewing each product, a complete disk image of the OS was restored to the test machine from a sector-level backup on a SyQuest cartridge. Boot sector viruses are all genuine infections, held on 3.5-inch diskettes (one each). The June 1996 WildList (available at http://www.virusbtn.com/WildLists/) was used as the source for the In the Wild test-sets.

WWW address for calculation information:
http://www.virusbtn.com/Comparatives/NT/199610/protocol.html

TEST-SETS

In the Wild Boot Sector Test-set. 80 viruses; one each of:

15_Years, AntiCMOS.A, AntiCMOS.B, AntiEXE.A, Boot.437, BootEXE.451, Brasil, Bye, Chance.B, Chinese Fish, Crazy_Boot, Da_Boys, Diablo_Boot, Disk_Killer, DiskWasher.A, Empire.Int_10.B, Empire.Monkey.A, Empire.Monkey.B, EXEBug.A, EXEBug.C, EXEBug.Hooker, FAT_Avenger, Feint, Finnish_Sprayer, Flame, Form.A, Form.C, Form.D, Frankenstein, Galicia, J&M, Joshi.A, Jumper.A, Jumper.B, Junkie, Kampana.A, Leandro, MISiS, Mongolian_Boot, Music_Bug, Natas.4744, NYB, Parity_Boot.A, Parity_Boot.B, Pasta, Peter, QRry, Quandary, Quox.A, Ripper, Russian_Flag, Sampo, Satria.A, She_Has, Stealth_Boot.B, Stealth_Boot.C, Stoned.16.A, Stoned.Angelina.A, Stoned.Azusa.A, Stoned.Bravo, Stoned.Bunny.A, Stoned.Daniela, Stoned.Dinamo, Stoned.June_4th.A, Stoned.Kiev, Stoned.LZR, Stoned.Michelangelo.A, Stoned.Manitoba, Stoned.No_Int.A, Stoned.NOP, Stoned.Spirit, Stoned.Standard.A, Stoned.Swedish_Disaster, Stoned.W-Boot.A, Swiss_Boot, Unashamed, Urkel, V-Sign, WelcomB, Wxyc.

In the Wild File Test-set. 342 samples of 109 viruses; made up of:

Accept.3773 (5), Alfons.1344 (5), Anticad.4096.A (4), Anticad.4096.Mozart (4), Arianna.3375 (4), Avispa.D (2), Backformat.A (1), Bad_Sectors.3428 (5), Barrotes.1310.A (2), BootEXE.451 (3), Bosnia:TPE.1_4 (5), Burglar.1150.A (3), Byway.A (1), Byway.B (1), Cascade.1701.A (3), Cascade.1704.A (3), Cascade.1704.D (3), Cawber (3), Changsa.A (5), Chaos.1241 (6), Chill (1), Concept (4), CPW.1527 (4), Dark_Avenger.1800.A (3), Datalock.920.A (3), DelWin.1759 (3), Desperado.1403.C (2), Die_Hard (2), Dir_II.A (1), DR&ET.1710 (3), Fairz (6), Fichv.2_1 (3), Finnish.357 (2), Flip.2153 (2), Flip.2343 (6), Freddy_Krueger (3), Frodo.Frodo.A (4), Ginger.2774 (2), Green_Caterpillar.1575.A (3), Helloween.1376.A (6), Hi.460 (3), Hidenowt (1), Imposter (4), Istanbul.1349 (6), Jerusalem.1244 (6), Jerusalem.1808.Standard (2), Jerusalem.Sunday.A (2), Jerusalem.Zero_Time.Australian.A (3), Jos.1000 (3), Junkie (1), Kaos4 (6), Keypress.1232.A (2), Lemming.2160 (5), Liberty.2857.A (2), Little_Brother.307 (1), Little_Red.1465 (2), Macgyver.2803 (3), Major.1644 (3), Maltese_Amoeba (3), Manzon (2), Markt.1533 (3), Mirea.1788 (2), Natas.4744 (5), Necros.1164 (2), Neuroquila (1), Nightfall.4518.B (2), Nomenklatura.A (6), November_17th.800.A (2), November_17th.855.A (2), No_Frills.Dudley (2), No_Frills.No_Frills.843 (2), Npox.963.A (2), Nuclear.B (4), One_Half.3544 (5), Ontario.1024 (3), Pathogen:SMEG.0_1 (5), Ph33r.1332 (5), Phx.965 (3), Predator.2448 (2), Quicksilver.1376 (1), Sarampo.1371 (6), SatanBug.5000.A (2), Sayha (5), Screaming_Fist.II.696 (6), Sibylle (3), Sleep_Walker.1266 (3), SVC.3103.A (2), Tai-Pan.438 (3), Tai-Pan.666 (2), Tentacle (3), Tequila.A (3), Three_Tunes.1784 (6), Trakia.653 (1), Tremor.4000.A (6), Trojector.1463 (6), Trojector.1561 (3), Unsnared (3), Vacsina.TP-05.A (2), Vacsina.TP-16.A (1), Vampiro (2), Vienna.648.Reboot.A (1), Vinchuca (3), VLamix (1), Wazzu (4), Werewolf.1500.B (3), Xeram.1664 (4), Yankee Doodle.TP-39 (5), Yankee_Doodle.TP-44.A (1), Yankee_Doodle.XPEH.4928 (2).

Standard Test-set. 511 samples of 250 viruses, made up of:

Abbas.5660 (5), AIDS (1), AIDS-II (1), Alabama (1), Alexe.1287 (2), Algerian.1400 (3), Amazon.500 (2), Ambulance (1), Amoeba (2), Anarchy.6503 (5), Andreew.932 (3), Angels.1571 (3), Annihilator.673 (2), Another World.707 (3), Anston.1960 (5), Anthrax (1), AntiGus.1570 (3), Anti-Pascal (5), Argyle (1), Armagedon.1079.A (1), Assassin.4834 (3), Attention.A (1), Auspar.990 (3), Baba.356 (2), Backfont.905 (1), Barrotes.840 (3), Bebe.1004 (1), Big_Bang.346 (1), Billy.836 (3), BlackAdder.1015 (6), Black_Monday.1055 (2), Blood (1), Blue_Nine.925.A (3), Burger (3), Burger.405.A (1), Butterfly.302.A (1), BW.Mayberry.499 (3), BW.Mayberry.604 (6), Cantando.857 (3), Cascade.1701.Jo-Jo.A (1), Casper (1), Catherine.1365 (3), CeCe.1998 (6), CLI&HLT.1345 (6), Cliff.1313 (3), Coffeeshop (2), Continua.502.B (3), Cosenza.3205 (2), Coyote.1103 (3), Crazy_Frog.1477 (3), Crazy_Lord.437 (2), Cruncher (2), Cybercide.2299 (3), Danish_Tiny.163.A (1), Danish_Tiny.333.A (1), Dark_Avenger.1449 (2), Dark_Avenger.2100.A (2), Dark_Revenge.1024 (3), Datacrime (2), Datacrime_II (2), DBF.1046 (2), Dei.1780 (4), Despair.633 (3), Destructor.A (1), Diamond.1024.B (1), Dir.691 (1), DOSHunter.483 (1), DotEater.A (1), Ear.405 (3), Eddie-2.651.A (3), Eight_Tunes.1971.A (1), Enola_Gay.1883 (4), F-You.417.A (1), Fax_Free.1536.Topo.A (1), Fellowship (1), Feltan.565 (3), Fisher.1100 (1), Flash.688.A (1), Four Seasons.1534 (3), Frodo.3584.A (2), Fumble.867.A (1), Genesis.226 (1), Green.1036 (6), Greetings.297 (2), Greets.3000 (3), Halloechen.2011.A (3), Hamme.1203 (6), Happy_New_Year.1600.A (1), HDZZ.566 (3), Helga.666 (2), HLLC.Even_Beeper.A (1), HLLC.Halley (1), HLLP.5000 (5), HLLP.7000 (5), Horsa.1185 (3), Hymn.1865.A (2), Hymn.1962.A (2), Hymn.2144 (2), Hypervisor.3128 (5), Ibqqz.562 (3), Icelandic.848.A (1), Immortal.2185 (2), Internal.1381 (1), Invisible.2926 (2), Itavir.3443 (1), Jerusalem.1607 (3), Jerusalem.1808.CT.A (4), Jerusalem.Fu_Manchu.B (2), Jerusalem.PcVrsDs (4), John.1962 (3), Joker (1), July_13th.1201 (1), June_16th.879 (1), Kamikaze (1), Kela.b.2018 (3), Kemerovo.257.A (1), Keypress.1280 (6), Kranz.255 (3), Kukac.488 (1), Leapfrog.A (1), Leda.820 (3), Lehigh.555.A (1), Liberty.2857.A (5), Liberty.2857.D (2), Loren.1387 (2), LoveChild.488 (1), Lutil.591 (3), Maresme.1062 (3), Metabolis.1173 (3), Mickie.1100 (3), Necropolis.1963.A (1), Nina.A (1), November_17th.768.A (2), NRLG.1038 (3), NutCracker.3500.D (5), Omud.512 (1), On_64 (1), Oropax.A (1), Parity.A (1), Peanut (1), Perfume.765.A (1), Phantom1 (2), Phoenix.800 (1), Pitch.593 (1), Piter.A (2), Pixel.847.Hello (2), Pizelun (4), Plague.2647 (2), Poison.2436 (1), Pojer.4028 (2), Positron (2), Power_Pump.1 (1), Prudents.1205.A (1), PS-MPC.227 (3), PS-MPC.545 (6), Quark.A (1), Red_Diavolyata.830.A (1), Revenge.1127 (1), Riihi.132 (1), Rmc.1551 (4), Rogue.1208 (6), Saturday_14th.669.A (1), Screaming_Fist.927 (4), Screen+1.948.A (1), Semtex.1000.B (1), Senorita.885 (3), Shake.476.A (1), ShineAway.620 (3), SI.A (1), SillyC.226 (3), SillyCR.303 (3), SillyCR.710 (3), Sofia.432 (3), Spanz.639 (2), Stardot.789.A (6), Stardot.789.D (2), Starship (2), Subliminal (1), Suomi.1008.A (1), Suriv_1.April_1st.A (1), Suriv_2.B (1), Surprise.1318 (1), SVC.1689.A (2), Svin.252 (3), Svir.512 (1), Sylvia.1332.A (1), SysLock.3551.H (2), TenBytes.1451.A (1), Terror.1085 (1), Thanksgiving.1253 (1), The_Rat (1), Tiny.133 (1), Tiny.134 (1), Tiny.138 (1), Tiny.143 (1), Tiny.154 (1), Tiny.156 (1), Tiny.159 (1), Tiny.160 (1), Tiny.167 (1), Tiny.188 (1), Tiny.198 (1), Todor.1993 (2), Traceback.3066.A (2), TUQ.453 (1), Untimely.666 (3), V2P6 (1), V2Px.1260 (1), Vacsina.1212 (1), Vacsina.1269 (1), Vacsina.1753 (1), Vacsina.1760 (1), Vacsina.1805 (1), Vacsina.2568 (1), Vacsina.634 (1), Vacsina.700 (2), Vbasic.5120.A (1), Vcomm.637.A (2), VCS1077.M (1), VFSI (1), Victor (1), Vienna.583.A (1), Vienna.623.A (1), Vienna.648.Lisbon.A (1), Vienna.Bua (3), Vienna.Monxla.A (1), Vienna.W-13.507.B (1), Vienna.W-13.534.A (1), Vienna.W-13.600 (3), Virogen.Pinworm (6), Virus-101 (1), Virus-90 (1), Voronezh.1600.A (2), Voronezh.600.A (1), VP (1), Warchild.886 (3), Warrior.1024 (1), Whale (1), Willow.1870 (1), WinVir (1), WW.217.A (1), XQG.133 (3), Yankee_Doodle.1049 (1), Yankee_Doodle.2756 (1), Yankee_Doodle.2901 (1), Yankee_Doodle.2932 (1), Yankee_Doodle.2981 (1), Yankee_Doodle.2997 (1), Zero_Bug.1536.A (1), Zherkov.1023.A (1).

Polymorphic Test-set. 10,000 samples, made up of 500 samples of each of the following 20 viruses:

Alive.4000, Code.3952:VICE.05, Digital.3547, DSCE.Demo, Girafe:TPE, Gripe.1985, Groove and Coffee_Shop, MTZ.4510, Natas.4744, Neuroquila.A, Nightfall.4559.B, One_Half.3544, Pathogen:SMEG, PeaceKeeper.B, Russel.3072.A, SatanBug.5000.A, Sepultura:MtE-Small, SMEG_v0.3, Tequila.A, and Uruguay.4.

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PRODUCT REVIEW 1

F-PROT Professional for Windows NT

Martyn Perry

This month a *Windows NT* product takes a turn under the spotlight; namely, *F-PROT Professional for NT* v2.23a from the Finland-based *Data Fellows*.

Licence Considerations

The licence covers the supply of a pre-specified number of base packages which include full documentation. In addition, a pre-specified number of additional manuals and a user's guide (which may be copied freely) are included.

The licence is granted on a per PC basis which is extended to include the home computers of users based at the office where the licensed software is installed.

Presentation and Installation

The product comes with a single manual with sections for DOS, *OS/2*, and *Windows 3.1*, *95* and *NT*. There are three choices as to the type of installation: Network Administration, Standalone Computer or Update.

For the Network Installation, the user is prompted to select the installation directory for the product (the default is a directory called F-PROTNT underneath the *Windows* System directory. A shared directory exists for communication between the server and client machines. This is user-defined and must be visible to the users with full (read/write/create/delete) rights.

The installer is prompted for an administrator's password, and installation will not proceed until one is entered. The files are now copied, with a vertical level meter showing progress of individual files being transferred as well as a normal progress meter for overall installation.

Finally, the installer is prompted to enter his name, and that of his organisation and machine. This creates the F-PROT Professional common program group, which includes the main program as well short-cuts to a number of pre-defined tasks, namely: scan a diskette, scan a hard disk, and scan a network. F-Agent is loaded automatically from the Startup group: it runs in the background to start scheduled tasks, and also takes care of communication between a workstation and the *F-PROT* administrator.

The application is started with a default task to scan all hard disks when the machine is idle and to report if a virus is found. The default initial configuration does not include the administration facility; however, this can be accessed from the File menu.

Administration

Scanner administration is performed by the administrator logging in to the application by using the password chosen on installation. Administration revolves around managing tasks and preferences – a task is a pre-defined scan; the preferences determine how *F-PROT* operates.

Preferences cover various areas of the product such as file extensions to be scanned, and how reports are to be handled. A task can be executed either by scheduling it or by running it interactively. A task can be stopped at any time by clicking the Stop button in the dialog window. The program prompts for confirmation: if this is given, it will halt the scan and produce a summary of the incomplete results.

Tasks are defined from the Tasks Menu. Existing tasks can be modified by double-clicking on the task from the task list in the main window, which brings up the 'Task Settings' window shown below. Each task is given a name for identification; and for each, several options are available:

- method of scanning used (limited at the moment to Secure only)
- action to be taken when a virus is detected
- drive selection
- selection with browse facility down to individual directories or files

Further settings include a choice of Executables Only or All Files. 'Executables Only' scans executable files with default extensions COM, EXE, SYS, OV?, APP, PGM, and BIN. [*Interestingly, this does not include DOT and DOC, though these files were checked. Ed.*] These can be modified using the Set Preferences options under Scanning. The final option controls the checking of boot sectors on hard and floppy disks.

F-PROT for Windows NT allows the user considerable flexibility in configuring individual scan settings and times.

The type of malware to be detected can also be chosen. This includes Viruses and Trojan Horses and/or, as a separate selection, Document Macro Viruses (the default is both). If both are deselected, the OK button is greyed out, preventing execution of scanning for nothing. A separate section defines what objects will be scanned.

F-PROT has two modes of scanner operation; Immediate and Scheduled. The configuration options for these scans can be pre-defined and stored as tasks. An immediate scan will check the server on demand, using the current immediate settings defined as a task. A scheduled scan allows checks on a defined, timed basis.

To start an immediate scan, set up the task so it is displayed on the task list. Select the specific task required and click start on the task bar. If a virus is found, when the scanner is set to delete infected objects, this message is displayed: 'The file <filename> is infected. Overwrite and delete the file: Yes, or Yes to All'. The slide bar on scan display can be selected as the scan proceeds, which allows the user to scroll back up to view the messages that have gone off the top of the screen.

In addition to simply scanning at a given time, the scheduled scanning option offers periodic scanning, which can be set to execute at regular intervals after a pre-defined amount of idle time. If Scheduling is enabled, a task can be configured to start only after a defined number of idle minutes.

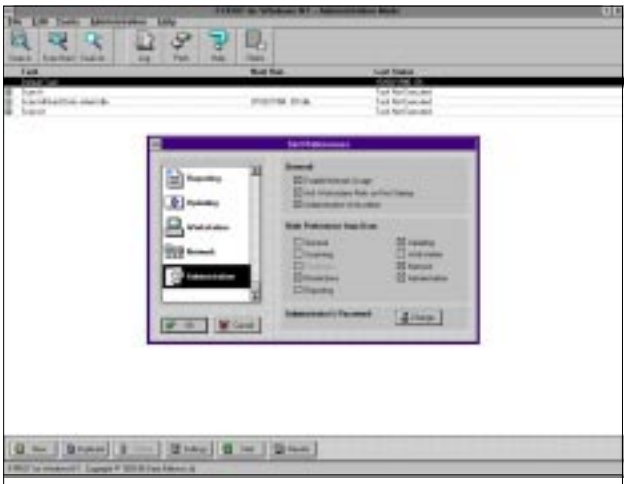
The date and time choices are comprehensive, allowing scans to be selected, daily, every second to ninth day, on specific days, or a specific day in the month. If specific days are selected, the Week selection can be every week, or second to fourth week. Month selection can be specific month(s), every month, or every second, third or fourth month.

One fairly serious problem with scheduling using F-Agent is that scheduled jobs only trigger when someone is logged on. If this is not the case, next time the user does log on, they are warned that jobs were missed, and given the opportunity to execute them there and then.

Using F-Agent may thus be a problem on machines used as servers: under normal circumstances no one should be logged on at these machines' consoles. A more effective strategy, if more complicated to implement, would be to use the built-in *NT* scheduler, which deals a little [*but not much! Ed.*] better with not having someone logged on at the time of an event, or to use a service element – services are components of *Windows NT* which are always running, even when no one is logged on, and under normal circumstances run at a higher level of user privileges than standard user programs.

Configuration Options

The configuration options are referred to as Task Settings. These settings can be created either by copying an existing task and editing its parameters, or by creating a completely new task. Various selections can be made for each task. These include:



F-PROT for NT's preferences dialog superimposed on the main task display screen.

- options to scan – this can include local and network drives. This can be extended down to specified directory or file. If the option is left empty, *F-PROT* will prompt for the directory or file when the task is started.
- objects to be included in the scan: these can be executable or all files and boot sectors
- actions to be taken on virus detection: report only, attempt disinfection, and delete or rename infected file

Reports, Activity Logs, and Communications

F-PROT records executed tasks in the file F-PROTW.LOG. Each entry consists of the task name, execution time and result status. A separate log file reports the results from the task with details of the scan and any viruses detected.

The product supports communication between administrator and users in the form of Bulletins and Messages. These are files which are handled using directories or the server, which is a directory defined with the administrator preferences. The files are created using a separate editor.

Further communication options include having a workstation inform the administrator in the event of a virus being detected, with reports also being sent to the REPORT directory.

In addition, infected and suspect files will be transferred to INFECT and SUSPECT directories respectively, along with the supporting information file. The latter is a useful feature not often seen; it will be helpful for the busy administrator to have the information telling him where this file originated when he has to deal with it.

Tasks can be created by the administrator and distributed to users via the network. *F-PROT* on local workstations will automatically add any distributed tasks to their local task lists.

Updates

Updates can be distributed over the network using an administrator option. Using this option will copy everything under the administrator's F-PROT root directory to the

shared UPDATE directory. From there, they are detected by the various clients as they log on, and then copied to their local drives.

The update bulletins are worth a particular mention: they are in newsletter format, and cover changes to the product and new viruses detected. Additionally, news items and details of how the viruses known to *F-PROT* work are included.

Detection Rates

The scanner was checked using four test-sets: In the Wild, Boot Sector, Standard and Polymorphic – see summary for details. Undetected viruses in the file test-sets were identified using the delete files option and listing the files left behind in the virus directories.

The tests were conducted using the default scanner file extensions supplied. The results were generally good. The In the Wild test produced a 100% result; however, the Standard test only produced 83% success, and the Polymorphic, only 55%. In the Boot Sector set, *F-PROT* suffered from the common problem of being unable to detect viruses on disks not readable by *NT* – readers should refer to the *Windows NT* comparative review for further information. This problem knocked its score against the test-set to 82.5%.

Real-time Scanning Overhead

To determine the impact of the scanner on the server, 50 files making up 6,797,522 bytes (EXE and COM files) were copied from one server directory to another using COPY. The directories used for the source and target were excluded from the virus scan to avoid the risk of a file being scanned while waiting to be copied. The default system setting of Best Foreground Application Response Time was used.

Because of the different processes which occur within the server, the time tests were run ten times for each setting and an average taken. The four tests were:

- Program not loaded. This establishes the baseline time for copying the files on the server.
- Program unloaded. This is run after the other tests to check how well the server returns to its former state. The result in this section is actually fractionally lower than the first, but the discrepancy is well within error.
- Program loaded, but the immediate scanner not running. This tests the impact of the application in a quiescent state, just running F-Agent program which handles the scheduling and communication activities.
- Program loaded and the immediate scan running. This is the full impact of running the scanner on the server files. See the summary for the detailed results.

As *F-PROT* performs a clean unload of all the files which were originally installed, there is effectively no residual overhead. The effect of the scheduling agent is fairly low, though higher than expected, and the overhead only becomes significant when the scan is running. The impact of this can be adjusted by changing foreground/background response under *NT*.

Conclusion

The documentation includes a discussion of the impact of viruses with the various operating systems and the clean up processes. The on-line help is available and is a good adjunct to the manual.

The product installs easily, and a deinstall option is included. The product has a good range of options for scanning and dealing with viruses, as well as for communicating between administrator and workstation. One of the few things missing is on-access scanning, which is sure to be on the way.

F-PROT Professional for NT

Detection Results

Test-set[1]	Viruses Detected	Score
In the Wild	342/342	100.0%
Boot Sector	66/80	82.5%
Standard	338/409	82.6%
Polymorphic	5553/10000	55.5%

Overhead of On-access Scanning:

Tests show time taken to copy 50 COM and EXE files (6.8MB). Each is performed ten times, and an average is taken.

	Time	Overhead
Not loaded	7.54	-
Unloaded	7.52	-0.27%
Loaded, no manual scan	8.56	13.53%
Loaded, manual scan	13.06	73.21%

Technical Details

Product: *F-PROT Professional for NT*. v2.23a

Developer/Vendor: *DataFellows Ltd*, Päivantaite 8, FIN-02210 Espoo, Finland. Tel +358 0 478 444, fax +358 0 478 44599, WWW http://www.datafellows.com/.

Distributor UK: Portcullis Computer Security Ltd, The Grange Barn, Pike's End, Pinner, Middlesex, England HA5 2EX. Tel +44 181 868 0098, fax +44 181 868 0017.

Price: Toolkit base product per year – £180 with monthly upgrades; £140 with quarterly upgrades. Separate user licence required: 11–50 users, £35/PC (monthly updates), £25/PC (quarterly updates); 51–100 users, £25/PC (monthly updates), £20/PC (quarterly updates). Other prices on request.

Hardware used:

Server: *Compaq Prolinea 590*, with 16MB Ram and 2GB hard disk, running under *Windows NT Server 3.51*.
Workstation: *Compaq 386/20e*, with 4MB Ram and a 207MB hard disk, running under DOS 6.22 and *Windows 3.1*.

[1]Test-sets: In the Wild and Polymorphic – see this issue p.17. Standard – see *VB* July 1996, p.22.

PRODUCT REVIEW 2

A Product with Integrity

Dr Keith Jackson

Integrity Master is a software package which describes itself as 'the fastest, most powerful data integrity and anti-virus software available for any price' – a sweeping claim. Although the product itself a DOS program, it claims to execute happily under *Windows 3.x*, *Windows 95*, OS/2, and also across networks. This review discusses its abilities under *Windows 3.x*.

Function

Integrity Master (*IM*) claims to detect and remove known or unknown viruses, detect file corruption due to hardware or software problems, verify that restored files are intact, and detect file damage. These elements can all be monitored by checking their integrity: the product creates 'signature data' (checksums), and verifies that they remain unchanged.

The product can also verify integrity of the boot and/or partition sector, CMOS memory, normal memory, and interrupts. Although the product's main aim is to check integrity, the documentation states that *IM* has extensive information about individual viruses – I will return to this.

Documentation

The documentation is a single manual (A5, 144 pages long) entitled *Defeating Viruses and Other Threats to Data Integrity*. It is two manuals in one – a User's Guide, and a section called *Data Integrity and Viruses*. The documentation, refreshingly, advises users not to bother reading all the User's Guide; but to get on with using the product and resort to on-line help if they get stuck. Would that other products were so candid!

The product's developers are right to advise users to concentrate their reading effort on the second part of the manual. It is well written, and gives excellent background information for anyone unfamiliar with viruses and their effects. Given my perpetual grouching about disinfection, I was particularly pleased to see *IM's* documentation state, in bold letters: 'It is totally unsafe and irresponsible to depend upon disinfectors as a way to recover from virus infections'. I agree completely.

Installation

IM was provided for review on one 1.44 MB 3.5-inch floppy disk. Installation proved straightforward, if somewhat tedious. The product installs itself into a subdirectory called \IM_HOME. The drive on which *IM* is installed may be changed, but this subdirectory must have a fixed name, and must be present in the root subdirectory (hence the backslash).

When installation begins, *IM* asks if this is a 'brand new install'. Answering in the affirmative, I was then presented with an agreement including the memorable phrase: 'By accepting this agreement, you agree not to sue us, should you have a problem'.

If the user does not accept this, *IM* will not install. If the reply is affirmative, the user is asked more questions on performing installation and to state which disks should be ignored, offered a product tutorial, and asked to choose between 'Fast' (1 minute) and 'Full' (15 to 30 minutes) installation. I chose 'Full', mainly as I was not sure of the difference between the two.

Then came two unexpected questions; first: 'How familiar are you with DOS?'. Then I was asked to choose a 'Security Level' (Absolute, Very High, Typical, Not Vital). Digging around in the documentation, I discovered that the choices referred to where *IM's* checksums were stored; e.g. Very High uses a hidden file stored on a floppy disk. I chose 'Typical'.

On with the questions. Why am I using *IM*? (Virus protection, or protection against 'other' types of problems?) Err, don't know – perhaps both would be nice? Do I want speed or convenience? Both, but that is not an explicit option. Would I like 'Standard File Extensions'? Sounds good. Do I want to check only programs? Perhaps. Whoever installs the product is unlikely to know the answers to such questions.

Installation continues, but not before producing page after page of onscreen instructions as to what I should do. The developers should look at all this: if I purchase a single copy, I will probably not know the answers to many of the questions, and I will guess. If I am a corporate user, I'm going to be fed up at providing these answers over and over again. Either way, it's pointless.

IM let me choose where to store its integrity files (remember the 'Security Level' question?) – the options are either to leave a hidden file in every subdirectory, or to store the

Integrity Master's menu style makes it fairly easy to control its many options.

checksums on a diskette. The former scatters files across the hard disk, which I abhor, and the latter requires the user to remember to supply this floppy every time *IM* is executed.

The floppy disk option is rightly claimed to be more secure (it is more difficult for malware to manipulate the checksums); however, in practice it may well be difficult to achieve. For instance, in many work environments, the user does not set up his own PC, but will have to maintain control of *IM's* floppy disk checksum store. I would suggest that *IM* needs an option to store its checksums within its own subdirectory.

Checking

IM contains many options allowing integrity checking to be tailored in almost any way. A check can be performed on the integrity of an entire disk, on just the files on a disk, on CMOS memory, on the current subdirectory (with or without daughter subdirectories), on specific files, and on the boot or partition sector. *IM* can reload the boot sector, partition sector and/or CMOS memory from a floppy disk backup if they have been corrupted.

On installation, the product created enough information within its checksum files to permit any of the above integrity tests to be carried out. It even complains about its own files being altered (including its report file!). Surely the developers should take account of this? An option to check only for known viruses (aka 'scanning') is included.

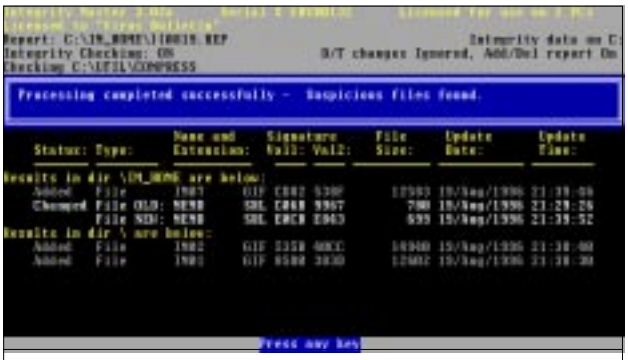
Although *IM* was happy to access the virus test-sets stored on a magneto-optical disk, it refused to check all files on the disk unless it had previously 'initialised' the disk: it wanted to create checksum files in every subdirectory of the magneto-optical disk that contained my test-set. No way! The only alternative I could come up with was to copy the test-set onto the hard drive of my test PC (bit by bit, as it is too big for the disk.

[*The manufacturers point out that all that is required to prevent the attempted creation of the checksum files is to select 'integrity Checking: Offer' and 'integrity Update: Never' on the options menu. The MO disk could then be scanned without problems. Ed.*]

Checking Speed

When *IM* was used to check the integrity of my test PC, it was difficult to come up with a measure of how fast it could operate. When used on the entire disk, it checked the hard disk of my test PC in 2 minutes 3 seconds, dropping to 1 minute 55 seconds when only the files on the disk were checked, and plummeting to 3 seconds when only the partition sector and boot sector were checked.

Checking of CMOS memory was (unsurprisingly) virtually instantaneous. *IM* could search the hard disk for known viruses (i.e. acting as scanner) in 1 minute 58 seconds, rising to 3 minutes 4 seconds when all files were scanned.



Here, *Integrity Master* is detecting changes on the disk – new and modified files are flagged.

Scanner execution time probably provides the nearest thing to a fair comparison as far as *IM's* execution timings are concerned. *Dr Solomon's Anti-Virus Toolkit* scanned the hard disk of my test PC in 4 minutes 5 seconds, *Sophos' SWEEP* in 6 minutes 47 seconds. Both figures were approximately doubled when all files on the hard disk were scanned.

The above measurements show clearly that *IM* is very fast when used to check the integrity of a disk, and faster at scanning a disk than other market-leading scanners. The two other scanners quoted above are by no means slow, and *IM* scans a hard disk much faster than either.

Windows Execution

All above timings were measured using *IM* under DOS. I would like to have provided similar timings for execution under *Windows* – this proved problematic.

Although the documentation stated that the product runs happily under *Windows 3.1*, whenever I tried this, *IM* said it could not find its data files; in particular, MEMW.SRL. No amount of experimentation could change this. Eventually I found a *Windows* executable file called IMWIN, undocumented in the manual – this was my salvation.

When IMWIN was executed, it asked me: 'Would you like to create the Master Group?'. After an affirmative answer, the product created eleven icons in a *Windows* group. These were mainly various ways of executing the DOS version of *IM* to carry out specific tasks, along with help files made available using Notepad.

The product still complained it couldn't find MEMW.SRL; however, it did now offer to construct the file. Once this was completed, *IM* could be used in the same way as under DOS. All the timings listed above were roughly 7% slower under *Windows*, an overhead introduced by *Windows* itself.

Infuriatingly, *IM* kept complaining that the integrity of the *Windows* INI files was altered. Many of these change automatically – exactly how one uses *Windows* without altering such files is beyond me. I'm sure that with its many options, *IM* can be set up to ignore such files. The default setting does not do this, though it is obviously possible for *IM* to detect that *Windows* is active.

Virus Detection

IM can be used to scan only a disk: as reported, this test executes very quickly, but how good is it at detecting the presence of viruses? I tested this using the test-set referred to in the Technical Details section below.

When *IM* scanned the viruses in the In the Wild test-set, it stated that 276 of the 286 test samples 'contain signs of a known virus', a detection rate of 97%. 150 of the detected samples were defined as 'suspicious'. *IM* is a bit vague on what it means by this term, though the report file contained an example that a file with an illegal date/time would be regarded as 'suspicious'. The product flagged 92 files in the Standard test-set as suspicious, and further stated that 260 of the 265 test samples (98%) contained signs of a known virus.

However they are dressed up, the above figures are quite impressive. Not only is *IM* faster than most scanners (see above), it is as good as, if not better than, most scanners at detecting known viruses.

Its only problem in looking for known viruses was its tendency to ask me a multiple-choice question whenever it came up with a new onscreen message. One option was not to show a particular message again, but I still had to answer several questions during each scan. If there is a way of stopping this, I did not find it. [*Stiller informs us that the 'Halt' option on the menu will handle this. Ed.*] *IM* also insisted on user confirmation whenever the current screen became full of messages. The only way I found to stop that one during the above tests was to lay my mobile phone on the space bar to provide multiple, continuous, keypresses! [*At VB, this is known as running the product in 'coffee-mug-mode', as an empty mug propped on the keyboard comes in handy now and then. Ed.*]

The Rest

Several add-on programs are included, which allow *IM* to be executed when desired, and provide a report on PC configuration. The latter is like a cut-down version of the *Quarterdeck* program *Manifest*; it presents information returned by the BIOS, and the low-level attributes of the machine, in an intelligible form – and also manages to include a plug for other programs from the developer of *IM*!

The final add-on program makes a file which contains a 'small harmless fragment of the Demolition virus'. This is intended to be used to demonstrate how this product *will* react to the presence of a virus. It would, perhaps, be preferable if *IM* were to create instead a copy of the *EICAR* anti-virus test file, a standardized file which was designed for this very purpose.

IM can be executed from the command-line: this is useful for incorporating integrity checking into batch files. Umpteen command-line switches are provided to permit this to be tailored. Although it sounds good, bear in mind that *IM* continually asked questions about what decisions should be taken. It is unlikely that ordinary users who execute standard batch files will know the answers to such questions; thus *IM* must operate in 'silent' mode. The fact that preconfigured batch files are supplied does help here.

Conclusions

Integrity Master is very quick, and accurate, at verifying the integrity of a hard disk. It can check at various levels, and careful configuration will allow the user to reap the benefits. Testing memory and/or interrupts fails miserably if (like me) you use a PC in various configurations.

Its myriad options and endless questions are its downfall. I am sure that it is possible to set it up to verify exactly the desired files, to produce no false alarms, and not to ask the user questions he cannot answer. However, I'm also certain that achieving this state of Nirvana will not be trivial: if PCs on a site are not set up in *exactly* the same way, some technical support person is in for a lot of work.

What use is *IM* as far as macro viruses are concerned? These reside in word processor documents which by their nature change continually. To be of help here, integrity checking would need to operate on only those parts of the dormant file that can contain viruses.

I like this product, with its focus on integrity checking, and its inclusion of eminently reasonable scanning facilities. As usual, the legal conditions are both problematical and seemingly over the top; however, they are not vastly different from those of so many other products, and at least the wording (especially in the section about agreeing not to sue) is far clearer than most such products).

Interestingly, *IM* is the exact inverse of *IBM's* anti-virus product. *IM* is an integrity checker with a scanner thrown in for good measure. *IBM* provides a scanner with an integral integrity checker. Is the end result really any different?

Technical Details

Product: *Integrity Master v3.02a*, serial no VBVB0132.

Developer: *Stiller Research*, 1265 Big Valley Dr, Colorado Springs, CO 80919-1014, USA. Tel +1 719 533 1879, fax +1 719 533 1728, email 74777.3004@compuserve.com.

Availability: PC with 310 KB of available memory, running under DOS v2 or above. Also operates under *Windows 3.x, 95*, and *NT*, and OS/2. Supports a maximum of 2621 files in a single subdirectory, and warns about using DOS commands APPEND, SUBST or ASSIGN in conjunction with the product.

Price: Base price US$45.00 + postage. Site licences: 1–5 users, US$22.00/PC; 6–10, UD$19.00; 11–15, US$17.50; 16–20, US$16.50. Other sizes on application. Licences for 50+ users include free updates for one year.

Hardware used: *Toshiba 3100SX*; 16 MHz 386 laptop with 3.5-inch (1.4 MB) floppy drive, 40 MB hard disk and 5 MB of RAM, running under *MS-DOS v5.00* and *Windows v3.1*.

Test Viruses: Where more than one variant is used, the number of samples is shown in brackets after the virus name (if the total is greater than one). For a complete explanation of each virus, and nomenclature used, please refer to the list of PC viruses published regularly in *VB*. For a listing of the boot sector viruses see *VB*, March 1996, p.23; for the others, see January 1996, p.20.

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END NOTES AND NEWS

S&S International is presenting **Live Virus Workshops** at the *Hilton National* in Milton Keynes, Buckinghamshire, UK on 7/8 October 1996. Details are available from the company: Tel +44 1296 318700, fax +44 1296 318777.

***Sophos Plc's* next anti-virus workshops** will be on 20/21 November 1996, and 29/30 January, 19/20 March, and 21/22 May 1997 at *Sophos'* training suite in Abingdon, UK. The two-day seminar costs £595 + VAT. One single day may be attended at a cost of £325 + VAT (day one: Introduction to Computer Viruses; day two: Advanced Computer Viruses). For further information on this or the Practical NetWare Security Workshop (3 October, 26 November), contact Julia Line; Tel +44 1235 544028, fax +44 1235 559935, or access the company World Wide Web page (http://www.sophos.com/).

Reflex Magnetics has another **Live Virus Experience** scheduled for 9/10 October 1996. Further information is available from Rae Sutton; Tel +44 171 372 6666, fax +44 171 372 2507.

The *Computer Security Institute* (*CSI*) *23rd Annual Computer Security Conference* is to be held from 11 to 13 November in Chicago, Illinois, USA. The event will feature a program of over 120 sessions, including presentations on **Internet security, access, email**, etc. It will also include an exhibition of computer security products – free passes to attend the exhibit available from the *CSI*. For details on attending , contact Patrice Rapalus of the *CSI* on Tel +1 415 905 2310; email prapalus@mfi.com.

McAfee has announced a new promotion for anti-virus software users: large corporate users upgrading from a competing product to one of the *McAfee* products will be offered a discount of 25%. To be eligible, a company must have at least 100 users. A *McAfee* spokesman commented that this was a 'great opportunity for users to upgrade to the leading solution that holds a 68% share of the anti-virus sector at a very competitive price'. At the same time, the company has launched *NT-ssential*, a management suite for *NT* servers combining anti-virus and backup. The new product integrates *NetShield* with *Seagate's Backup Exec NT*. Details are available from the company; call Caroline Kuipers on Tel +44 1344 304730, email caroline_kuipers@cc.mcafee.com.

***Compsec 96*, the 13th world conference on computer security, audit, and control** will be held from 23–25 October 1996 at the QEII Conference Centre in London UK. The conference will address the problems inherent in security, and risks and threats to IT systems. Information can be obtained from Alex Verhoeven on Tel +44 1865 854654, fax +44 1865 854971, email a.verhoeven@elsevier.co.uk.

***International Data Security* has announced the launch of courses for network protection**: Network Security/Management seminars, and Corporate Anti-Virus courses. The one-day Network Security course will take place at various venues in the UK, and will cost £50 per person. The one-day anti-virus course will cost at £400**,** and will take place at *Novell's* UK headquarters in Bracknell, UK. For details on venues and dates, contact Julie Randall of *International Data Security*; Tel +44 171 209 2222.

Network Security Management has announced the publication of another book; ***Computer Evidence: A Forensic Investigations Handbook***. Written by erstwhile *Virus Bulletin* editor Edward Wilding (who now works for *Network Security Managament*), the book is available immediately at a price of £39.00. Topics covered include forensic principles, explains legal technicalities, and gives instructions on data recovery. To order, fax *Sweet & Maxwell Ltd* on +44 1264 342761.