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MARCH 2, 2004

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Forward Thinking

CONSUMER ELECTRONICS LEADS THE WAY

I JUST RETURNED from the annual Consumer Electronics Show (CES) in Las Vegas, the industry's premier product showcase, which sets the stage for both the consumer electronics and IT industries. The economies of scale afforded by the mass market are now driving the industry. In the past, a new technology was introduced for businesses first and then made its way into consumer products, but all that's changing. Now we're seeing new technologies that will reach consumers first. Here are the standout hardware products I saw at CES.



Big screens. The show floor was packed with large displays—and I do mean large. LG.Philips was showing a 76-inch plasma display and a 55-inch LCD. Not to be outdone, Samsung countered with an 80-inch plasma and a 57-inch LCD. You won't see screens quite this large at your local Best Buy or Circuit City this year, but you will see a variety of 50-inch plasmas and 30- to 40-inch LCDs. Sharp is in the game as well, with a new factory and plans to be the first to sell 45-inch LCDs. Meanwhile, projection TVs offer big screens at lower costs. Texas Instruments was pushing its Digital Light Processing (DLP) technolo-

gy, while Intel made a big push for its upcoming liquid-crystal-on-silicon (LCOS) chips. More than 50 companies at the show were selling large displays, which seems unsustainable. But prices aren't expected to fall anytime soon. With supply limited and demand growing, LCD prices should remain fairly stable at least until the late fall and maybe into mid-2005 when new factories open.

Small hard drives. A couple of companies showed their tiny storage devices, including Hitachi's 1-inch microdrive and Cornice's *storage element*. Already we're seeing these drives in smaller portable music players that store 2GB of music. And Toshiba, whose 1.8-inch hard drives were in the first generation of hard drive-based portable players, is now pushing a 0.85-inch drive. All this activity will lead to less expensive, higher-capacity miniature audio and video players.

New processors. Intel used its CES keynote speech to show Grantsdale, its soon-to-be-released next-generation series of processors and chipsets. The silicon giant is integrating into the desktop chipset loads of features, including multichannel audio, better graphics, and even wireless capability. Meanwhile, AMD is pushing high performance with its Athlon 64 line. And Transmeta low-power chips were in a number of tiny computers on the show floor.

Better, faster wireless. The wireless developers had all sorts of variations of 802.11 technology for wireless gear. My one concern: Many of these wireless companies are developing incompatible products, which could result in confusion for everyone.

THE HP/APPLE SURPRISE DEAL

MICROSOFT SET THE stage for the software direction at CES, but by the end of the show the focus had strayed. In his keynote speech, Microsoft chairman Bill Gates introduced a new version of MSN Premium, launched the SPOT watches, and demonstrated Windows Media Center Extender technology and the first Portable Windows Media Center handhelds.

But the show floor was filled with Microsoft "partners" that seemed not to want Microsoft to be as dominant in consumer electronics as it is in PCs. Intel launched its big push into consumer electronics with the Intel Entertainment PC. InterVideo demonstrated its Instant-On software, which lets devices boot in Linux to play digital media and then

switch to Windows. And the show floor was packed with Windows and non-Windows media receivers.

HP CEO Carly Fiorina's big news was a major deal with Apple, whereby HP will install iTunes on all its systems and resell the iPod. Since Microsoft has been pushing its own Windows Media technology, this was widely seen as a push by HP for independence.

The deal took everyone by surprise, especially Microsoft. How—or whether—HP will integrate iTunes and Media Center is unclear, but I doubt we'll see iTunes playing Microsoft's WMA format. The HP/Apple deal was the most visible sign that many fear the Redmond company is aiming for too dominant a role in media formats and distribution.



The HP/Apple deal took everyone by surprise, especially Microsoft.

Forward Thinking

MICHAEL J. MILLER

TALKING WITH MICHAEL DELL

RECENTLY, I HAD the opportunity to meet with Dell chairman and CEO Michael Dell to discuss the state of the industry. You can read the full interview at www.pcmag.com/interviews. Here are some excerpts.

MM: You've broadened Dell's product line more this year than in any other year, with printers, a music player, TVs, and storage products. How broad will you go?

MD: We continue to expand out in the enterprise, and that's growing very nicely for us. But we've also been growing our consumer business rapidly. And as this whole digital-home thing became more apparent, we put a lot of effort into putting more of the pieces together.

We've already sold a million Dell printers, and we've got a whole bunch of new printers lined up for next year to broaden the line further. On the consumer side, the Dell DJ is a fairly obvious move. We've had this partnership with MusicMatch, and millions and millions of customers have been using MusicMatch from Dell for many years with the Dell Dimension. In fact, we sold several tens of thousands of songs just in the first five days of the service.

MM: Is there any consumer product that doesn't sell well through the direct channel? Some people say you need to see a large-screen TV before you buy.

MD: What's really happening here is interesting. For the first time we're seeing Moore's Law in high-resolution digital displays. So you've got a silicon-based technology that's right up our alley in terms of cost curves and more performance for less cost. They'll be in conference rooms in small businesses and medium businesses. We already have a monster DLP projector business that's going very fast.

As the cost curve comes down and you get incredible performance, you put these things in your home. So you've got this massive display with advanced resolutions, which is pretty cool. You can do a lot of things with that, like hook up your computer and your television signals to it.

MM: How fast do you think 64-bit computing is going to scale? Do you have any interest in using the AMD processor?

MD: This idea of taking the 32-bit instruction set and extending it is a good one. AMD isn't the only company that's thought of it. I don't think Intel has made an official announcement, but it has indicated an interest. I fully expect that there will be a variety of choices. And we're going to participate fully.

MM: What trends do you see in Linux? Do you think it's going to continue to grow in market share?

MD: It looks like it's going to continue to grow. Most Linux users are converting from Unix as opposed to



converting from Microsoft. Something like 90 percent of them are Sun to Linux, or other Unix to Linux. That's an easier migration. Certainly some people out there are saying they don't like Microsoft, but most of the Linux we see is Unix conversion. I think it's going to continue to grow, but Windows is still very strong.

MM: For next year, which categories of products are you most excited about?

MD: I think you're going to continue to see Windows and Linux migrations in the enterprise. And the server consolidations, SANs, and storage consolidations are going to continue. I think we're going to see a fair amount of refresh on the corporate side, and a lot of that will be mobile wireless. We're already starting to see some waves of refresh with big corporations.

As more and more of the desktops have gone to flat screens, the notebook appears more affordable. They both have flat screens, and you can get a 15-inch notebook with a wide-aspect display and a DVD drive. It's an awesome desktop replacement.

MM: So we've got all these new gadgets, but what are you using at home?

MD: I have two machines. I have one of those little I/O Gear deals, where you hit double Shift and it switches between them. I've got a Dimension XPS and a Dell workstation. And I've got a three-monitor display. I'm kind of addicted to the multiple monitors.

MORE ON THE WEB: Join us online and make your voice heard. Talk back to Michael J. Miller in our opinions section, www.pcmag.com/miller.

“As this whole digital-home thing became more apparent, we put a lot of effort into putting more of the pieces together.”



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26 First Looks

- 26 Intel Pentium 4 (Prescott)
 - Dell Dimension XPS
 - iBuyPower Gamer Extreme PC
- 28 MSN Premium
- 30 CorelDraw Graphics Suite 12
- 32 3.4-GHz Pentium 4 Extreme Edition
 - Dell Dimension XPS
 - Falcon Northwest Mach V 3.4 Extreme Edition
 - Velocity Micro ProMagix A/V/D
 - VoodooPC Rage d100 Extreme ▼
- 35 Microsoft Virtual PC 2004
- 35 Segue Soft Access Point Module
- 38 Toshiba TLP-T6IMU
- 38 DoubleSight DS-1500
- 39 Epson Perfection 4870 Photo
- 40 Microtek ScanMaker i300
- 41 A2i xCat System
- 42 Adobe Atmosphere



ALSO IN THIS ISSUE

- 49 Feedback
- 144 Backspace

COVER STORY

IDentity

Theft: What, Me Worry?



Millions of Americans fall victim to identity theft every year. And by all estimates, the situation is only going to get worse as more information is accessed more easily online. Our story tells you how to avoid becoming an ID theft statistic—and what to do if this happens to you.



79 Spy Stoppers

If you don't have protection, your PC is likely crawling with spyware that can track you online, profile you, and record your keystrokes. We show you ways to avoid, block, detect, and remove spyware.

96 Safe Computing, Unsafe PCs

What if your personal machine is perfectly secure but you need to use an Internet café? Or what if you need to administer PCs or share them with others? We look at four ways to stay safe in shared environments.

ON THE COVER

Spyware
page 79

Identity Theft
page 75



Great Graphics page 102

Pentium 4 page 26

Easy Ways to Secure
Your Business page 113

Exclusive Interview:
Michael Dell page 6

19 Pipeline

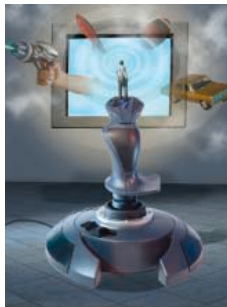
- 19 Microsoft extends the Media Center.
- 19 P2P file sharing: Watch for infected files.
- 19 Digital music downloading is plummeting.
- 20 Apple keeps its sights set on music.
- 20 Blackspace: A brand new take on software.
- 20 Strangers on trains: Speaking Wi-Fi.
- 22 **COMING ATTRACTIONS:** Samsung and Xerox LCDs, TimeSheet Professional 9.0.



HARDWARE

102 Explicit Graphics

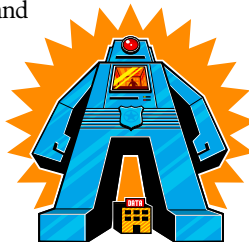
Total 3D realism may be just a pipe dream, but the movers and shakers in the graphics industry are reaching for it. In this tech update, we tell you everything you need to know about the making of special effects for PC games and more.



SECURITY APPLIANCES

113 Small-Business Security

Small businesses rely on e-mail and Internet connectivity as mission-critical tools these days, and that makes the threat of viruses, spam, and other malicious content all the more frightening. But a new breed of security appliances have come to the rescue.



58 Solutions

- 58 **Master of the House:** Control your lighting, climate, and security devices via the Web with home automation technology.
- 60 **Office:** Graphics come in so many different file formats; which one is best for your needs? We help you choose.
- 62 **Internet:** Search toolbars add a wealth of handy features to your browser window.
- 64 **Security Watch:** Spammers use clever methods to sneak past filters. Here's how to keep the junk out.
- 66 **Enterprise:** Toys "R" Us isn't playing around when it comes to complying with Sarbanes-Oxley antifraud laws.
- 69 **User to User:** Our experts help you set up a dual-monitor system, explain the mysterious Mr. Enigma Registry entry, and more.

Opinions

- 5 Michael J. Miller: Forward Thinking
- 51 Bill Machrone: ExtremeTech
- 53 John C. Dvorak
- 55 John C. Dvorak's Inside Track
- 57 Bill Howard: On Technology

Personal Technology

138 After Hours

Online Games Revisited: One great thing about online games is that they can grow and change over time. In this story, we take a second look at some online games to see how they've developed.

140 Gear & Games

Lord of the Rings: The Return of the King; MobiTV for your cell phone; the Slim Devices Squeezebox; the latest game controllers.

CES: THE BIBLE

Want to know what is or will be hot in consumer electronics? Get the full, unabridged report from the huge Consumer Electronics Show (CES), held earlier this year in Las Vegas. (ces.pcmag.com)

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 - Digital living rooms grow up
 - Next-generation cell phone gaming
- (www.pcmag.com/news)

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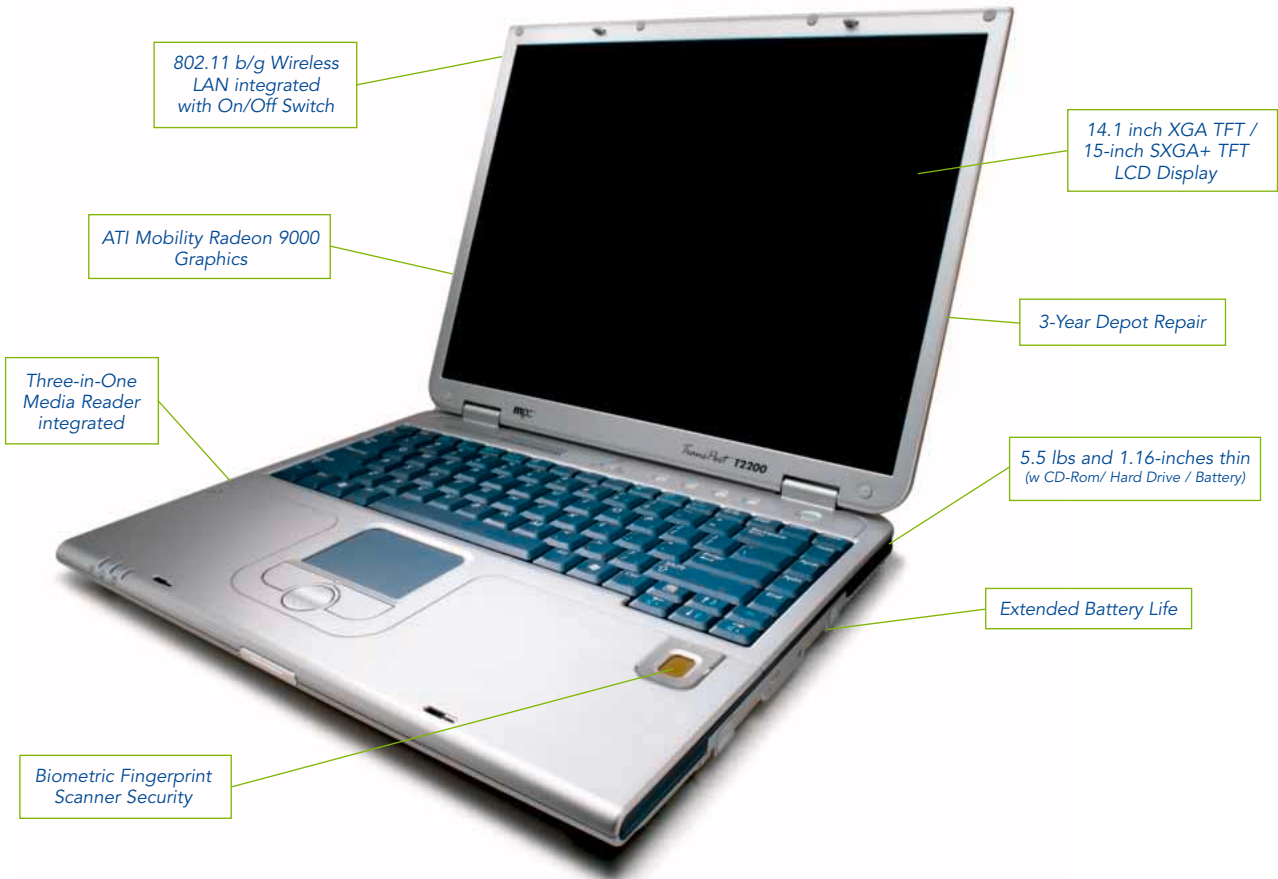
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PIPELINE



Microsoft's eHome Push

Will the connectivity come together this time?

With his sights set on the PC becoming a command center for all digital home entertainment devices, Bill Gates introduced Microsoft Windows Media Center Extender Technology software at January's Consumer Electronics Show in Las Vegas.

PCs running Microsoft Windows XP Media Center Edition are already designed to manage digital demands in households, including photos, Internet downloads, and live feeds, as well as movies, radio, video, television, and more. The drawback has been that users had to gather around their PCs to enjoy the content.

Media Center Extender will enable digital access for PC-based content for any connected (wired or wireless) TV or monitor. The initiative is focused on "demand for a new generation of products that will allow access to favored digital entertainment, such as live and recorded TV, photos, movies, and music that resides on a Windows XP Media Center Edition PC from any room in the home," says Brad Brooks, Microsoft Windows eHome marketing director.

"This initiative has the poten-

tial to change the consumer electronics market at a pace seldom seen," says analyst Rob Enderle. But he adds that a potential weakness is the tendency to talk about all the required technologies at the expense of pushing forward toward compelling experiences.

Available by 2004's holiday season through a variety of hardware partners, Media Center Extender kit for around \$100. Set-top boxes will ship with remote controls and are expected to cost about \$250.

Onkyo, Sony, and many others showed media receivers at CES. And InterVideo showed software called InterVideo InstantON, which boots Linux and organizes home entertainment content for PCs and TVs.

Hewlett Packard will be one of the manufacturers releasing an undisclosed Extender hardware device in 2004. But at CES, the company also announced plans for a digital entertainment hub, which will act as a single-access device for music, photos, TV, video, and movies.—Karen Jones

P2P Problems

PEER-TO-PEER (P2P) FILE-SHARING networks are having more problems than just dramatic declines in download numbers. Security company TruSecure, through its division ICSA Labs, warned in January that there has been a significant surge in malicious code posted on P2P networks.

ICSA Labs officials claim that 45 percent of thousands of free files they collected via Kazaa, the most popular P2P client, contained viruses, Trojan horses, and back doors. Fizzer and Magic Eightball are just two of the viruses that have spread via Kazaa downloads in the past year.



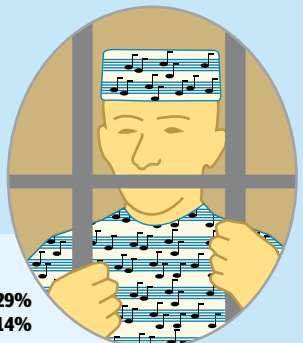
The problem extends beyond casual home downloaders, says Bruce Hughes, of ICSA Labs. "Organizations need to warn their employees about file-sharing applications and the danger they pose at work and at home," he says. Proceed with caution.—Sebastian Rupley

Music Swappers Do An About-Face

The percentage of American online users downloading music files has plummeted in the wake of the Recording Industry Association of America (RIAA) lawsuits initiated in September 2003 against those suspected of copyright infringement.

| Percentage of U.S. Internet users who said they were downloading music files | |
|--|-----|
| March 12 to May 20, 2003..... | 29% |
| November 18 to December 14, 2003..... | 14% |

Based on telephone surveys of 1,358 Internet users. Source: Pew Internet & American Life Project.



CAR NET

In late March, Florida-based MeshNetworks plans to roll out a highway-based network in Garland, Texas, for car-to-car and car-to-Internet communications. The network will have 500 repeaters and light-pole-housed wireless access points over 60 square miles, with throughputs of 1.5 Mbps. The network will serve public safety vehicles first and consumers later.

HP IPOD

This spring, Hewlett-Packard plans to start selling a digital-music player based on the Apple iPod. The HP player—and the company's consumer PCs and notebooks—will come with Apple's iTunes software installed, pointing users to Apple's online music store. HP CEO Carly Fiorina said that her company had conducted a search spanning many digital-music technologies but decided Apple's technology is superior.

A REAL BROUHAHA

RealNetworks has rolled out new RealPlayer multimedia software, which lets customers play music purchased at Apple's iTunes Music Store, without a license for Apple's FairPlay digital-rights management scheme. Apple wasn't commenting at press time, but some analysts predict that the company will pursue legal action or software patches that would protect its music file format.



Apple Bets On Tunes

Music remains on Apple Computer's mind. Some analysts criticized January's Macworld show in San Francisco for not being the soiree of innovation that it often is, but CEO Steve Jobs did wheel out a brand-new software application and miniature versions of the Apple iPod digital music player.

In the new \$49 iLife 4 multimedia suite, Apple has added a fifth application called GarageBand (see the photo), which can mix up to 64 tracks and combine improvised and canned musical parts. It simulates 50 musical instruments and has 1,000 canned audio loops recorded by professional musicians.

Jobs brought out musician John Mayer to demonstrate how you can play guitar or piano direct to a Mac and synthesize the sound to simulate choirs, ballroom pianos, vintage guitar amplifiers, and more. Mayer said playing authentic-sounding guitar lines on a keyboard—down to effects like string bending and scratchy fretboard sounds—is a standout feature. Jobs cited market research showing that one in two U.S. households has a practicing musician, and some show attendees felt that people would buy Mac systems just to run GarageBand, though that remains to be seen.

The new miniature iPod comes in an array of colors, and a 4GB model will sell in April for \$249. The maximum storage capacity of the minis will be considerably lower than the 40GB you can get on current full-size iPods.—SR

The Anti-Interface

WHAT MIGHT SOFTWARE LOOK LIKE without any common interface standards? Start-up company NBOR may have an answer with its Blackspace environment.

Blackspace—roughly similar to a desktop publishing application with animation and numerous other extras—eschews dialog boxes, menus, and the like in favor of new tools.

Aimed initially at the education market, Blackspace is a drawing, animation, photo-editing, slide show creation, and text-editing surface that sits atop Windows or Linux (a Mac OS version is coming). The software has been in closet development for ten years and uses “universal tools” in lieu of common standards.

Everything is an object in Blackspace. You can drag words to the left or right and they move precisely with your mouse—as

objects, with no kerning effect. If you want to create an outline look, you draw stairs to the left of a column of text, then draw a pointed arrow toward that column.

Slide shows and animation work in the same free-form way. If you have several pictures, you can draw arrows connecting either the pictures or their file-names to indicate an order, and then start cycling them as a slide show (see the photo). Blackspace does buck mightily against interface standards, though. You can only import Word files in rich text format, you can't import Excel files at all, and you rarely see a menu.

But some people are wowed by the application's adventurous aspects. “Blackspace is a fundamental change in how we learn, work, play, and communicate.” says John Seely Brown, former

chief scientist at Xerox's PARC. “It's as great as the advent of motion pictures, and a new interactive medium.”

The software costs \$299. You can get it for \$149, however, if you register at www.nbor.com before February 15.—SR



Smart Trains

What's your alternative to dozing on the morning train? In France, it's working on a Wi-Fi-connected notebook computer.

SNCF, France's national railway, has implemented a service on the Paris-Bordeaux-Pau line called Clic TGV,



which gives passengers on high-speed trains wireless access to the Internet through Wi-Fi access points and an on-board server.

“In the future, various solutions will be examined to increase the connection speed, exploit groupings of GPRS links, connect to different wireless networks that may be crossed during a voyage, and develop satellite links,” according to SNCF officials.—SR

The 3D Gaming—Cell Phone?

The race for better graphics performance on PCs is a long-standing tradition. Now ATI and others want to take cell-phone graphics to the next level.

The ATI Imageon 2300 is the first 3D graphics coprocessor for wireless handsets and smart phones, according to ATI. It comes equipped with a full-featured graphics engine, including geometry processing of up to 1 million triangles per second, perspective correction, and dithering. The chip also has an MPEG-4 video decoder and video resolutions of up to 2 megapixels, making it ideal for camera phones with high-speed data access. The result is far better picture quality, even on a 2-inch screen, ATI claims.

Are 3D games really something people want to squint at on tiny displays? “Here in North America,

we're way behind Japan and Korea,” points out Azzedine Bouguira, ATI's director of marketing for handheld products. “For a year and a half they've been running 3D games there,” he says, albeit with slow software rendering. Bouguira also notes that when ATI introduced graphics accelerators in laptops, “people laughed at us.” Now they are a standard feature.

Will you pay to play high-end games and accept the estimated \$10 monthly premium for 3D phones? ATI competitor nVidia predicts there may be a market and is working on a 2.5D product. Meanwhile,

Sprint plans to offer 3D games. The jury's out on consumers' willingness to pay, but people once scoffed at paying for downloadable ring tones; now it's a multimillion-dollar business.—John R. Quain



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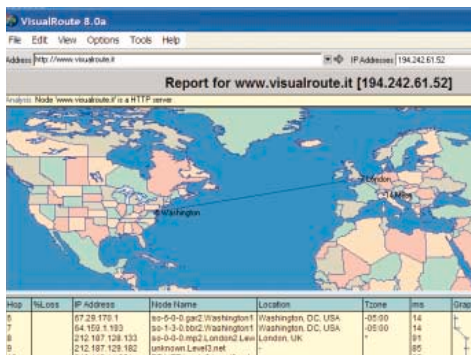
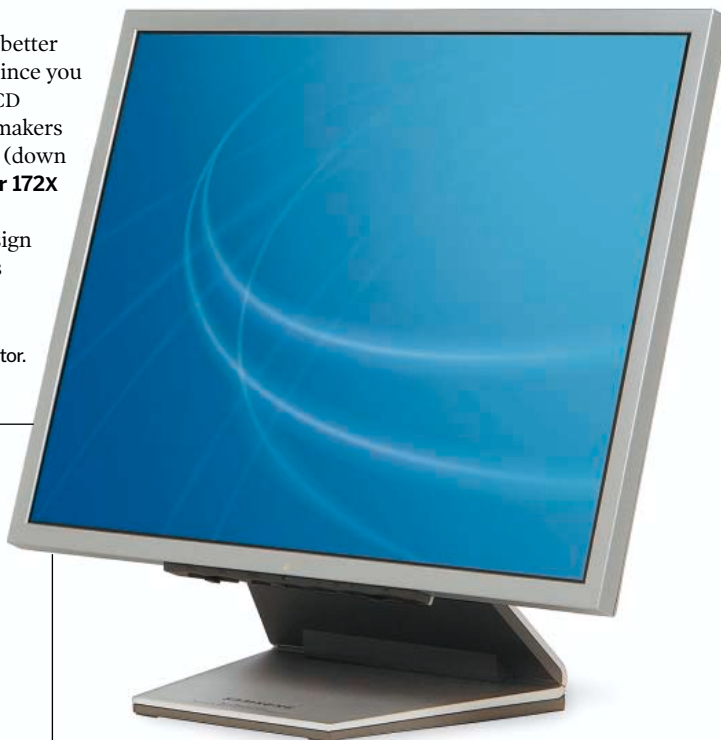
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COMING ATTRACTIONS

Ultrafast LCD Panel

The faster the rated response time of an LCD panel the better moving images (such as movies and games) will look, since you won't see the trails and ghosting that plagued earlier LCD monitors. We were impressed last year when monitor makers debuted units with 16-millisecond (ms) response times (down from the typical 25 ms). Now the **Samsung SyncMaster 172X** pushes the threshold down to 12 ms. Ideal for gamers, the 17-inch panel also features an ultranarrow bezel design and Samsung's MagicBright technology, which changes the panel's settings based on what type of application you're using.—*Jamie M. Bsales*

\$630 street. Samsung Electronics, www.samsungusa.com/monitor.



Visually Track Your Net Traffic

Visualware's **VisualRoute 8** lets network administrators keep tabs on Internet performance and usage by visually mapping where and how traffic is flowing on an Internet connection. The software displays a geographical map of IP addresses, as well as the performance of each segment along the route. The software's intelligent tracing capabilities use multiple protocols (including ICMP, TCP, and UDP) to provide more thorough reporting of IP routing. It's available in a Personal Edition, as well as a Server Edition that delivers remote access to multiple users.—*JMB*

Single user license, \$49.95 direct. Visualware Inc., www.visualware.com.

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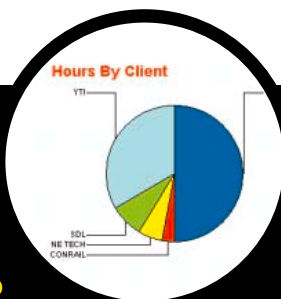
The Xerox name has started appearing on LCD monitors, thanks to a licensing agreement with long-time monitor maker Proview Technology. Featuring slender (1.5 inches deep) chassis designs, the monitors will use premium panels for top image quality. A total of 13 models are planned, ranging in size from 15 to 19 inches.—*JMB*

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FIRST

HANDS-ON TESTING OF NEW PRODUCTS

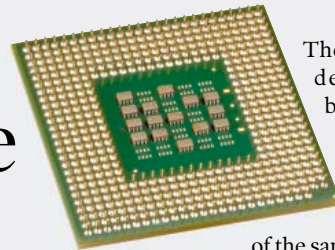
28 MSN Premium
30 CorelDraw Graphics Suite 12
32 Dell Dimension XPS (3.4-GHz P4 Extreme Edition)



32 Falcon Northwest Mach V 3.4 Extreme Edition
34 Velocity Micro ProMagix A/V/D
34 VoodooPC Rage d:100 Extreme



Prescott Brings More Cache to Intel's Future



The new chip doesn't deliver nearly the boost we thought it would versus the Northwood core, at least when comparing CPUs

of the same clock speed.

That's partly because the 31-stage pipeline in Prescott is longer than the 20-stage pipeline of Northwood, resulting in a performance hit with branchy code like that found in our Business Winstone 2004 test (though the larger caches help soften the blow). Moreover, the SSE3 instructions that Prescott supports are not yet exploited by most of the apps that make up our Content Creation Winstone 2004 test. But the Prescott architecture does set the stage for performance gains as Intel pushes toward 4 GHz and beyond. So Prescott is an important step.

That said, if you're buying a performance-oriented mainstream PC today, there should be little discernible difference in everyday computing speed between a 3.2-GHz P4, a 3.2E P4, or an Athlon 64 3400+. It's the other components—memory, graphics card, hard drive speed, and setup—that will make a big difference.

BY KONSTANTINOS KARAGIANNIS

Shopping for a new PC has just gotten even more confusing.

Intel has introduced its next-generation Pentium 4 chips—code-named *Prescott*—which feature architecture improvements that should give the platform room to stretch for at least a year to come. • That's the good news. The bad news:

The previous-generation P4 chips (based on the architecture code-named Northwood, which debuted in 2001 and introduced SSE2, more bus bandwidth, and speeds surpassing 2 GHz) will continue on, in several flavors.

So PC buyers will encounter the original non-Hyper-Threading P4; P4 with Hyper-Threading; P4 Extreme Edition with Hyper-Threading (sometimes abbreviated to EE); the new Prescott-based P4 with Hyper-Threading, which will have an E designation after the speed (3.2E, for example); and Prescott-based P4 without Hyper-Threading (with an A designation after the clock rating, such as 2.8A).

Got that?

Fortunately, it won't be a shopping nightmare for long.

Ultimately, Intel is planning to make Prescott the high-volume part, replacing 0.13-micron fabrication with the new 90-nm process. The Extreme Edition chips (now at 3.4 GHz; see "P4 Extreme Reaches 3.4 GHz" on page 32) will continue on as the performance leaders in ultra-high-end machines.

As an architecture, Prescott does bring a trio of headroom-increasing technologies: 16K of L1 data cache (up from 8K in Northwood), 1MB of L2 cache (up from 512K), and 13 new SSE3

instructions that help multimedia tasks. Prescott will come in speeds up to 3.4 GHz, but the first batch of machines are using the more readily available 3.2-GHz parts. Lower-speed Prescott chips (down to 2.8 GHz) will also be available.

To see how Prescott compares with Northwood and AMD's current fastest mainstream chip, the Athlon 64 3400+, we built identical (but for the processors and motherboards) white-box systems. We were surprised by the results:

PERFORMANCE TESTS

High scores are best.
Bold type denotes first place.

| | Graphics card | Business Winstone 2004 | Business Winstone 2004 Multitasking (total score) | Multimedia Content Creation Winstone 2004 | PCMark CPU | 3DMark03 Pro | Serious Sam: The Second Encounter (fps) | Tom Clancy's Splinter Cell (fps) |
|-----------------------------------|--------------------|------------------------|---|---|--------------|--------------|---|----------------------------------|
| WHITE-BOX SYSTEMS | | | | | | | | |
| Athlon 64 3400+ | ATI Radeon 9600 | 23.3 | 2.8 | 34.4 | 4,147 | 3,050 | 35 | 36 |
| Pentium 4 3.2 (Northwood) | ATI Radeon 9600 | 24.2 | 3.0 | 30.2 | 4,854 | 3,035 | 33 | 35 |
| Pentium 4 3.2E (Prescott) | ATI Radeon 9600 | 23.9 | 3.0 | 30.6 | 4,928 | 3,052 | 34 | 36 |
| REVIEWED PRESCOTT | | | | | | | | |
| Dell Dimension XPS | ATI Radeon 9800 XT | 22.4 | 3.1 | 31.1 | 4,914 | 5,396 | 113 | 53 |
| iBuyPower Gamer Extreme PC | ATI Radeon 9800 XT | 17.9 | 2.4 | N/A | 4,944 | 5,391 | 115 | 53 |

Each machine was equipped with 1GB of RAM. We ran all tests at 1,024-by-768 resolution, with 2X anti-aliasing and 2X anisotropic filtering enabled for the 3D and game tests.
N/A—Not applicable: The system could not perform this test.

PHOTOGRAPHY BY THOM O'CONNOR

L O O K S

www.pcmag.com/firstlooks

- 35 Microsoft Virtual PC 2004
- 35 Segue Soft Access Point Module
- 38 Toshiba TLP-T61MU
- 38 DoubleSight DS-1500



- 39 Epson Perfection 4870 Photo
- 40 Microtek ScanMaker i300
- 41 A2i xCat System
- 42 Adobe Atmosphere

WHAT THE RATINGS MEAN

- EXCELLENT
- VERY GOOD
- GOOD
- FAIR
- POOR

Dell Dimension XPS

If you have time to read only one statement in this review, make it this one: We adore the new Dell Dimension XPS. Sure, it's pricey (\$3,199 direct), but this is about as wonderful a dream machine as you'll find in the Prescott world.

The 3.2E P4 is helped along here by IGB of dual-channel 400-MHz DDR SDRAM, as well as a boutique-style hard-drive setup. Two 10,000-rpm SATA drives in a RAID 0 configuration run the OS at blazing speed and still provide 148GB of storage. An additional 120GB of deep storage is present in a third IDE hard drive.

and a 48X CD-RW.

For all video tasks, including watching DVDs or gaming, you'll be dazzled by the Dell 2001FP 20-inch LCD monitor. It has a 16-ms response time and truly responds even to the high frame rates found in games like Serious Sam. It can also rotate to portrait mode. Coupled with the 256MB ATI Radeon 9800 XT, this is state-of-the-art video in the truest sense of the phrase.

Complementing the terrific video combo is equally impressive audio: the Creative Audigy 2 and 450-watt monster Logitech Z-680 5.1 speakers. Dell also went with Logitech for the MX-500 high-resolution optical mouse. Rounding out these components are a Corel WordPerfect Productivity Pack and a two-year warranty.

This Dimension XPS does lose a step in overall speed compared with machines based on Extreme Edition CPUs. But with a 3.4-GHz EE chip, this same configuration would cost you \$800 more. For most buyers, this 3.2E SKU is all they need.



This Prescott-based Dimension XPS costs \$800 less than the same machine with an Extreme Edition P4.

Dell Dimension XPS

With 3.2E-GHz Intel P4, 1GB dual-channel 400-MHz DDR SDRAM, two 74GB 10,000-rpm SATA hard drives (in a RAID 0 configuration), one 120GB IDE hard drive, 8X DVD+RW drive, 48X CD-RW drive, 256MB ATI Radeon 9800 XT, 20-inch LCD monitor, Microsoft Windows XP Home, \$3,199 direct (E-Value code 6V411-XPSRPW). Dell Inc., www.dell.com. OVERALL ●●●●



Ready to make multimedia magic out of the box, the Dimension XPS comes with full versions of Pinnacle Studio 8, Jasc Paint Shop Pro 8.0, and Jasc Photo Album 4. Adding a card reader might be a good move for digital camera owners, but we can't complain about the optical drives: You get an 8X DVD+RW



You'll either love or hate the iBuyPower entry's NZXT Guardian case. The machine delivers an affordable way to get a Prescott PC.

Logitech Z-640 5.1 speakers (a budget version of the Z-680 set). You'll be able to work on audio and video projects with the 4X DVD multiformat writer and 16X DVD-ROM drive, although we'd like to see more than just the OEM version of Nero Express for CD and DVD creation, even at this price.

By omitting a RAID 0 drive configuration, iBuyPower kept the price low but also fell behind the Dell entry on all but the CPU and gaming tests. Be it in business or multimedia applications, RAID 0 once again proves important. Seriously consider adding another 120GB, 7,200-rpm SATA drive to the on-board RAID controller if you buy this machine, thereby boosting performance and doubling storage.

Still, there's a lot here to like. And this affordable system is covered by a warranty that does not feel like a cutback: three years, with on-site service included for the first year.

iBuyPower Gamer Extreme PC

Showing that Prescott really has a future as a volume part, the iBuyPower Gamer Extreme PC comes in at a likable \$1,995 (direct) price. That gets you a 3.2E P4 CPU coupled with IGB of dual-channel 400-MHz DDR SDRAM.

With a front reminiscent of a Transformers robot face, the new NZXT Guardian case is one you'll either dig or detest. A matching green keyboard and optical mouse are included, although the still-viable 19-inch CRT (a ViewSonic E90F+SB) is left an easy-on-the-eyes silver. The powerful 256MB ATI Radeon 9800 XT card keeps your eyes focused on what's going on within the confines of the bezel.

Audio is decent, coming from a Creative Audigy 2 and 51-watt

iBuyPower Gamer Extreme PC

With 3.2E-GHz Intel P4, 1GB dual-channel 400-MHz DDR SDRAM, 120GB 7,200-rpm SATA hard drive, 4X DVD+/-RW drive, 16X DVD-ROM drive, 256MB ATI Radeon 9800 XT, 19-inch CRT monitor, Microsoft Windows XP Home, \$1,995 direct. iBuyPower Computer, www.ibuypower.com. OVERALL ●●●●



MSN Premium: Enough to Fill a Butterfly Net

BY MARGE BROWN

The ISP battle between AOL and MSN continues, with broadband serving as the new front. Microsoft announced its **MSN Premium** service right around New Year's. The company continues to roll out exclusive content (and those ubiquitous butterfly ads) to woo subscribers.

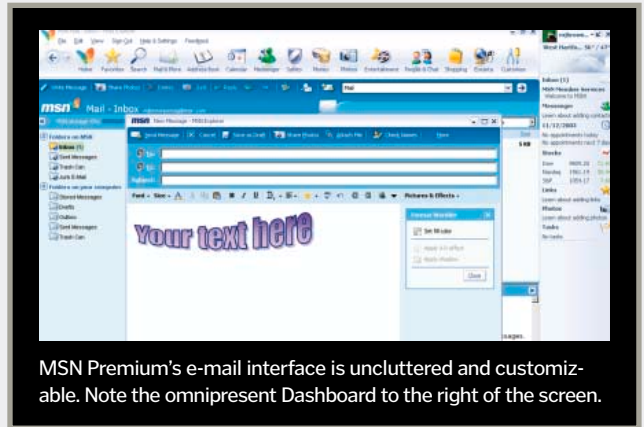
The price is certainly attractive: MSN Premium costs just \$9.95 a month for users who already have a broadband service provider, or \$39.95 to \$49.95 a month when you sign up for broadband through one of Microsoft's partners. That's a shot across the bow of AOL 9.0 Optimized, which runs \$14.95 per month if you already have an ISP or \$54.95 with AOL-supplied broadband service.

Sophisticated Internet users will find the crisp and consistent interface (with its denser text format) more pleasant than

now gives you quick access to photo slide shows, flags unread e-mail, shows calendar events, and even delivers traffic alerts. Another nice touch: You can opt to keep the Dashboard open within any application.

Customization options for the My MSN home page let you change the page's format, color scheme, theme, content, and more. For example, you might want headline news, related videos, and weather in the forefront; or maybe sports reports, incoming Hotmail messages, and movie video clips instead. You can also drag and drop content modules, moving them around the My MSN page to suit your needs. We prefer this free-form customization approach to the more packaged AOL approach.

Integrated versions of McAfee VirusScan and McAfee Personal Firewall Plus, as well as e-mail filters, a pop-up guard, and parental



MSN Premium's e-mail interface is uncluttered and customizable. Note the omnipresent Dashboard to the right of the screen.

if you are indeed in the market to refinance your mortgage).

Parental controls are member-specific and let you manage e-mail, instant messaging, calendar entries, and Web browsing remotely. The service lets parents approve (or block) sites on the fly and delivers a weekly Online Activity Report so that you can peruse activity by user.

MSN Premium offers a generous ten subaccounts (AOL currently gives subscribers seven). The primary user on an account gets 25MB of e-mail in-box storage plus 10MB for attachments; subaccounts get 10MB and 3MB, respectively. E-mail access features are impressive: You can send, receive, and manage MSN e-mail from MSN Premium, of course, but also from Hotmail and by using the Microsoft Office Outlook Connector for MSN, which is new with MSN Premium. Outlook Connector lets you access your MSN Premium e-mail, calendar, address book, tasks, and notes from within Microsoft Outlook XP and Outlook 2003.

Subscribers will find a wealth of ways to use their accounts beyond simple Web browsing. For example, we used the organization tool in Picture It! Library to insert photos into e-mail messages and upload the images to the Web for 30-day storage—a process that makes ad hoc photo sharing a breeze. Photo Story lets you add audio and music to

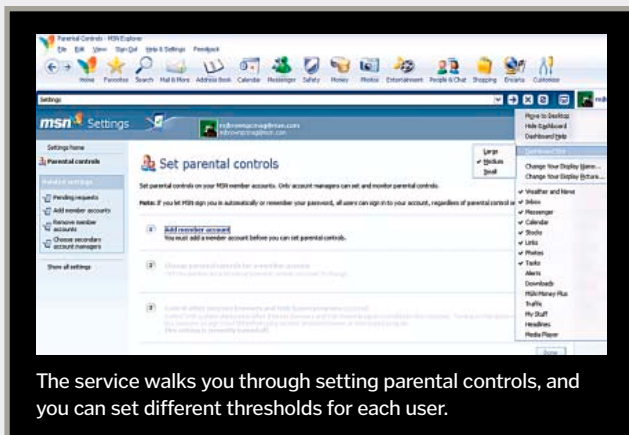
a series of photos to create a multimedia slide show for sharing via e-mail, IM, or video CD. IM enthusiasts can share photos in real time with MSN Photo Swap (in the included MSN Messenger tool).

Compared with Video@AOL, the MSN Video portion of the service is more limited. For example, in the News category, MSN Video offers NBC News and Business news stories and commentaries. Video@AOL News carries news stories from ABC, AP, and CNN. Moreover, Video@AOL provides the ability to share videos in IMs and e-mail, to join video-related chat sessions, and to rate videos. Such community features might make the additional cost of AOL 9.0 Optimized worthwhile for those who regularly use the video capabilities of their Internet service.

Of course, Microsoft plans on adding new content continually, so video selection shouldn't deter you. There's a lot to like about MSN Premium, especially for veteran Web users who want the clean, customizable interface, built-in photo-sharing, and Outlook integration.

MSN Premium

Direct price: With user-provided broadband, \$9.95 per month; with broadband from Microsoft ISP partner, \$39.95 to \$49.95 per month. Requires: 256MB RAM; 320MB hard drive space; Microsoft Windows 98, Me, 2000 (with SP2), or XP. Microsoft Corp., www.msn.com. ●●●●●



The service walks you through setting parental controls, and you can set different thresholds for each user.

AOL's graphical multimedia interface, which appeals more to entry-level users. MSN Premium's primary navigation tool, a customizable toolbar at the top of the screen, carries over from Version 8. You can set it to show your most frequently used features (such as News, Search, and Maps) and display them as text or small, medium, or large icons.

Also enhanced in this release are the Dashboard and My MSN navigation aids. The Dashboard

controls, provide peace of mind. MSN filters junk e-mail at the server, but you can also categorize items as junk, opting to have some or all reported back to the system's filter to train it.

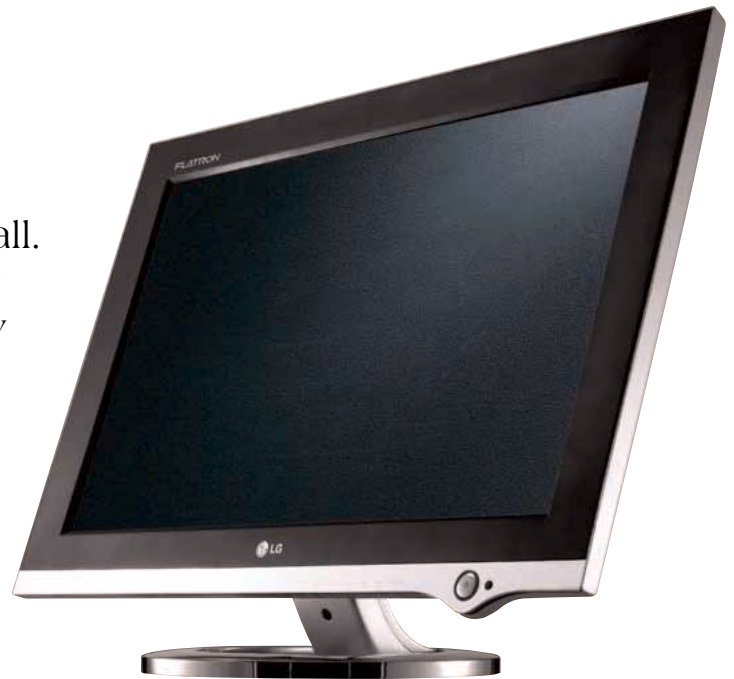
Pop-up Guard, which lets you control those pesky ads that jump onto your screen, has some clever settings options. For example, you can block pop-ups entirely or have the utility show an unobtrusive thumbnail of the ads it has blocked (useful

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LIFE'S GOOD

Corel's Answer to Adobe Creative Suite

BY SALLY WIENER GROTTA

Now that the name Adobe is synonymous with imaging, the CorelDraw Graphics Suite is often lost in the noise. But Corel has long offered very powerful illustration and photo-editing programs, complemented by tools, tutorials, and on-screen guidance that make it easier even for nongraphics professionals to be creative and productive. **CorelDraw Graphics Suite 12** delivers incremental improvements to an already strong graphics suite for art and business professionals.

The suite consists primarily of CorelDraw 12 (for illustration), Photo-Paint 12 (for photo and image editing), and Corel R.A.V.E. 3 (Rave Animated Vector Effects, for animation). Version 12's interface is virtually the same as Version 11's smooth, easy-to-understand layout.

Previous versions of the suite already offered an impressive array of intuitive tools and features, providing users with easy access to tremendous power, especially for photo/image editing and illustration. Photo-Paint's natural media brushes, for instance, as well as CorelDraw's Artist Media brushes, are among the most extensive on the market. They are simple to control and come with a wide range of options for texture, shape, pressure, color variability, and more.

Similarly, CorelDraw has a heritage of first-rate illustration tools. Its typography handles text almost as well as a desktop publishing program, with the ability to lay out long documents up to at least 99 pages.

Though not as powerful or versatile as other animation programs (like Macromedia Flash), R.A.V.E. 3 uses CorelDraw's excellent object creation and manipulation tools to animate sophisticated geometric shapes.

The most impressive innovations in the new Graphics Suite are the intelligent drawing tools

in CorelDraw and R.A.V.E. 3, which make it easier to create and place objects quickly and precisely. With the new Smart Drawing tool, freehand-drawn shapes are recognized and automatically converted into perfect geometric objects, such as circles, ellipses, rectangles, and so on. The curves are smoothed and extra nodes removed on the fly, leaving you free to sketch out your ideas rather than waste time worrying whether a square is actually square.

Turn on Dynamic Guides and alignment lines pop out as you draw, showing you precisely the angles and relationships between what is already on the page and what you are drawing. The Guides work interactively with the improved Snap to Objects tool. Point to a current object with your cursor and start drawing or placing another object, and words will actually display as you work, telling you whether you are snapping to a node, intersection, edge, midpoint, or center. Similarly, you can align to the tangent or perpendicular of an object, or even to the baseline or bounding box of text.

The Eyedropper tool in pick up color from anywhere on your desktop. It also lets you copy a range of properties, such as outline, fill, size, rotation, effects,

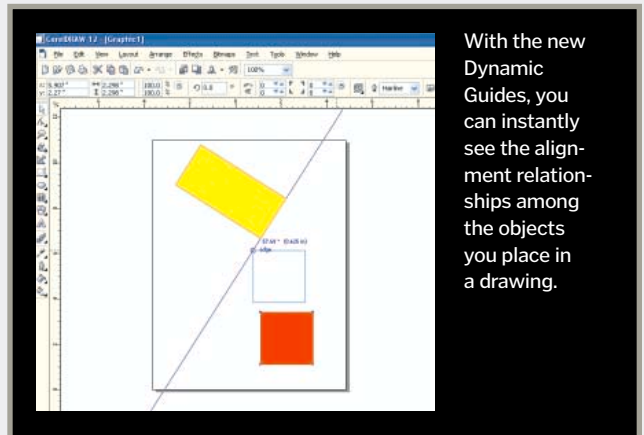
and other attributes, and apply them to other objects.

Photo-Paint is virtually unchanged in this version, other than the suite-wide improvements regarding language and export. The one new tool is a Touch-Up brush which, like Photoshop's popular Healing brush, lets you easily paint away imperfections.

Corel has always offered extensive import and export options covering a wide range of

three main programs, the Graphics Suite includes CorelTrace 12 (which converts bitmapped images into vector shapes), Corel-Capture 12 (a screen-capture utility), Microsoft's Visual Basic for Applications 6.3 (for macro building), Bitstream Font Navigator 5.0, QuickTime 6.0 Player, and Kodak Digital Science color management, plus a large library of clip art and fonts.

The competing Adobe Creative Suite is an indispensable tool for graphics professionals—especially those who must be seen to be using the top



With the new Dynamic Guides, you can instantly see the alignment relationships among the objects you place in a drawing.

file formats. Version 12 takes compatibility even further, including more robust AutoCAD DXF/DWG support. Unfortunately, it still does not support digital camera RAW formats, which will disappoint photographers who shoot with digital SLRs.

With the product's Unicode support, sharing files across international borders is better enabled, since it includes more than 65,000 characters for all written languages. The Export to Microsoft Office or WordPerfect Office dialog offers the option of optimizing a graphic for presentation, desktop, or commercial printing.

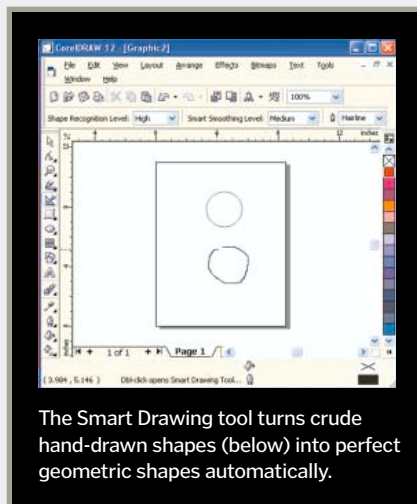
In addition to the

brand-name product in their field no matter what it costs (\$749 and up). The Adobe suite features the industry-defining Photoshop and Illustrator. Adobe's suite also offers more than CorelDraw Graphics Suite—specifically Version Cue's file management and Acrobat Professional.

But for users who simply want accessible imaging and illustration power, the \$399 Corel Graphics Suite 12 is a cost-effective option that offers impressive creativity, a wealth of accessible features, and intelligent workflow. It's not an essential upgrade for users of Version 11, but it's a strong product in its own right nonetheless.

CorelDraw Graphics Suite 12

\$399 direct; upgrade, \$179; educational version, \$99. Requires: 128MB RAM (256MB or more recommended); 250MB hard drive space; Microsoft Windows 2000, XP, or Tablet PC Edition. Corel Corp., www.corel.com.



The Smart Drawing tool turns crude hand-drawn shapes (below) into perfect geometric shapes automatically.



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THE POSSIBILITIES ARE INFINITE

P4 Extreme Reaches 3.4 GHz

BY KONSTANTINOS KARAGIANNIS

Intel's performance leader, the Pentium 4 Extreme Edition family, has just received a speed bump. Maintaining its 2MB of on-die L3 cache, the chip is now available in a 3.4-GHz version. As we found, the new part commands a significant price premium over plain-vanilla P4 chips and is intended for serious gamers and others who are willing to pay more for even a slight edge. To see how the new chip performs, we looked at systems from Dell, Falcon Northwest, Velocity Micro, and VoodooPC.

Do note that the overall performance leader, the VoodooPC Rage, overclocks its chip to 3.57 GHz. However, second place does not go to the other overclocked system—the 3.47-GHz Velocity Micro. Using the same 10,000-rpm drives as the VoodooPC box, the Velocity Micro pretty much tied the Falcon Northwest entry. And then there's the Dell, which lagged slightly (but not alarmingly) behind the leader on about half the tests but offers a savings of hundreds of dollars compared with the others.

There's no doubt that the latest P4 EE chip is peppy and sure to give gamers the extra jazz they desire. But we'd be remiss not to point out that noticeable savings at not-so-noticeable performance sacrifices are available with one of the new Prescott P4-based machines (see "Prescott Brings More Cache to Intel's Future," page 26).

DELL DIMENSION XPS



Without sparing a nicety, the Dell Dimension XPS manages to be the cheapest of the high-end Extreme Edition boxes: \$3,999 direct. A gamer's delight, the second-generation XPS incorporates the same type of goodies you'd expect from an enthusiast shop.

Most notably, Dell does the other guys one better with its monitor. You can't miss the beautiful 20-inch LCD included with this system. The Dell 2001FP has a 16-ms response time, which means that pixels refresh fast enough even for the most demanding 3D game frame rates. The 256MB ATI Radeon 9800 XT driving the LCD is amazing in real-world use, providing plenty of horsepower and a flawless output image. Do note that on the 3D benchmark tests, though, the card seems to lag slightly behind the nVidia boards used in the fastest machines here.

While none of the benchmark tests had the Dell leading, the system did keep up. Dell backs up the CPU with IGB of dual-channel 400-MHz DDR SDRAM, as well as two 74GB 10,000-rpm SATA drives in a RAID 0 configuration running the OS. Dell also has an added 120GB IDE drive for extra storage.

You won't be able to complain about what comes on the hard drive. Jasc Paint Shop Pro 8.0 and Photo Album 4 give you a head start on digital photography. Corel WordPerfect Suite II and

Pinnacle Studio Version 8 will handle both the boring and exciting types of content creation. As for the latter, you'll appreciate moving your video creations to the 8X DVD+RW drive. There's a 48X CD-RW, too, for those straight audio projects. Speaking of audio, the proven Creative Audigy 2 in this system outputs to the thunderous 450-watt Logitech Z-680 5.1 speakers. Games sound insanely real.

FALCON NORTHWEST MACH V 3.4 EXTREME EDITION

All 3.4-GHz P4 Extreme Edition boxes are about performance. But the Falcon Northwest Mach V 3.4 Extreme Edition (\$6,745 direct) is also about looks and customizability.

Like many Falcon cases, this one came in with an eye-pleasing bit of art on its side. This time it's the automotive-black Exotix case with laser-cut Falcon Eye logo, which glows via an internal LED. You can get whatever you want on the side of your box, assuming you can afford the overall package.

Consider that you can chop off about \$2,000 by not ordering the 20-inch NEC 2080UX LCD monitor and Logitech Z-680 5.1 speakers, but for some that would be



Falcon Northwest will customize your case with almost anything you can imagine.

anathema to the enthusiast cause. Both components do a nice job of outputting what comes from their respective signal cards: the 256MB nVidia GeForce FX 5950 Ultra and the Creative Audigy 2 ZS. That said, let us point out that we do like the less costly Dell 20-inch LCD a lot better.

Falcon once again proves that it knows how to squeeze the most out of every component. The 3.4-GHz chip turned in decent numbers across the board despite the 7,200-rpm (not 10,000-rpm) 120GB SATA drives in a RAID 0 configuration. We would have liked to have seen how 10,000-rpm drives would have worked here, and this is no

Though the Dimension XPS is but a rounding error behind the others here in performance, the price difference is enough to make the Dell model one of our favorite high-end gaming machines right now.

Dell Dimension XPS
 With 3.4-GHz Intel P4 Extreme Edition, 1GB dual-channel 400-MHz DDR SDRAM, two 74GB 10,000-rpm SATA hard drives in a RAID 0 configuration, one 120GB IDE hard drive, 8X DVD+RW drive, 48X CD-RW drive, 256MB ATI Radeon 9800 XT, 20-inch LCD monitor, Microsoft Windows XP Home, \$3,999 direct (E-Value code 6V411-XPSRPW). Dell Inc., www.dell.com. OVERALL ●●●●●●●●
 ●●●●●●●● ●●●●●●●● ●●●●●●●● ●●●●●●●●

PERFORMANCE TESTS

| | Processor | Graphics card | Business Winstone 2004 | Business Winstone 2004 Multitasking (total score) | Multimedia Content Creation Winstone 2004 | PCMark CPU | 3DMark03 Pro | Serious Sam: The Second Encounter (fps) | Tom Clancy's Splinter Cell (fps) |
|--|--|------------------------------|------------------------------|--|--|---------------|-----------------|---|--|
| Dell Dimension XPS | 3.4-GHz P4 Extreme Edition | ATI Radeon 9800 XT | 23.5 | 3.2 | 34.2 | 5,151 | 5,448 | 139 | 56 |
| Falcon Northwest Mach V 3.4 Extreme Edition | 3.4-GHz P4 Extreme Edition | nVidia GeForce FX 5950 Ultra | 24.4 | 3.2 | 33.8 | 5,271 | 5,483 | 146 | 56 |
| Velocity Micro ProMagix A/V/D | 3.4-GHz P4 Extreme Edition (overclocked to 3.47 GHz) | nVidia GeForce FX 5950 Ultra | 23.7 | 3.1 | 34.1 | 5,307 | 5,631 | 148 | 57 |
| VoodooPC Rage d:100 Extreme | 3.4-GHz P4 Extreme Edition (overclocked to 3.57 GHz) | nVidia GeForce FX 5950 Ultra | 25.8 | 3.4 | 35.1 | 5,556 | 5,431 | 152 | 56 |

RED denotes Editors' Choice. Each machine was equipped with 1GB of RAM. We ran all tests at 1,024-by-768 resolution, with 2X anti-aliasing and 2X anisotropic filtering enabled for the 3D and game tests.

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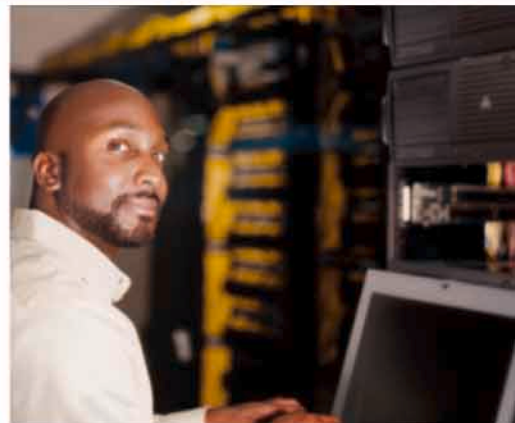
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mere idle curiosity on our part: For this price, we expect the latest in hard drive technology.

The 8X DVD+/-RW multiformat drive was a perfect choice, though, and can work in tandem with the standard 16X DVD-ROM drive for copies and the like. You'll need to install some video-editing software to unleash the multimedia possibilities.

As with the Velocity Micro and VoodooPC entries, Falcon Northwest will let you send in your case to get an upgrade for the life of the system. The service fee is minimal, and the company discounts the price of the parts you order. This option and the three-year parts-and-labor warranty soften some of the price blow.

Falcon Northwest Mach V 3.4 Extreme Edition

With 3.4-GHz Intel P4 Extreme Edition, 1GB dual-channel 400-MHz DDR SDRAM, two 120GB 7,200-rpm SATA hard drives in a RAID 0 configuration, 8X DVD+/-RW drive, 16X DVD-ROM drive, 256MB nVidia GeForce FX 5950 Ultra, 20-inch LCD monitor, Microsoft Windows XP Home, \$6,745 direct. Falcon Northwest, www.falcon-nw.com. OVERALL ●●●●●●



VELOCITY MICRO PROMAGIX A/V/D

The Velocity Micro ProMagix A/V/D (\$4,395 direct) is deceptive. Its black-and-silver case almost looks mainstream, until you notice the lower front-panel temperature readout and the windowed side with blue lighting.

The mainstream illusion is also shattered, in a good way, when you realize what's inside: a nicely appointed blend of support components for the new 3.4-GHz P4 Extreme

Edition (slightly overclocked to 3.47 GHz). We like the implementation of two 74GB 10,000-rpm SATA drives in a RAID 0 configuration: It definitely helped this system stay competi-

ve on our performance tests. Velocity Micro even goes a step further by adding a 200GB Ultra ATA 7,200-rpm drive, making deep storage seem not so remote. Another liberating drive combo is the 4X DVD+/-RW multiformat drive and the 16X DVD/52X CD-RW drive, which allows for fast disc-to-disc work in all formats.

You get plenty of software, too. Office tasks are handled by Corel WordPerfect Suite 2002. The more interesting package for multimedia types is the Ulead Digital Creation Suite, which includes VideoStudio 7, MovieFactory 2 SE, and PhotoImpact XL. The game bundle that comes with the Creative Audigy 2 ZS card features *Tomb Raider: Angel of Darkness* and *Tom Clancy's Rainbow Six 3*.

For gaming and movies, you'll be really moved by the Creative MegaWorks 650 6.1 speakers. This THX set puts out a pulsing 575 watts of power. The included 19-inch ViewSonic E90FB is a flat-front CRT, although it doesn't quite give the "big" experience gamers might crave. It is powered by the blistering 256MB nVidia GeForce FX 5950 Ultra, which hasn't disappointed in performance.

Taking into account all you get, plus the three-year warranty and upgrade service that's available, the Velocity Micro ProMagix A/V/D is not easy to pass up for the price.

Velocity Micro ProMagix A/V/D
With 3.4-GHz Intel P4 Extreme Edition, 1GB dual-channel 400-MHz DDR SDRAM, two 74GB 10,000-rpm SATA hard drives in a RAID 0 configuration,



A relatively understated beauty, the Velocity Micro ProMagix A/V/D delivers the goods—at a good price.

Edition (slightly overclocked to 3.47 GHz). We like the implementation of two 74GB 10,000-rpm SATA drives in a RAID 0 configuration: It definitely helped this system stay competi-

one 200GB 7,200-rpm UATA hard drive, 4X DVD+/-RW drive, 16X DVD/52X CD-RW drive, 256MB nVidia GeForce FX 5950 Ultra, 19-inch CRT, Microsoft Windows XP Home, \$4,395 direct. Velocity Micro Inc., www.velocitymicro.com. OVERALL ●●●●●●



VOODOOPC RAGE D:100 EXTREME

A sinister beauty, the VoodooPC Rage d:100 Extreme (\$4,500 direct) comes in a tall, black metal tower with the Voodoo name and the company's tribal mask logo cut into its base. You can have it with or without the side window for the same price, but we love the view



This Voodoo's anodized black tower case oozes evil, and the overclocked CPU oozes performance.

of the maroon interior. We're not sure our picture does it justice, but we hope our praise will.

What's inside the brushed and anodized case is pretty darn amazing, too. VoodooPC is the only vendor here to overclock the new EE chip to 3.57 GHz, and the company claims it will soon be able to push the chip even farther. In the meantime, let's just say we noticed their current efforts on our performance tests.

The Rage machine easily won the business and multimedia contests, splitting top honors only on graphics card-intensive 3D tests where anomalies typically abound (owing to drivers and other regularly changing factors). We can't be sure why this 256MB nVidia GeForce FX 5950 Ultra fell a hair behind the others on 3DMark03 Pro. As for the more standard results, those were

helped along by hard drive choice. Like Dell and Velocity Micro, VoodooPC used two 74GB 10,000-rpm SATA drives. However, unlike the others, it didn't add a third drive at this price for extra storage.

Also like the Velocity Micro box, the Rage has the Creative Labs game bundle. VoodooPC doesn't load much software, but what's here is noteworthy (including the OS, which is XP Pro, not Home). For taking advantage of the two bleeding-edge optical drives—the 8X multiformat DVD burner and the 52X CD-RW—there's a full version of Roxio Easy CD & DVD Creator 6. To get videos to that burn stage, CyberLink PowerDirector 2.5 ME comes in handy.

Whether gaming or watching videos, we found the 19-inch NEC FE991 CRT to be solid but

not as eye-catching as the tower itself. We were much more impressed by the Creative GigaWorks 7.1 speakers, which nicely tap the full potential of the Audigy 2 ZS, immerse you in aural virtual worlds, and maybe cause structural damage with their 700 watts of power. Not quite, but the oomph is truly there.

Even the input devices are cool, made up of a Logitech Bluetooth keyboard and mouse. We'd probably add another drive, but all that could be done for surprisingly little extra. This is cutting-edge performance done with eerily pleasing aesthetics.

VoodooPC Rage d:100 Extreme

With 3.4-GHz Intel P4 Extreme Edition, 1GB dual-channel 400-MHz DDR SDRAM, two 74GB 10,000-rpm SATA hard drives in a RAID 0 configuration, 8X DVD+/-RW drive, 52X CD-RW drive, 256MB nVidia GeForce FX 5950 Ultra, 19-inch CRT, Microsoft Windows XP Professional, \$4,500 direct. VoodooPC, www.voodoopc.com. OVERALL ●●●●●●



Virtual PC 2004 Puts Multiple PCs into One Box

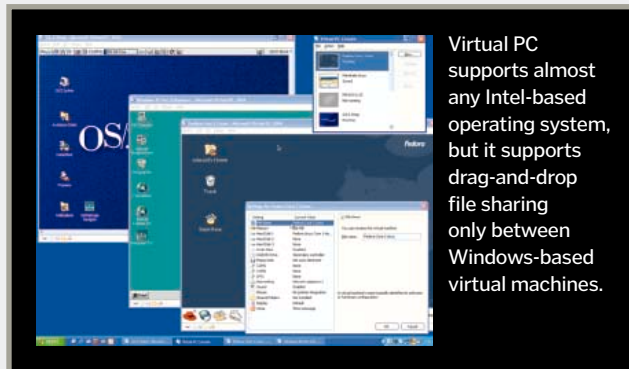
BY EDWARD MENDELSON

Connectix's Virtual PC has become a popular utility among developers and power users, since it creates one or more virtual "guest" computers in your physical computer's memory and lets you network them together with other virtual computers and real ones. It was effective enough for Microsoft to take notice—and snatch it up—and **Microsoft Virtual PC 2004** is the first release since the ownership change.

Compared with the previous version, VPC 2004 offers improved speed, security, and convenience, as well as a \$100 price drop (to \$129; current users can upgrade for free). That's all well and good, but the Redmond giant also took away *official* support for most non-Microsoft operating systems. Linux, NetWare, and other Intel-based operating systems still load and run just as well as they did under earlier versions, but Microsoft removed

the wizard-based instructions for installing them. That gives VPC 2004's larger competitor, VMware Workstation (now owned by EMC), an even bigger advantage in this space.

VPC 2004's interface is essentially unchanged. It is based around a Control Console that shows a list of virtual machines installed on your system, as well as icons showing thumbnails of the screens of virtual machines currently running or in a suspended state. The well-organized settings menu lets you add or remove support for up to four network adapters in each virtual machine for unparalleled flexibility in networking. Unlike VMware Workstation, VPC 2004 emulates a standard S3 video card, so you don't need special drivers to get screen resolutions larger than VGA. On the other hand, VMware virtual machines can use peripherals connected to the host via USB ports, but VPC 2004 can't.



Virtual PC supports almost any Intel-based operating system, but it supports drag-and-drop file sharing only between Windows-based virtual machines.

A new security restriction prevents MS-DOS-based guest machines from using VPC 2004's file-sharing features together with MS-DOS's Expanded Memory Specification (EMS). This makes it impractical to use the utility with MS-DOS programs (like Lotus 1-2-3) that require EMS for efficient operation.

Otherwise, we found few problems with the new version. Unsupported Linux versions like Mandrake Linux and Fedora Core worked smoothly, although

we needed two tries to install Fedora Core; on our first try, Virtual PC failed to recognize the second installation CD.

That said, Microsoft Virtual PC 2004 is more approachable than VMware Workstation, and it is the easiest way to pack a dozen computers into a single case. If you don't mind the Microsoft-only mindset of the new version, it's a fine choice.

Microsoft Virtual PC 2004

\$129 list. Microsoft Corp., www.microsoft.com/virtualpc. ●●●●●

Turn Your PC into a Wireless Access Point

BY LES FREED

PCTel's **Segue Soft Access Point Module** (SAM) is a clever piece of software that turns any LAN-connected PC into a Wi-Fi wireless access point. Given the low price of Wi-Fi APs (typically \$60 or less), SAM might not appear to make economic sense. But SAM's price is even lower: Several motherboard and wireless chipset makers have purchased licenses to include SAM with their products, making SAM effectively free to end users. And for setting up a temporary AP in a hotel room, meeting room, or the like, it's a darn clever solution.

SAM operates by creating a bridge between a wired LAN connection and a compatible Wi-Fi card installed in the same PC. Installation is extremely simple and takes only a few

minutes. Once SAM is installed, your PC operates just like a conventional wireless AP, complete with WEP security. The SAM program resides in the

System tray; clicking on the tray icon displays the SAM status screen where you can change options and view a list of connected wireless clients.

We tested SAM on a Sony VAIO notebook using an Ethernet LAN connection and a Netgear Wi-Fi card. We were able to connect to the SAM access point with no problems using a variety of wireless LAN clients, including a Wi-Fi-equipped TiVo.

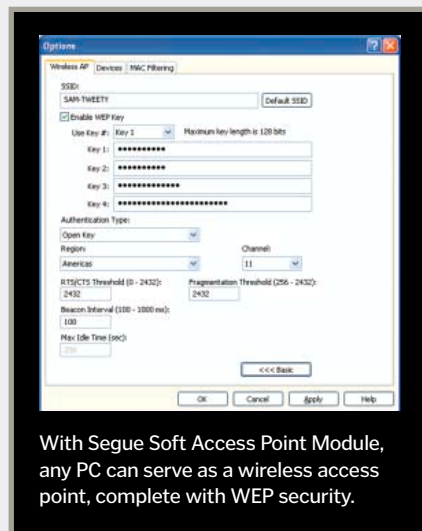
SAM can be a viable, inexpensive alternative to a conventional access point for some users, but it's not for

everyone. First, the PC must be on in order for SAM to operate. Given the huge power consumption differential between a conventional wireless AP and a desktop PC, the AP may be cheaper to operate in the long run. Second, the effective operating range of the SAM AP isn't as good as a standalone AP's. Finally, since SAM is software-based, it places a small but measurable load on the host computer's CPU. On our 1-GHz Pentium III test system, SAM used 3 to 10 percent of the CPU cycles with no clients connected and up to 20 percent with a single, active wireless client.

Despite such drawbacks, SAM is an interesting tool for setting up a temporary wireless LAN or for using wherever you need to create a wireless LAN with minimal effort and expense.

Segue Soft Access Point Module

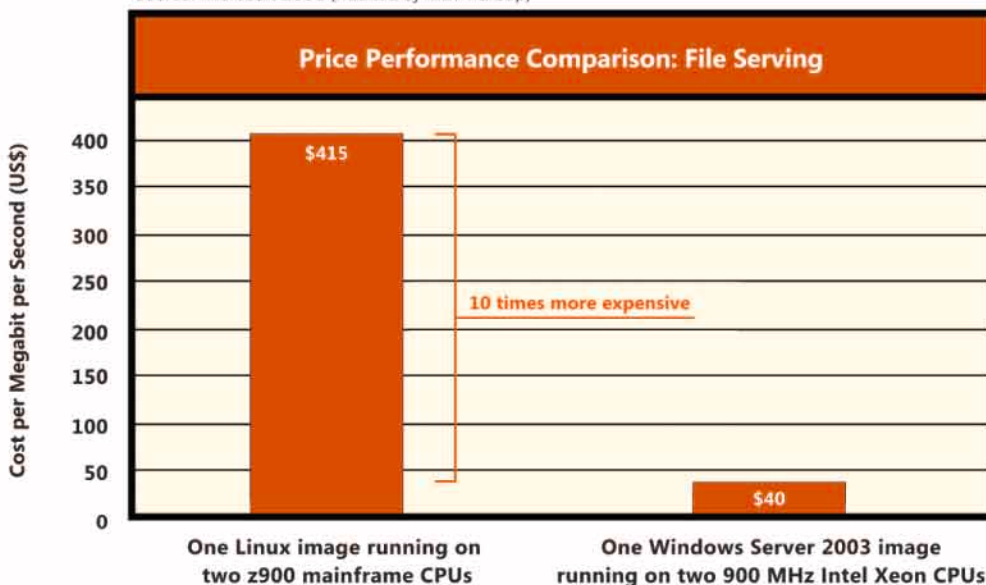
Free on select PCs. PCTel Inc., www.pctel.com. ●●●●●



With Segue Soft Access Point Module, any PC can serve as a wireless access point, complete with WEP security.

**WEIGHING THE COST OF LINUX VS. WINDOWS?
LET'S REVIEW THE FACTS.**

Source: Microsoft 2003 (Audited by META Group)



Linux was found to be over 10 times more expensive than Windows Server™ 2003 in a recent study. The study, audited by leading independent research analyst META Group, measured costs of Linux running on IBM's z900 mainframe for Windows-comparable functions of file serving and Web serving. The results showed that IBM z900 mainframe running Linux is much less capable and vastly more expensive than Windows Server 2003 as a platform for server consolidation. To get the full study and other third-party findings, visit microsoft.com/getthefacts



Camera-Ready Presentations

BY ALFRED POOR

Supposing that a picture is worth a thousand words, how much more would it be worth to project an image of the object itself, such as a product prototype or a printed book or report? The new 6.2-pound **Toshiba TLP-T61MU** (\$2,400 street) is an XGA LCD projector that comes with a handy detachable document camera, so you can show just about anything. And its price means you don't have to pay an enormous premium for this feature.

Unlike previous projectors with cameras, which required you to place the object to be displayed on top of the unit, the TLP-T61MU's camera is a separate module that clips securely to the side of the projector. You can detach the module and connect it to the projector by means

of the included cable.

Beyond the camera, the TLP-T61MU performs well as a projector. It comes with a 30-page manual, a thorough quick-start reference sheet, a 10-foot VGA cable, and a pair of remote controls. One remote has a basic set of controls, while the second adds remote mouse control and a laser pointer. The mouse functions work by plugging an IR receiver into your computer's USB port. The projector has only analog computer connections—no DVI connection—along with composite and S-Video. There is also a convenient VGA monitor pass-through connection.

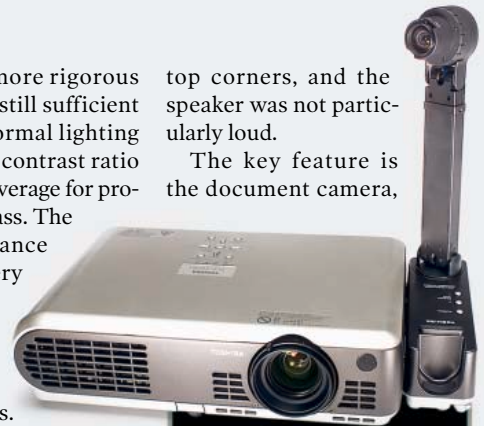
We tested the projector with images created by DisplayMate software (www.displaymate.com). The unit is rated at 1,500 ANSI lumens. While it measured lower than that—1,020 lu-

mens—on our more rigorous tests, the unit is still sufficient for use under normal lighting conditions. The contrast ratio of 147:1 is about average for projectors of this class. The brightness variance ratio of 1.3:1 is very good; we didn't notice any uneven brightness in all-white or all-black screens.

The TLP-T61MU showed smooth color ramps, good color tracking, perfect auto-sync, and excellent convergence, even though it has a three-panel design. There's an automatic keystone adjustment that works well and is easy to override if you don't want the aliasing it can produce. And there's an energy-saving mode that is slightly dimmer but extends lamp life. The only weak points were that the focus was a little soft in the

top corners, and the speaker was not particularly loud.

The key feature is the document camera,



The Toshiba TLP-T61MU's camera detaches, allowing flexibility in displaying objects.

which adds important versatility in a compact design. If you've got more to show than will fit in PowerPoint, the TLP-T61MU may be the projector you need.

Toshiba TLP-T61MU

Street price: \$2,400. Toshiba America Information Systems Inc., www.csd.toshiba.com. ●●●●●

Seeing Double

BY ALFRED POOR

What's better than having an LCD monitor on your desk? Having two LCD monitors, of course. That's the premise behind the new **DoubleSight DS-1500** (\$799 direct). You get two 15-inch XGA LCD monitors mounted side-by-side on a single stand, making a dual-monitor work style more practical. The idea is ambitious, though the execution of the concept disappoints.

We're big fans of using dual monitors for everyday productivity chores. For example, you can put your Web browser on one screen and your word processor on the other—and cut and paste with both in full view. Or you can work on a document on one screen and keep tabs on your e-mail in-box on the second screen.



We like the concept of side-by-side panels, but the DoubleSight DS-1500 disappoints.

And the idea of two 15-inch panels makes a lot of sense. This provides you with a display area of 2,048 by 768 pixels, for a total of more than 1.5 million pixels. A 19-inch LCD SXGA panel, by comparison, delivers about the same amount of screen real estate but would cost more.

The DS-1500 has a stylish silver stand, which permits tilt-and-swivel adjustments. The single set of front-panel controls lets you configure the screen

settings. An indicator light at the bottom of the unit shows whether the controls apply to the left- or right-hand screen, or both.

The DS-1500's image quality was generally good. Color ramps were smooth, color tracking was fine, and the auto-sync feature worked perfectly for each panel. But the DS-1500 has two flaws—one of which is serious. First, the viewing angle artifacts were noticeable: Although colors shifted only slightly at horizontal angles, the changes were dramatic at relatively off-axis angles on the vertical plane.

The bigger problem was that there was no light-gray response, and we could not adjust the brightness or contrast controls to coax light shades into appearing. This means that it is difficult or even impossible to see details such as the sliders on windows, and anti-aliased text

can be extremely difficult to read. According to a company representative, the problem is caused by settings in the display's firmware that DoubleSight intends to adjust in future units. The effect, however, can be corrected by adjusting the contrast settings in your computer's graphics display adapter driver, if that feature is available.

Even if the DS-1500's performance were perfect, its price would still be an issue. With individual 15-inch monitors currently priced at \$350 or less, the DS-1500 is more expensive than a pair of standalone displays.

If the DS-1500 used premium panels or had premium features—such as digital interface connections or wide viewing angles—then it would be a more attractive choice. But the DS-1500 has too many rough edges; you're better off with a pair of standalone 15-inch panels.

DoubleSight DS-1500

Direct price: \$799. DoubleSight Displays LLC, www.doublesight.com. ●●●●●

Epson's (Almost) Perfection

BY DANIEL GROTTA AND SALLY WIENER GROTTA

The **Epson Perfection 4870 Photo** scanner (\$450 street) is possibly the best desktop flatbed scanner we've tested, rivaling even professional scanners that cost thousands.

The Perfection 4870 is the first Epson scanner with firmware and hardware that incorporates Digital ICE technology (from Applied Science Fiction, now part of Kodak). Digital ICE automatically reduces or eliminates the effects of dust, scratches, tears, and creases in both prints and transparencies. The scanner also comes with Easy Photo Fix, Epson's proprietary utility for restoring faded prints and reducing the effects of film-grain patterns.

The PC- and Mac-compatible

Perfection 4870 scans in 48-bit color with an optical resolution of 4,800-by-9,600. The silver-and-gray unit, at nearly 15 pounds and 5.3 by 12.0 by 18.7 inches (HWD), is built like a tank: large, solid, and heavy. Its rounded cover, which is also thick and heavy to accommodate the built-in transparency adapter, remains upright when fully opened—a welcome touch.

The transparency adapter covers a 6- by 9-inch area and allows scanning of up to eight 35-mm slides at a time. Setting up the scanner is easy. The interface offers three scanning settings: Automatic, Home, and Professional. For even more control and precision, Epson bundles LaserSoft's SilverFast SE 6, a high-power professional scanning program. The generous bundle also includes Adobe

Photoshop Elements 2.0 (for image editing and archiving), Abbyy's FineReader 5.0 (for OCR), a USB cable, and four film frames.

With the Perfection 4870 connected via USB 2.0 (it also supports FireWire), we scanned our 8- by 10-inch test photo at 300 ppi in only 17 seconds. Default image quality is superb—razor sharp, with spot-

Digital ICE to repair deep scratches, like those on our test images, and you can't change the setting. As a result, the Perfection 4870 didn't reduce scratches as much as other models we've tested.

Digital ICE issues aside, the Perfection 4870 is a first-rate



The pro-quality Epson Perfection 4870 delivers outstanding scans.

on colors and clear details in even the darkest shadows. And true to its billing, Photo Fix worked well at reducing grain and restoring faded colors.

Unfortunately, Epson set the sensitivity threshold too low in

graphics scanner that will find ready acceptance among advanced amateur photographers and pros on a budget.

Epson Perfection 4870 Photo
Street price: \$450. Epson America Inc., www.epson.com. ●●●●

Introducing the Penabled™ Cross Executive Pen

A.T. Cross and Wacom have combined their expertise in technology, function and quality to offer the finest writing instrument for Penabled Tablet PCs.

The Penabled Cross Executive Pen uses patented Wacom technology that

allows the pen to be cordless and battery-free, provide 256 levels of optimum pressure sensitivity, have a programmable side switch and electronic eraser.

The sleek, modern, metallic pen is available in capped and non-capped styles, both with pocket clips, and features the patented Cross "pen-on-paper" feel.



For more information or for purchases visit www.cross.com or www.wacom.com

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Ethan Trull v. Microsoft Corp. and Activision, Inc.,
Case No. 97 CH 3140

Circuit Court of Cook County, Illinois

To: All People That Bought in 1995 or 1996 Microsoft's SideWinder 3D Pro Digital Joystick Packaged With Activision's Combat Simulation Game MechWarrior 2 not for resale (the "SideWinder/MechWarrior 2 Bundle"), or Who Paid \$14.95 To Upgrade The MS-DOS Version Of The MechWarrior Game Included In The SideWinder/MechWarrior 2 Bundle To A Windows 95 Version Of The Game.

Who Is Affected?

Consumers who purchased the SideWinder/MechWarrior 2 Bundle not for resale in 1995 or 1996 or who paid \$14.95 to upgrade the MS-DOS version of the MechWarrior 2 game included in the SideWinder/MechWarrior 2 Bundle are affected. If you purchased these products, you may be entitled to receive computer game software as part of a class action settlement.

What Is This About?

The lawsuit, Trull v. Microsoft Corp. & Activision, Inc., No. 97 CH 3140, Circuit Court of Cook County, Illinois, claims that the Side Winder 3D Pro Joystick and MechWarrior 2 game that were sold as a bundle in 1995 and 1996, are incompatible with each other, and are incompatible with the Windows 95 operating system. Microsoft and Activision deny these claims and allege that the joystick and game included in the SideWinder/MechWarrior 2 Bundle are compatible with each other and with the Windows 95 operating system. The Settlement is not an admission of wrongdoing or an indication that any law was violated.

What Can You Get From The Settlement?

If you are a member of the class of persons described above, you can receive your choice of one of the following packages of personal computer game software: (1) Tony Hawk's Pro Skater 3 bundled with Mat Hoffman's Pro BMX; or (2) the MechCollection, which includes MechWarrior 4: Vengeance, MechWarrior 4: Black Knight Expansion, and MechCommander 2.

How Do You Participate In The Settlement?

You may request a detailed notice and claim form by writing to the Trull Settlement Administrator at P.O. Box 13005, Birmingham, Alabama 35202 or by calling the Trull Settlement Administrator toll free at 888-878-1992. Completed claim forms must be received by the Trull Settlement Administrator or postmarked no later than **May 27, 2004**. You will need to provide information described on the claim form.

What Are Your Options?

If you wish to participate, you should contact the Trull Settlement Administrator and obtain a claim form. The completed claim form must be received by the Trull Settlement Administrator or postmarked no later than **May 27, 2004**.

If you want to exclude yourself from the Settlement and do not want to be legally bound by its terms, you must exclude yourself by **April 2, 2004** in order to preserve your right to sue Microsoft or Activision about any of the legal claims in this case. If you exclude yourself, you cannot get any benefit from the Settlement. If you do not want to exclude yourself, but object to the Settlement, you may do so by **April 2, 2004**. You may obtain a detailed notice of the Settlement from the Trull Settlement Administrator. The detailed notice explains how you can exclude yourself or object.

The Court will conduct a hearing to decide whether to approve the Settlement as fair and reasonable, to award attorneys' fees and costs, and to deal with such other matters as may properly come before the Court at that time. The hearing will be held at **2:30 p.m. on April 27, 2003** in Room 2305 of the Richard J. Daley Center, 50 West Washington Street, Chicago, Illinois, 60602. You are permitted to attend the hearing, but it is not necessary to do so in order to participate in the settlement. Objections can be made with the Trull Settlement Administrator in accordance with the provisions of the detailed notice that can be obtained from the Trull Settlement Administrator.

This is only a summary of the proposed settlement. In order to receive a copy of the detailed notice of the Settlement or a claim form, you may write or call at the address or phone number below:

Trull Settlement Administrator
P.O. Box 13005

Birmingham, Alabama 35202

Web address: www.noticeclass.com/trullsettlement

Toll Free Phone Number: 888-878-1992

Any additional inquiries regarding the settlement should be made to the claims administrator or Plaintiff's counsel at:

The Langone Law Firm
25 East Washington Street
Suite 1805
Chicago, IL 60602

Please do NOT call, write, fax or e-mail the Court or the Clerk.

Date Jan. 5, 2004

ENTER: /s/ The Honorable Richard Siebel
Circuit Court of Cook County, Chancery Division

FIRST LOOKS

ICE Flows Downstream

BY SALLY WIENER GROTTA AND DANIEL GROTTA

We've come to appreciate scanners equipped with Applied Science Fiction's Digital ICE technology, which can correct damaged prints with surface defects such as dust, rips, scratches, and creases. And we're happy to see it appearing in midrange (as opposed to high-end) scanners such as the **Microtek ScanMaker i300** (\$150 street).

The PC- and Mac-compatible i300 is a 48-bit device with an optical resolution of 4,800-by-2,400. It measures just 2.4 by 11.5 by 19 inches, which is fairly small for a CCD-based flatbed scanner. The cover is thin but substantial, and you can remove it to accommodate books and other thick originals. The glass platen can accommodate originals up to 8.5 by 11.7 inches (though the active scan area is limited to 6-by-9 photos when Digital ICE is used). The i300 ships with LightLid 35, a handheld adapter for scanning slides and nega-



The Scan-Maker i300 is an affordably priced scanner with Digital ICE technology.

tives. The software bundle includes Adobe PhotoDeluxe 4.1 for image editing, Abby's FineReader Sprint for OCR, and Ulead Photo Explorer for archiving images.

The front-panel controls include one-touch buttons to launch the i300's Scan, Copy, E-Mail, OCR, Web, and Custom functions. Setup and installation are fast and trouble-free, with basic setting and preference selections made by pressing the Setup/Cancel button on the front panel or via the included utility Microtek Scanner Configuration.

ScanWizard 5, Microtek's fine scanning software, can be activated as a standalone program or Twain driver, and you can toggle between a simple or more sophisticated interface. The simple interface doesn't let you specify resolution; instead, that is automatically set by the output selected (ink jet printer, screen, e-mail, and so on). The advanced interface is comprehensive, providing most of the tools and functions advanced users need and want.

But the i300 is no speed demon. Connected via USB 2.0, the i300 took almost 40 seconds to scan our 8-by-10 test photo at 300 dpi. Activating Digital ICE extends scan times to over 5 minutes.

The resulting scans, however, are generally worth the wait. Image quality is very good, with excellent, accurate color and very appealing skin tones, although images appear slightly soft. We scanned several damaged prints using Digital ICE, with spectacular (though not perfect) results. In addition, Microtek includes its own ColoRescue software to restore faded color photos. Indeed, the utility was able to boost the darkness and density of faded prints, but it did little to restore washed-out reds and yellows.

Still, good scan quality and the inclusion of Digital ICE make the ScanMaker i300 appropriate for most casual users.

Microtek ScanMaker i300

Street price: \$150. Microtek Lab Inc., www.microtekusa.com. ●●●●●

The Cat's Meow in Content Management

BY RICHARD V. DRAGAN

Aimed at midsize and large enterprises, the **A2i xCat System** for product content management offers a truly impressive solution for centralizing, editing, and publishing catalog data. With knockout speed for handling even the largest catalogs, ease of use for end users who aren't database experts, and solid Web connectivity, this solution can be worth every penny (deployment costs start at \$50,000) to the organization struggling to maintain and distribute catalog data both online and in print.

The core module is the A2i xCat Server, which we installed on Windows Server 2003 running against a SQL Server 2000 database. (The deployment options are quite flexible, including support for Linux, Solaris, and AIX, plus Oracle and IBM DB/2 as the database.) The xCat Server builds intermediate indexes and greatly speeds up searching catalog data. Of course, for best results, you'll want as much server memory as possible; 512MB is the recommended minimum.

We tested the xCat Console

utility with several large sample catalogs, including an industrial catalog that had nearly half a million products. This tool features a handy graphical interface for mounting and launching catalogs, plus viewing the underlying database tables in your product catalog.

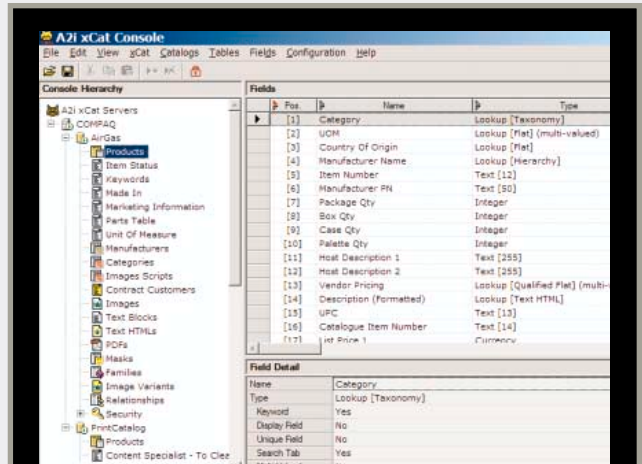
Once it's configured and running, everyday users in your organization will rely on the xCat Client module as their main tool. It's here that the A2i package truly shines. While e-commerce solutions like Microsoft Commerce Server 2003 or IBM WebSphere Commerce Suite offer "business desks" for basic administration of product lines and items, xCat goes much further. It delivers a truly comprehensive tool for mastering even the most demanding industrial catalogs, both in terms of sheer number of entries or complexity (such as numerous product lines, and dependencies/rules for the way items are bundled and sold).

Several standout features for end users include nearly instantaneous speed while browsing thousands of records. For instance, we could view the first and then last records in

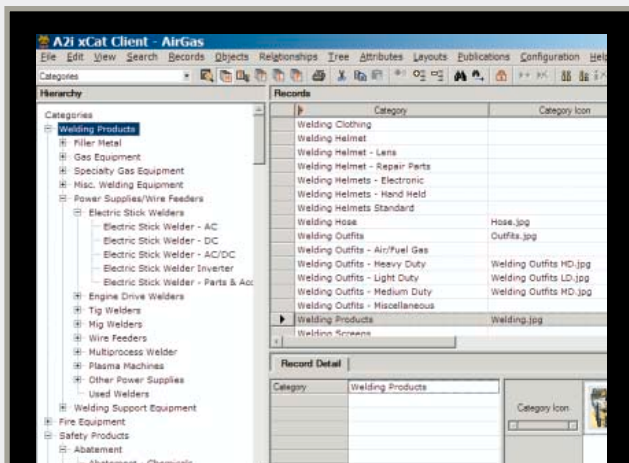
our test catalog effortlessly just by dragging in the spreadsheet-style record viewer. Through separately available APIs for Microsoft (via COM) and J2EE (via Java), developers can integrate xCat features into their

For example, we could type "1/4 inch," ".25 in.," or "0.635 cm" on a part size to get to the same matching results. The xCat search engine does the conversion automatically.

In the system's Layout mode, the xCat server becomes a way to export catalog data into Adobe InDesign or Quark



At the heart of the impressive A2i xCat System is the xCat Console, which lets users control product catalogs, with support for extremely fast and flexible multidimensional searches on thousands (and even millions) of items.



With comprehensive control over the most complicated product lines and items, the A2i xCat Client module lets ordinary users design views and edit product data while greatly speeding up product searches.

own Web or standalone desktop applications.

When working with catalog data in the xCat Client, users can add and edit new categories and items. Images can be added and automatically rescaled on the fly using another add-on module, the xCat Image Manager. Best of all, users needn't be database experts—or worry about the underlying database structure—to design and tweak even the most complex product lines. Within its more than half-dozen views (for seeing hierarchies, attributes, and the like), the tool makes consistent use of drag-and-drop support to speed up schema design and data entry.

Searching for product data gets a boost with extensive support for specifying dimensions of products, whether in physical size or weight. The search engine is truly international and can convert between some 40 different physical dimensions.

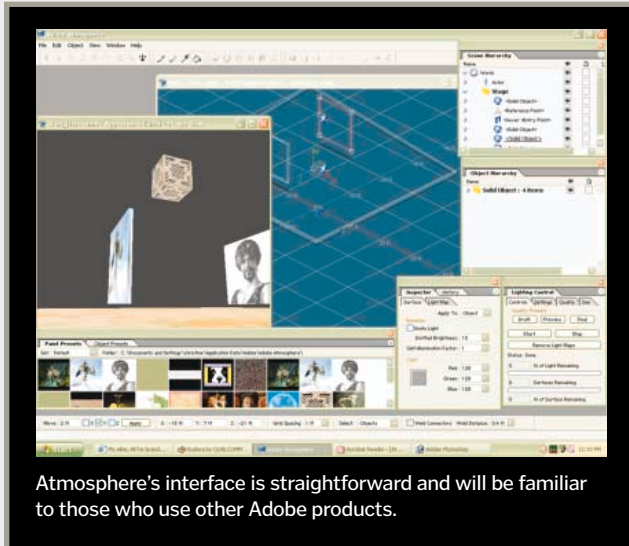
XPress (using a separate plug-in) for creating print documents. You can define and reuse templates for common catalog page styles. The ability to blast out literally thousands of catalog pages from a central data store is a real time-saver for any product-centric organization.

For our testing, we also looked at the separately available xCat Import Manager utility. This tool offers seamless support for XML in merging disparate catalog schemas and cleaning up data. Overall, this enterprise-worthy product offers some standout support for building and maintaining product catalogs.

No matter how complicated or extensive your product information is, chances are the xCat System can tackle it with ease. It's the most impressive product of its kind we've seen yet.

A2i xCat System

Direct price: \$50,000 and up. A2i Inc., www.a2i.com.



Atmosphere's interface is straightforward and will be familiar to those who use other Adobe products.



The Atmosphere Player utility offers visitors extensive control over viewing and interacting with the 3D worlds.

Add a 3D Atmosphere to Your Web Site

BY CHRISTINE SAUCIER

Adobe is looking to extend its digital content creation franchise with a brand new tool for creating 3D environments for the Web. **Adobe Atmosphere** (\$399 direct) is a standard-setting choice for developing interactive e-commerce, educational, and entertainment projects.

Atmosphere offers many advantages for creating visually stunning 3D environments. Key among them are the program's easy-to-use interface, support for real-time interaction, small file sizes for Web viewing, and the ability to add 3D environments to PDF files. Viewers can not only see interactive 3D objects but can also collaborate with other viewers in the environment.

Creating environments (what Adobe calls "worlds") with Atmosphere is relatively easy, whether you are a novice Web developer or a seasoned professional. That said, Atmosphere is not one of those programs you can start using without reading the comprehensive manual. You'll certainly need to work through the tutorials to get a firm grasp on the product's numerous features.

Fortunately, users familiar with other Adobe products will find Atmosphere's interface very

recognizable. In the center of the screen is your project. To the right are the Scene Hierarchy and Object Hierarchy panes to view all components of your 3-D world. Below these are the Inspector/History pallets, where you can adjust settings and view previous actions. Along the bottom, the Paint and Object Preset pallets let you view thumbnails of the image and video objects you are importing.

At the very top of the UI are various context-sensitive tools, which change as you move among the program's three editors. The Scene Editor lets you place solid objects in the world, switch viewpoints, execute scripts, and more. To add an object, simply click on the item and then click in the Scene Editor to place it precisely where you want it.

The Solid Object Editor allows creation of complex objects in the world. For example, you can combine cubes, cones, and other primitives to create a tower for the scene. Accessing the Solid Object Editor is as easy as clicking on an object in the world; clicking on an area away from an object brings you back to Scene Editor. This intelligent, automatic toggling among editors is a real time-saver.

Publishing an Atmosphere

world and uploading it to the server couldn't be easier: Simply select Publish from the File menu. All files needed to display the project online are saved to the specified folder. You can then view your world in a browser.

In addition to the authoring program, Atmosphere has two other components: Atmosphere Collaboration Server, which allows messaging and collaboration within Atmosphere environments; and Atmosphere Player. Both are free downloads.

The Player automatically downloads when a viewer accesses a Web page with an Atmosphere world. It lets the visitor easily navigate a world with the mouse and Shift and Arrow keys. Adjusting the Player settings is very straightforward; it includes preferences for navigating the scene, and much more.

Unlike the 3D scenes most visitors are used to on Web sites, where interaction is limited to rotating an object and zooming in and out, Atmosphere gives end users many more options. Visitors can toggle physics properties (collide, gravity, and so on) on or off, select avatars for themselves, choose to view or hide their own avatar (or the avatars of others currently visiting the world), and so on. The movement controls for avatars make

their actions look realistic: They can bow, stretch, wave, and more. The environment also lets visitors chat with one another and even supports private chats.

Such features render the possibilities for Atmosphere worlds truly limitless. Atmosphere can be used for 3D "eye-candy" demos of products or to show a 3D recreation of a wedding hall, home, or other venue, of course. But the real value for companies lies in using it to create inviting environments where visitors would stay and interact with others, rather than just as a way to show products.

Although Atmosphere has much power, it does have some limitations. The Player works with Windows 98 SE, Me, 2000 and XP, but not the Mac platform. And even though Adobe strove for small file sizes, more elaborate worlds will download slowly for dial-up users.

Still, considering the reasonable price (\$399 direct) and the program's ability to create truly interactive 3D environments, we think Adobe has another winner. Atmosphere could do for 3D Web worlds what Acrobat did for rich documents: Make them easily accessible for nearly everyone.

Adobe Atmosphere

\$399 direct; Academic version, \$99. Adobe Systems Inc., www.adobe.com.



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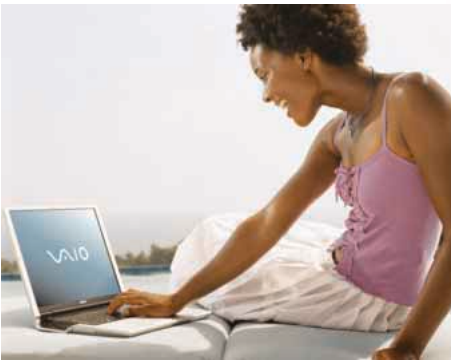
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FEEDBACK

“What’s the difference between a Comdex attendee and a canoe? If I try hard enough, I’ll get that canoe to tip.”



COMDEX COMPLAINTS

AS A LIFELONG LAS VEGAS resident, I was a little dismayed reading John C. Dvorak’s feelings about Las Vegas (Inside Track, January 20). He moans about the number of strip clubs we have to offer, but he fails to mention that those clubs are filled to capacity every night Comdex is in town. He gripes about the guys handing out the cards for the escort services but doesn’t tell you why they’re around the convention. Maybe it’s because the Comdex attendees use these services! Don’t worry, guys, what happens in Vegas stays in Vegas.

Dvorak needs to learn a few things: The reason we charge \$300 for a room that should cost \$75 is that it’s the only way to get any money out of people’s pockets. Comdex attendees are notorious for not spending money. They usually come to town with one white shirt and a \$20 bill in their pocket, and by the end of the week, they haven’t changed either one. Here’s a joke we used to tell: What’s the difference between a Comdex attendee and a canoe? If I try hard enough, I’ll get that canoe to tip.

STEPHEN C. PERKINS

PUSH THE ENVELOPE

I WANT TO POINT OUT A PROBLEM with your recent printer reviews (“Small Office, Shoestring Budget,” February 3, page 106). I have a small business, and new ink jet printers do not offer an easy way to handle single-envelope printing. On my Epson Stylus 900, I have to remove the paper, adjust the paper width, insert the envelope, print it, then readjust the paper holder, and finally reinsert the paper. I remember when printers used to have a separate slot for handling envelopes and odd-size pieces of paper. This feature seems to have been eliminated on modern printers. I’d like to see *PC Magazine* address the envelope-handling capabilities of business printers.

LES PALOCSAY

TAKE A COMPUTER TO SCHOOL

ONE OF YOUR RECENT FEEDBACK PAGES (February 3, page 53) included a complaint about your suggestion to donate computers to schools. The main issue is that incomplete systems and low-powered desktops don’t help students. But Internet research, administrative tasks, word processing, and presentations don’t take a massive

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amount of computing power. A computer lab pieced together with different computers can be maintained efficiently by students and teachers with very little expense. It can also be a great training tool for students to learn how to assemble computers, install software, and make disparate systems function together.

I agree that PCs should be donated in working condition if possible, but please don’t discourage donations when thousands of school kids don’t have access to any computers at all. Volunteer organizations like Utah Tech Corps get together to renovate donated PCs, install operating systems, ensure there’s enough hard drive space and memory, test the computers, and deliver them to needy organizations and schools that have no computers. Visit www.utahtc.org/cgi-bin/techaffiliate.cgi#mission for more information.

DAVID P. COTHRAN

DOESN'T EVERYONE KNOW HOW TO TUNE PACKET FILTERS?

BASED ON YOUR RECOMMENDATION (January 20, page 86), I bought Norton Internet Security 2004 for a relative. It slowed her Internet access to a crawl. Uninstalling it restored her PC’s performance. Symantec’s support database acknowledges the problem and suggests monitoring packet statistics, tuning packet filters, and changing the loading order of drivers to fix the problem. These might be appropriate for an IT professional or a software engineer like myself, but my relative is nontechnical. When is the software industry going to realize that its customer base no longer comprises geeks and nerds and that home and small-business users do not have on-site IT support?

PETER NELSON

LEARNING FROM EXPERIENCE

I WAS CONSIDERING BUYING a replacement for my four-year-old computer when I read “Build Your Own PC” in your issue of September 16, 2003. After reading the article, I decided I could build my computer for about half the price of the new Dell system I was considering and not sacrifice anything in the way of performance. I now own the best computer I have ever used. I enjoy knowing that I built it myself and am pleased that if something goes wrong, or if I want to upgrade, I can just dig right in and do it myself. I ran into some snags with bad RAM modules and BIOS tweaks, but the support staff at my local computer store and the RAM vendor were very prompt and helpful. I would never have attempted such a project had I not read the article.

Now that everything works, I can say that I’m glad I had problems with the setup. I know much more about how my computer works than I would if it had worked perfectly from the start.

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ExtremeTech

Take Pictures, Not Snapshots

How many megapixels do you really need? At the recent Consumer Electronics Show, I ran into my friend George Margolin, who handed me a pair of rather amazing pictures. Both were 12- by 18-inch prints of digital photographs. One was a head shot of fellow columnist John C. Dvorak, the other a picture of John and me standing side by side. The resolution of these images is startling. You can count every hair on John's head (although that task is getting a little easier these days), and you can see the subtly colored fibers in his jacket. In the picture of the two of us, you can even read the small print on my name tag.

He shot both with a 2-megapixel camera. Most people these days don't even consider 2 megapixels sufficient for a 4-by-6 print, but George loves flouting convention. As further evidence, he shot both pictures handheld, through a longish zoom lens, in a large ballroom, at $1/30$ of a second, without a flash. He also likes saving a buck: He had both images printed at Costco for less than \$3 apiece. His miraculous camera? An Olympus C-2100 Ultra Zoom with a 10X zoom lens.

The discontinued C-2100 is a bit of a secret weapon—it has optical image stabilization. You've seen this feature in camcorders: The camera senses your motion and moves an internal lens in the opposite direction to eliminate or minimize shake and blur. Some do this by shifting the sensor itself, so that it follows your motion. We'll come back to this point as we explore George's rules for getting the most out of a digicam, even one with limited resolution.

First, compose in the camera. Don't just take a picture, figuring that you'll crop later. When you crop, you're throwing away pixels, shortchanging your resolution. That 10X zoom on George's camera certainly helps him get right in on his subjects, as he did with John and me.

Second, stabilize the camera. If it doesn't have built-in image stabilization, use a monopod for convenience or a tripod for true stability. A stable camera lets you choose a smaller f-stop, which improves your depth of field and generally coaxes a sharper image from your optics.

Third, use available light. Flash does almost everything wrong: The light is directional, harsh,

and has a short range, and for people, the direct-on light is unflattering and causes red eye. We're used to seeing one another lit from the side and from above, with shadows softened by incident light. Available light is almost always more flattering. For available light, however, you'll often need a longer shutter time. See rule 2.

Fourth, take pictures, not snapshots. Look at your subject artistically. Study the lighting, frame your shot with some care, and take your lens's focal length into consideration. Getting up close to your subject with your zoom lens set for a wide angle will generally result in an unflattering image, exaggerating some features. Medium telephoto shots are generally the most flattering for human subjects.

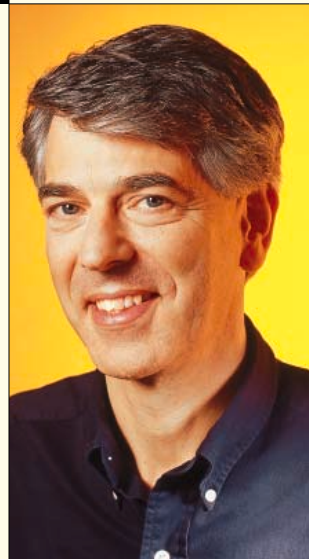
This last point is really George's cardinal rule and is the reason why people always do a double-take at his work. It just looks more interesting than everyday snapshots, because he studies his subjects and captures something of their essence, not just their image.

Megapixels are about as useful as a Ross Perot campaign button unless you hold the camera steady. And the more telephoto magnification you use, the greater the effect of motion. George says that you need an almost Zen-like relationship with your camera, and he suggests thinking of it as a kind of target rifle, where you squeeze off the shot slowly and easily, holding your breath. He can handhold shots from $1/15$ second all the way to $1/2$ second and with focal lengths equivalent to 100 or 200 mm—with a little help from his C-2100's image stabilization. Image stabilization can't do anything for a moving subject, though.

Meanwhile, it's gotten harder to find image-stabilized, long-zoom cameras. You can still find the 2001-vintage Canon PowerShot Pro90 IS, but among newer cameras, the Panasonic DMC-FZ10K looks promising, as does the Konica Minolta DiMAGE A1. The newer ones are both less expensive and more capable. Note, however, that these cameras run counter to the ever-smaller pocket camera trend. These are big, two-handed cameras that are designed for maximum flexibility and image quality.

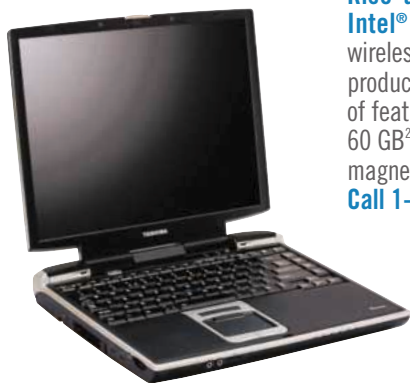
Give them a try; George would be thrilled.

MORE ON THE WEB: You can contact Bill Machrone at bill_machrone@ziffdavis.com. For more ExtremeTech columns, go to www.pcmag.com/machrone.



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John C. Dvorak

The New Networking Crock

Don't worry, if you haven't been invited once or twice already, you will be. You'll be invited to join one of the so-called social and business networks that are cropping up on the Web. The names are already becoming very familiar: Friendster, LinkedIn, Mixermixer, Ryze, and others. They use the Web as a nexus for mapping degrees of separation between you and anyone else in the known universe that is connected to other members.

These systems are designed to make our lives better and more efficient through connections. You've been wanting to have dinner with George Lucas, haven't you? After all, you have this great script for *Star Wars: Episode Minus 1*.

But who are we kidding? George Lucas is not showing up at your house anytime soon. This is plain, old-fashioned, hopeless Silicon Valley utopianism at work. Grab your wallet and hold on for dear life!

I'm sure these companies will become magnets for venture capital this coming year, and perhaps the public will want stock in them. I'm also sure that all of these companies will have business plans showing how they can make money with value-added services and by selling upgrades, T-shirts, hats, lapel buttons, RIM BlackBerry pagers, Web publishing, and advertising. I can also see the home brew version that always comes with this kind of service: the standalone, noncommercial, shrink-wrapped, personal networking tool. Your church can now network all its members in one easy step! And let's not forget the domino effect when the services fill up with people, get clogged, become too costly to manage, and—unless Microsoft stupidly buys these services for its mailing lists—go broke one after the other. It's all too predictable.

The entire flawed concept is a rehash of the touchy-feely community notions that emerged during the dot-com debacle. Everything had to be a community. Community means sales—big money! How? Nobody knows, but it does somehow. This new idea, sad to say, is largely based on the once-popular Six Degrees of Kevin Bacon notion, whereby you can show that there are never more than six people who know each other between you and Kevin Bacon. For example, your spouse (1) has a sister (2) whose best friend's (3) husband (4) used to

date a make-up artist (5) whose best friend (6) was Kevin Bacon's hairstylist. So what genius decided to turn this folly into a business?

One obvious imperfection is that the links are too often weak and sketchy. Otherwise, all the connected people would be hanging out together. In other words, you won't get Kevin Bacon over for dinner, either. Having links also implies that the linked people actually like each other, which excludes dubious acquaintances like prison bunk mates and codefendants.

Utopian concepts mostly destroyed the dot-com era. The amount of New Age idealism in Silicon Valley is disconcerting, especially when smart people dream up what are more properly called drinking clubs or lonely hearts societies. And I suppose going to a local Friendster mixer with high hopes of meeting your yuppie soul mate amidst a sea of drips, poseurs, and phonies is better than sitting alone at home watching reruns of *SpongeBob SquarePants*. Maybe.

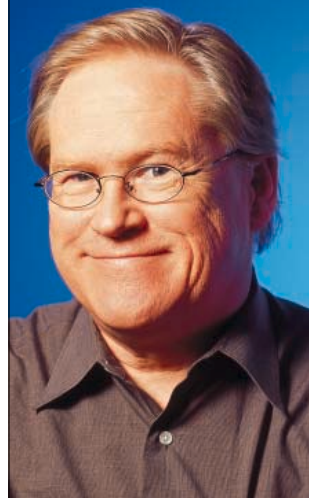
In fact, the social-networking systems will survive and the business networking systems will fail as the latter get bigger and more diluted. Let's face it: They'll attract the bottom feeders looking for a free lunch.

Then there is the issue of privacy. Do I want to be a CEO in a computerized networking system looking for a new CFO? What if someone is spying on the system? Can you imagine the leverage you'd have if you knew who was talking to whom? Even at lower levels, this is valuable information. I read the privacy statements of these systems, and I see no reason why these companies can't do this kind of monitoring. How would you know? Because they say they won't? How many dot-com promises were broken the last time around?

This kind of abuse is less likely and less important on the social networks. Who cares who is talking to whom? People are only concerned about the next party, meeting up for casual sex, finding a job as a Web page designer, or getting a new apartment.

You can expect to hear a lot of noise about these systems in the next year as the PR buzz machine cranks up and phony-baloney success stories are revealed to key media parrots. My advice: Be wary.

MORE ON THE WEB: Read John C. Dvorak's column every Monday at www.pcmag.com/dvorak. You can reach him directly at pcmag@dvorak.org.



This is plain, old-fashioned, hopeless, Silicon Valley utopianism at work. Grab hold of your wallets and hold on for dear life!



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JOHN C. DVORAK

Xbox, XDR memory, X Games. What's with all the X terminology? Enter the latest iteration in the high-speed memory wars: XDR DRAM. This design sends out 8 bits of data per clock cycle, creating a reported **3.2-GHz data rate** per pin at 400 MHz. Toshiba developed the design commercially; Samsung has licensed it. Expect it to be the next big thing in memory.

They Call Them Birds Dept.: Look for a new satellite initiative from Inmarsat to go into service with a splash this year. This one should deliver **432 Kbps worldwide** over what is called a *BGAN*, or broadband global area network. According to a Russian site that tracks such systems, the cost is expected to hover around a dollar a minute, which is too high for casual phone calls (which the system can handle) but cheap for **worldwide videoconferencing**, which is one of the promised applications.

Inmarsat is one of the pioneers of satellite phones, and it's one of the few companies that have stayed in business since its earlier system began service in 1982. The company uses old-fashioned, geosynchronous high-orbiting (35,786 km) satellites. Impractical for any **cheap two-way applications**, it was the only game in town for years until low-orbiting (780- to 1,414-km) systems from Iridium and Globalstar were launched. Both of these companies have had financial problems, and other planned systems have fallen apart. My favorite is the one Bill Gates is associated with: **Teledesic**. It was originally to go into service in 2002, then 2004, then 2005.

Teledesic was founded in 1990 with a plan to launch a **ridiculous 840 satellites**. It merged with ICO in 2000 and planned a mere 30-satellite rollout in 2004 with 46-Mbps service. In early 2002, Teledesic contracted for two satellites and promised 720-Mbps service to begin in 2005. Later in 2002, it suspend-

ed the contracts for the **two birds**, sent back its FCC licenses in 2003, and folded its tent.

I had been **openly skeptical** of Teledesic since its inception. A number of people, including a Saudi prince, **lost their shirts** on this fiasco. At one point, the company was talking about using **Russian ICBMs** to make the launches.

If you have any interest in this topic, the definitive resource is **Lloyd Wood**, whose Web site, *Lloyd's satellite constellations*, has links to just about every report on anything having to do with low-earth-orbit satellites. Type *Lloyd's satellite* into Google to get to it; the URL is complicated.

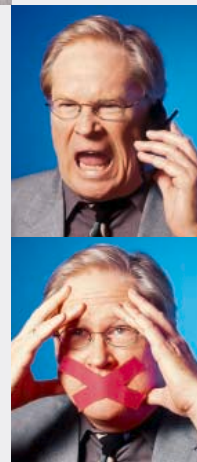
Watchdogging Digital Cameras Dept.: According to industry sources, 5.1 million digital cameras were sold by Japanese vendors alone last November. This puts the business at a **60-million-per-year** sales rate, at a minimum.

Two interesting trends are emerging as camera makers try to differentiate themselves. The first is the promotion of **old-brand-name lens** companies. HP is using Pentax lenses. Kodak is using Schneider lenses. Panasonic is using Leica lenses.

It's important to have good optics at all resolutions. One of the best examples of this is the trendy new Kyocera Finecam SL300R. A more expensive version of the camera with a Zeiss Tessar lens, sold under the Contax brand, reveals what a difference a lens can make, even at 3 megapixels.

This is especially true when a camera has a postprocessor, such as the NuCore chip (used in both these cameras). The NuCore chip makes images closer to typical 5-MP shots in quality, so the lens difference is more apparent. A variety of **postprocessing chips** are out there, and it's a shame that they aren't **highlighted** on the camera body as a feature. Even a little sticker would be useful.

Digital Photography Review (www.dpreview.com), Phil Askey's **fantastic**

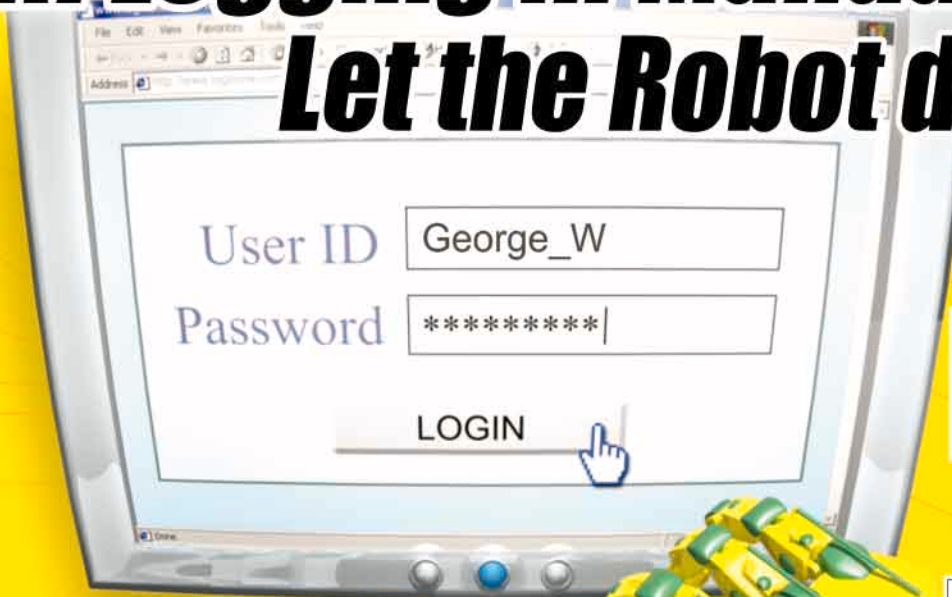


A variety of postprocessing chips are out there, and it's a shame that they aren't highlighted on the camera body as a feature.

Web site, goes on at length about breakdowns of image resolutions of various lens and camera combinations. But you can do this yourself with Adobe Photoshop. From my front porch, I took two pictures of an object a few miles away using the Fuji S-2 and a Nikkor lens and compared them with another image I shot with the same camera at the same focal length using a Tamron lens. Once I got them into Photoshop and magnified them, **the difference was remarkable** in both resolution and contrast. The \$1,000 Nikkor lens was far better than the \$300 Tamron unit. So the lens counts.

Losing Jobs for the Greater Good of India Dept.: Every time I complain about the outsourcing of data and other services to India, people call me a racist. Apparently, suggesting that these jobs should stay in the U.S. is politically incorrect, and we now owe India **an entitlement** despite its long-term alliance with the defunct Soviet Union. Anyway, the new term is *offshoring*. **American PR firms** efficiently **lobby** the media to prevent any sort of serious coverage of this issue. The funniest episode that got little press was that the State of Indiana recently **canceled** a multimillion-dollar offshore contract to upgrade a computer system that was processing—get this—unemployment claims. I **love** the irony!

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On Technology

No Cords, No Hassles

Wireless begets wireless. Once you cut the cord on a couple of devices, you want to cut them all. Aren't you glad your TV set no longer has a wired remote?

Wouldn't life be simpler if your surround-sound speakers didn't require you to snake a pair of cords back to the AV receiver? Here are half a dozen wireless technologies you'll want to take advantage of.

For home automation and control, a wireless protocol called Z-Wave from Zensys (www.zen-sys.com) has a good chance of coexisting with and possibly supplanting the X10 protocol. (See my story on X10 home automation on page 58.) X10 reacts to pulses sent over power lines, and with 25 years of refinement, it has been improved but not perfected. Z-Wave operates on a 908.42-MHz radio frequency, just above that of cordless phones, and it hops from device to device and back to the host controller, which can be a handheld remote or a PC. Unlike X10, all Z-Wave devices are two-way, meaning they can report back that they're on. Wall switch and appliance modules cost about \$30 to \$50, roughly the same as Leviton X10 or X10 Pro modules. Some PC-based X10 software, such as HomeSeer, lets you control X10 and Z-Wave devices simultaneously. Z-Wave is also compliant with the emerging Universal Plug and Play (UPnP) standard.

In a bachelor pad or in the family room, controller cords running from your sofa to your PlayStation 2 or Xbox are an eyesore, unless you put them away after each use. For a little more than the price of your next game, you can switch to a wireless controller, such as the Logitech Cordless Controller (\$59.95 direct), with versions for the PlayStation, PlayStation 2, Xbox, and PC. It's just like a regular controller only a bit bigger, but most users quickly adapt. Or you can plug two wired controllers into the Saitek WOW Wireless Adapter (\$40), which is PlayStation-only.

Cordless keyboards are nice to have, but cordless mice are essential, because mouse cords can snag and (unless they're incredibly thin and supple) resist your movements. I'm partial to Logitech because one of its keyboard-and-mouse sets is also a Bluetooth hub, and the keyboard on some Microsoft packages is split (probably better ergonomically, but I'm not going to retrain my hands). On the others, the function keys are clumped in groups of three when everyone else uses

four. Look for the lightest mouse you can get, closer to 4 ounces than 8, and don't worry about battery life.

Self-powered, audiophile-quality Wi-Fi loudspeakers are coming. At the recent Consumer Electronics Show, automation control start-up OpenPeak showed music streaming to loudspeakers via wireless Ethernet as part of its effort to simplify AV and home control. (Ethernet-to-IR converters make your Pocket PC into a whole-house remote.) Wi-Fi speakers mean you no longer have to wire individual rooms (at \$200 to \$500 per room) for whole-house audio or snake wires under the rug for rear surround sound. You could even have portable players pulling music off your PC's hard drive, as Linksys has announced. There are some obstacles to Wi-Fi if you send left- and right-channel information independently and the packets arrive out of sequence; a difference of a few milliseconds is deadly to the left and right surround sound.

Cordless headsets for traditional and cellular phones are great if you make a lot of calls and can amortize the cost over a lot of calling minutes. I was impressed by a prototype of the GN Netcom 6210, a Bluetooth device that works with Bluetooth cell phones and (with an adapter) traditional phones. But it costs \$299 (list), while a decent corded earpiece from Jabra runs one-tenth of that price.

NextGen City is rolling out public trials of MeshNetworks' vehicle-to-vehicle communications technology in the Dallas suburb of Garland late this winter. MeshNetworks' technology lets an industrial-strength variant of Wi-Fi hop from car to car, from cars to access points on light poles and buildings, and from there back to the Internet. (See Pipeline, page 19.) Like Wi-Fi or the coming Wi-Max (long distance mobile Wi-Fi), the MeshNetworks system handles Internet traffic wirelessly, but it's not directly compatible.

The 500 access points in the 60-square-mile city of Garland are for public-safety vehicles, but they could extend to private vehicles and homes. If and when MeshNetworks succeeds, you'll have two-way Internet access in your car—video, traffic warnings, and even emergency locator without a GPS receiver.

MORE ON THE WEB: You can contact Bill Howard directly at bill_howard@ziffdavis.com. For more On Technology columns, go to www.pcmag.com/howard.



Cordless keyboards are nice to have, but cordless mice are essential.

SOLUTIONS

Master of the House

Home automation technology is fun and affordable. Here's how to get started. **BY BILL HOWARD**

Home automation—using a PC and several additional attachments to control home appliances remotely—is a popular and growing field. Even if you can't afford a butler or housekeeper, you can screen visitors at the front door, set your lights and thermostat without lifting a finger, and more.

LET YOUR PC DO IT

Home automation comprises PC networking, shared Internet access, telephone communications, home security/surveillance, and automated/remote-control lighting and HVAC (heating, ventilation, air-conditioning). Eventually, it will encompass home chores, too. There are already robotic vacuum cleaners and lawn mowers with limited capabilities.

You could easily spend \$50 a square foot to automate a showpiece home—a hefty price considering an upscale, 3,000-foot home costs about \$150 a square foot to build. But \$1,000 can provide you with automation tools to make your life easier and amaze your neighbors. Even \$100 is enough for a starter kit to control half a dozen lights from your PC, from a PC-programmed timer, or from a wireless remote that's small enough to fit on a keychain. Here we'll recommend a shopping list around which to base your budget.

THE X10 MYSTIQUE

At the heart of most home automation schemes is a 25-year-old standard called X10. It's a method of transmitting signals over electrical wiring. The signal is at a much higher frequency than the 60 Hz your wiring uses, so the signal can be readily distinguished by a receiver/sensor. Receivers plugged into wall outlets or embedded in light switches "listen" for signals and react as necessary, flipping a switch to turn lights on or off (or dimming

them), starting a coffeepot, and so on.

Remote coffeemaking is a good example of what is possible yet not advisable. X10 signals are very reliable, but they can be interrupted by surges or drop-offs in the power lines. Damp weather or even an appliance being off can affect the performance of an X10 receiver. So any device that could be dangerous if not turned off properly shouldn't be controlled by X10. A porch light is no problem, a sprinkler would waste some water, but a space heater or coffeemaker could overheat.

Workarounds have evolved, such as sending the same command two or three

times in succession if you're using a PC-based controller or a simple clock timer that sends two on and two off commands (1 minute apart) per daily cycle. Getting the signal through the first time is a good reason to buy high-quality switches and to install signal boosters (that plug into a wall outlet) or breaker-box couplers. (Most homes have two electrical legs, or *paths*, connected only when a 220-volt appliance runs. A coupler bridges the legs.)

Most X10 users also have wireless remotes, which use radio frequencies (not infrared), so you don't have to be in the same room as the receiver. Most X10 starter kits include a wireless remote that controls X10 and audio equipment, as well as a small keychain remote that lets you turn on devices from outside the house.

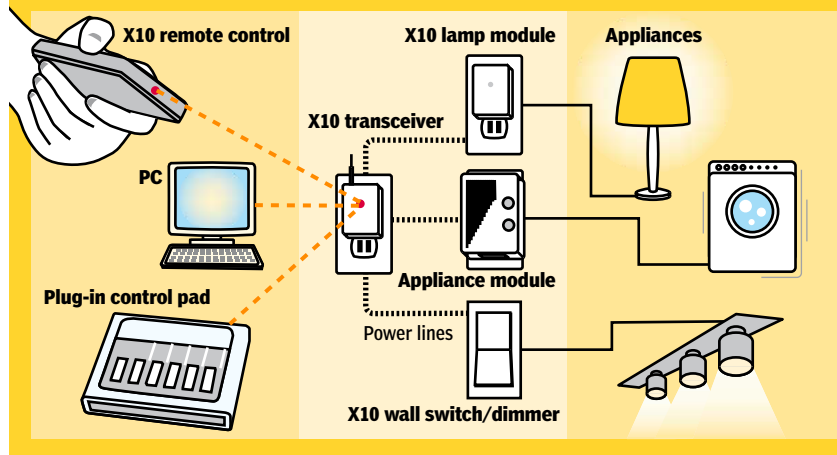
A fertile area for the future of home automation is energy-intensive water heaters, air conditioners, dishwashers, and dryers. You could turn the heat up at your home in New England just as your plane from the Caribbean was landing or reschedule a dishwasher to run at night, if electricity rates are cheaper then.

LIGHTING CONTROLS

To most people, home automation means pushing a button here and the lights dim

X10 Technology

Using high-frequency pulses, X10 products communicate through your electrical wiring and control lights, HVAC, kitchen appliances, and more.

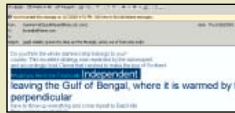




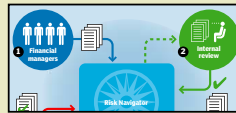
60 Office: Graphics formats.



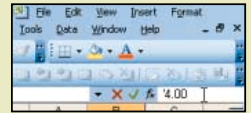
62 Internet: Google search toolbars.



64 Security Watch: Detect spam schemes.



66 Enterprise: Antifraud compliance.



69 User to User: Tips and tricks.

MAKING TECHNOLOGY WORK FOR YOU

over there. Although high-tech homes use dedicated wiring (running to a basement or garage control panel), and there are a couple of proprietary solutions (Lutron, www.lutron.com, is one player), most users opt for X10-based devices.

Don't buy cheap. A Leviton or X10 Pro wall switch for \$45 is a better deal than a basic X10 or RadioShack switch for \$15. The former resists interference, lasts longer, and can, for example, dim lights directly without turning them all the way on first. To start, use an X10 clock/controller (\$25, www.x10.com) that runs four lights. (Each of the four can be several lights set to any one of X10's 256 addresses.) A more versatile choice is a PC interface (\$25 to \$100, included with most X10 starter kits). It's a wall outlet module with battery backup and a serial or USB cable connection to your PC. The software lets you control more lights in more interesting ways, such as dimming four lamps to different levels for TV watching and adjusting outdoor lights to come on in relation to sunset or sunrise. When you unplug the controller from your PC, it remembers the programmed settings.

SECURITY

When you're in the market for a new alarm system, ask whether the alarm panel can tie into your computer network. If so, you may be able to monitor the alarm via a Web browser. You may also want to consider security cameras. For PC users, Ethernet cameras from D-Link, Panasonic, and Toshiba start at \$200 (wireless and tilt/pan cameras cost more), and you can access them over the Internet.

If you opt for an Ethernet camera for outdoors, buy a weatherproof housing, since few cameras are meant to withstand the elements. You can also use traditional cameras and then convert the analog video signal to digital so it can be transmitted efficiently over Ethernet. Our experience with X10-brand wireless cameras is that the price is attractive, but the signal doesn't carry anywhere near the claimed 100 feet; you might try an X10 wired camera for cheap (\$50), but we

weren't very impressed with their quality when we tested them.

You can monitor an Ethernet camera from any Web connection, or a third-party provider can monitor your cameras for a monthly service fee. Providers include Inetcam (www.inetcam.com) and Xanboo (www.xanboo.com). If you're not at a Web browser when an alert sounds, you can log on later to see who it was. Down the road, you'll be able to monitor from a color-screen cell phone.

\$1,000 SHOPPING LIST

If you're looking to invest \$500 to \$1,000 in home automation, consider the list below to get the most bang for your buck. Let's assume you already have a broadband modem connected by wired Ethernet to your PC, and you don't have any major remodeling planned.

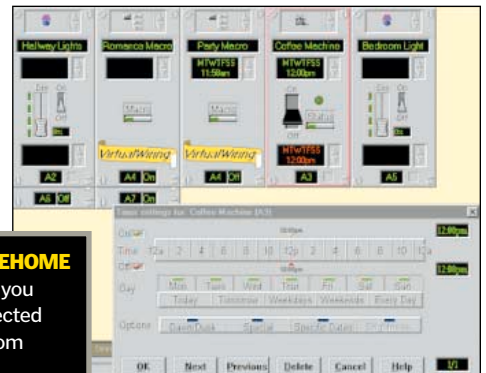
- Get an X10 starter kit with PC programmability (\$50).
- Add half a dozen X10 Pro or Leviton X10 switches—mostly in your living room—including one scene-controller switch. Save two remote switches for your front and side door lights (\$40 per switch).
- Add a Wi-Fi wireless access point and wired Ethernet switch (\$75 plus \$50 for a notebook Wi-Fi PC Card or desktop USB-to-Wi-Fi adapter), so you can roam the house with a notebook.
- Install an Ethernet monitoring camera aimed at the front door (\$200, plus another \$100 for a weatherproof housing).
- Install a whole-house surge suppressor to protect all your electronics (\$250, installed by an electrician).

NEXT STEPS

Once you're hooked up, you may want better and more versatile switches. Higher-end PC control software, particularly HomeSeer (\$150 direct, www.homeseer.com) and Advanced Quonset Technology's Home Control Assistant (\$80 to \$250, www.advancedquonsettech.com), give you added flexibility. If you have a Pocket PC

device with a Wi-Fi adapter, Nevo (www.mynevo.com) software can issue X10 lighting commands.

You may want to add programmable



X10'S ACTIVEHOME software lets you control connected appliances from your PC.

switches in the walls, too. In the space of one switch, you can have as many as eight mini-switches, each capable of controlling several lights. They typically cost from \$50 to \$100. The Leviton Maestro, which can control every light in your house, sells for \$500.

It's clear that PCs will play a bigger role in controlling and automating homes and in pushing automation technologies forward (and prices down). Universal Plug and Play (UPnP) is the likely umbrella technology that will unite the security, lighting, and audio-video factions. Both Windows Me and XP support UPnP and a handful of devices—including network adapters and routers—have shipped, but it's still a trickle. Specifications for home automation devices such as light switches were only published in late 2003. Unfortunately, little will be retrofittable, so you'll need new appliances to make all the parts work. If you have a dozen X10 wall switches controlling your lights now, you won't have to replace them, but you will need a new UPnP-aware X10 control box.

If you're ready to take the plunge, make an initial investment now and leave room for incremental improvements as the technology evolves and prices drop.

Bill Howard is a contributing editor of PC Magazine.

A Guide to Graphics File Formats

We'll help you decide which file format is best for your needs.

By Luisa Simone

You can gain more control over the quality and size of your images by picking the right format for the job.

Graphics files usually contain one of two types of data: *raster*—colored dots (or pixels) arranged in rows, and *vector*—images composed of lines, polygons, and text. Raster formats are ideal for photos, and

vector formats are best for logos and diagrams. Vector formats use smooth outlines to create objects, maintaining quality even when an image is enlarged or reduced.

Generally speaking, there are three factors to weigh when considering graphics formats: the output media (print or Web), the format's specific features, and your

workflow. Typically, the only Web formats worth using are those supported by most browsers: GIF, JPEG, and SWF. Large raster images are more download- and memory-friendly if they're compressed, but *lossy* compression schemes (such as JPEG) shrinks images by discarding data. Also, some formats support simple transparency (where designated pixels are opaque or clear), and others offer gradient (or *alpha channel*) transparency effects.

Workflow is also crucial: You can't choose a format if your equipment doesn't support it. The information below will help you make the right decision.

Luisa Simone is a contributing editor of PC Magazine.



JPEG is a full-color raster format supported by all popular Web browsers and digital cameras. Its compression can produce very small files for speedy downloads. But JPEG employs lossy compression, so it can degrade image quality (notice the blocky interference pattern). Each time you save a JPEG file you further degrade the image.



GIF is a Web-ready raster format. GIF files use a limited palette (256 simultaneous colors at most) but they often use fewer colors to reduce file size. Small color palettes (see the inset), lossless compression, transparent colors, and frame-based animation makes GIF a fine choice for Web graphics such as icons or logos.



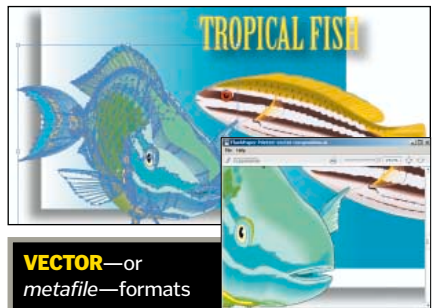
TIFF is a great choice for raster images intended for print. TIFF encompasses many different color modes. In addition to RGB color, TIFF supports 8-bit gray-scale or 32-bit CMYK data (for commercial offset printing). TIFF offers advanced features, including gradient transparencies, multiple layers, and several compression methods.



PNG (Portable Network Graphics) is gaining acceptance as a raster format for the Web. PNG supports palette-based and full-color images, plus lossless compression and a true alpha channel. The helmet in the image has a clear background as well as a soft, semitransparent drop shadow that can interact with other page elements. Note that not all browsers can display PNG's multilevel transparency.



NATIVE FILES are specific to particular programs. Proprietary formats support features essential to image development. The Photoshop file (PSD) shown here contains multiple layers, transparency masks, editable text, and automated shadows effects (as shown in the *Layers* palette).



VECTOR—or *metafile*—formats involve pictures composed of discrete objects. In the image, the blue highlighting of the fish on the left shows that the drawing comprises hundreds of individual shapes. On the Web, Macromedia Flash offers crisp text, smooth lines, and transparent objects, so it's a good choice for static images. The new Flash-Paper output option lets you zoom in without degrading quality (see the inset).

SAMSUNG



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The Next Small Thing

If you haven't tried a search toolbar yet, you're missing a great way to ease your searching. **By Tara Calishain**

Going to a search engine site to look up information is so 20th century. Why not use a search toolbar instead? These little additions to your browser put a wealth of search options at your fingertips, and they make searching quick and easy. One caveat: Most of the toolbars require ActiveX, so you'll have to make sure your browser and firewall allow it. And most toolbars work only in Internet Explorer. But if you don't use IE, don't worry; we've got a couple of options for you, too.

GOOGLE TOOLBARS

Google's official toolbar is available at <http://toolbar.google.com/>. You'll be asked to pick a language, and then you can download the toolbar. When you install the toolbar, you'll have to agree to both the terms of use and to the toolbar's feature set. Advanced functions require that information about the site you're browsing be sent to Google. You can disable the functions during the installation process if you're concerned about your privacy.

Once you've installed the toolbar, you'll find a bunch of useful tools. You can search Google, of course. You can also block pop-ups or fill in forms with one click. As you visit sites, the Google Toolbar shows the PageRank calculated by Google for each page, giving you an idea of how popular it is.

If you don't use IE you can still get great Google functionality, thanks to a couple of IE-independent toolbar projects. Check out Googlebar (<http://googlebar.mozdev.org>) if you use Mozilla or Netscape. Be sure *Software Installation* is enabled (*Preferences | Advanced | Software Installation*), or the installation won't work.

If you've used the "official" version of Google's toolbar with IE, Googlebar will look familiar. In fact, it can provide all the information the official version can except PageRank. You can use the *I'm Feeling Lucky* function, search Google's regular services (Google Groups, News,

Directory, Catalogs, and so on) as well as the specialty searches (such as U.S. Government or Microsoft).

Another terrific option works with just about any browser. GGSearch (www.frysianfools.com/ggsearch) isn't a toolbar; it runs as a small application that you launch independent of your browser. When you enter a search term, a Google results page opens in your browser.

You can search several Google properties, including news, groups, images, and stocks. And you can choose options such as the relevance filter, safe search, and the time period to use for the search. Unless you use IE, choose the *Enable custom browser* option, because otherwise the default browser (usually IE) will open with the results.

OTHER SEARCH TOOLBARS

Of course, Google isn't the only search engine, and others also offer toolbars.

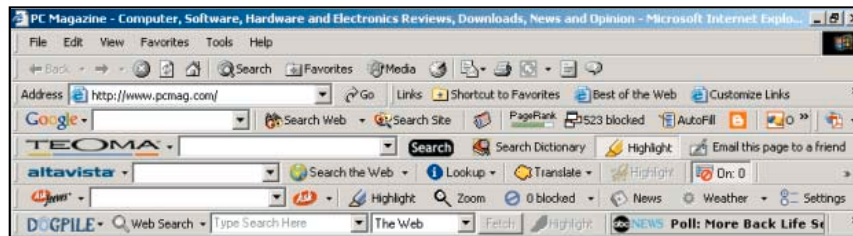
You can download the Teoma toolbar at <http://sp.ask.com/docs/teoma/>

like the one on Google's toolbar may prevent the box from appearing.) Clicking on the Teoma button at the left of the toolbar lets you add the *Search Dictionary* button, and you can also change highlight colors and button styles.

The default installation of the Ask Jeeves toolbar (<http://sp.ask.com/docs/toolbar/>) shows a few options such as the query box, highlight tool, and news search. Click on the Ask Jeeves logo and you can add buttons such as *AJ Kids*, *Dictionary*, *Stocks*, and *Weather*. The coolest option is the *Zoom* button, which lets you shrink the size of the Web page you're viewing so you can print it on fewer pages.

You can download AltaVista's toolbar at www.altavista.com/toolbar/default. Default buttons include an *Information lookup* button (for currency conversions, a dictionary, ZIP and area codes, and so forth) a translation tool, and a pop-up blocker. Additional buttons (accessible by clicking on the AltaVista icon and choosing *Add/Remove Buttons* from the menu) include individual lookup buttons for many of the reference items as well as for many AltaVista properties (including news, images, and so on.)

If you want to do all your searching in one place, try the metasearch engine Dogpile's toolbar (www.dogpile.com/info.dogpl/tbar). Besides returning quick results from the top search engines, the toolbar gives you a news ticker, local



SEARCH TOOLBARS put many cool options at your fingertips.

toolbar. The default install puts three items on the toolbar: a query box, a *Highlight* button, and a button for e-mailing a page to a friend. The query box works as you'd expect. Enter a search term and you get a Teoma page full of results. Hit the *Highlight* key in the toolbar and all the query terms on the page are highlighted instantly. If you click on the *Email this Page to A Friend* option, you'll get a pop-up box that you can use to send the title and URL of a page to an e-mail address. (Be aware, though, that pop-up blockers

weather, and Dogpile's *Cursor Search*, which lets you select any word or phrase on a page and then right-click to search.

Adding a toolbar can save you lots of time and make your searches easier. Adding a few—if you can handle the clutter—puts a variety of cool options right where you need them.

Tara Calishain writes ResearchBuzz, a weekly newsletter on Internet research and online information collections (www.researchbuzz.com).

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SECURITY WATCH

THE LOOKOUT

WINDOWS XP
SP2'S FIREWALL:
ON BY DEFAULT

Microsoft has released a document detailing the features expected in its Service Pack 2 (SP2) for Windows XP, which will ship later this year. SP2 adds security enhancements to Windows, in particular the improved Internet Connection Firewall (ICF), which will be turned on by default. The new ICF will shut all ports on your machine that are not being used. In addition, both RPC and DCOM have been restructured to diminish the possibility of attack and to let administrators control access rights. Microsoft frequently points out that users with ICF enabled are not vulnerable to the Blaster worm.

The new ICF has a number of other security features. For more information, visit www.eweek.com/article2/0,4149,1413404,00.asp.—Larry Seltzer

Spam War

In the battle for your in-box, spammers keep coming up with new tricks. **By Leon Erlanger**

Besides being the year of war, terrorism, corporate fraud, and blackouts, 2003 was also the year of spam. As more users found their legitimate e-mail vastly outnumbered by spam, spammers and antispam vendors played a constant Tom-and-Jerry game, frantically coming up with evermore-sophisticated techniques to outfox each other.

As recently as a year ago, many anti-spam solutions relied on keyword recognition to separate spam from legitimate e-mail. Spammers outwitted such strategies by interspersing commas, spaces, exclamation points, and deliberate misspellings (such as *V!agra*) in headers and message content to get through. We've all seen such tricks, but you may not be aware of less obvious ploys that rely on HTML features to foil spam filters. For example, a spammer may intersperse

```
&#86; &nbsp; &#105; &nbsp; &#97; &nbsp; &#103; &nbsp; &#114; &nbsp; &#97;
```

What a user sees is *Viagra*.

Spammers also place columns of letters in each cell of an invisible HTML table, so that the filter reads cell by cell, but the recipient reads across the cells. And if that's not enough, many spammers simply render text as an HTML image. According to Chris Belthoff of antispam vendor Sophos, more than 80 percent of current spam is HTML-based.

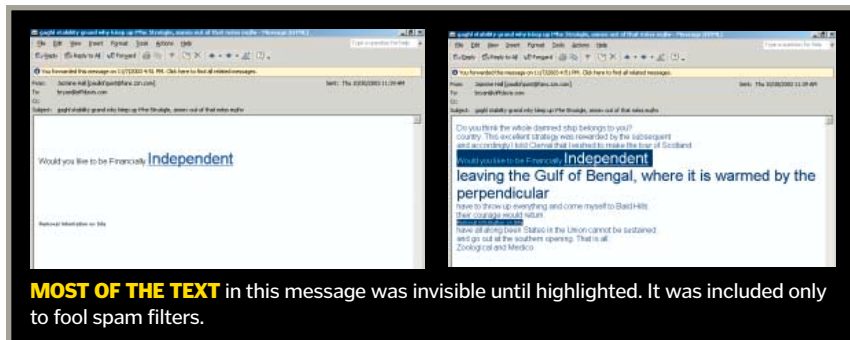
Antispam vendors have countered with more sophisticated spam-fighting techniques. For example, Bayesian filtering rates each word and feature of a message for the likelihood it is spam, based on careful analysis of past spam and non-spam e-mail. This is very clever, but spammers have responded by packing messages with lots of legitimate text and

create a signature to identify each. Signatures work particularly well for HTML images, according to Ken Schneider of antispam vendor Brightmail. Vendors often combine this method with blacklists of proxy sites that spammers use to hide their source IP addresses and URLs that spammers use as links. Or they may simply match a URL claiming to be a particular well-known site against its known true URL. Rules-based techniques match messages against a list of vendor rules that identify suspect e-mail. All of these techniques require frequent updating.

The contest continues. Spammers test, retest, and fine-tune their e-mails against real antispam products. They use e-mail bugs, in which one pixel links to a specific URL that tells the spammer which message got through antispam defenses and was opened by which users. They set up Web sites to test their spam against a variety of antispam solutions.

The lesson in all this is to make sure your antispam solution doesn't rely on a single technique and that vendors demonstrate a commitment to outwitting new spam tricks as they appear. For more information on spam, see "Can E-Mail Survive?" in our issue of February 17.

Leon Erlanger is a freelance author and consultant.



white-on-white text or zero-font-size characters in between visible text. You won't see such characters unless you select them with your mouse, but filters take them into account. Other tricks include using the ` ` HTML entity to place a space between letters, adding phony HTML style tags, or indicating each letter with an HTML entity. When a keyword filter sees HTML entities and style tags, it simply reads them as text. So if a spammer uses HTML entities for letters and spaces, the filter reads

features—visible or invisible. Highlight a spam message, and you may find an entire hidden short story, sufficient to thwart such filtering. Another tactic is to put as little information in an actual message as possible or to disguise the entire message as a topic that should interest the recipient, then link to a URL about the real spam topic.

Antispam vendors have added signatures, blacklists, and rule-based filtering to their arsenal. They set up spam honeypots to catch as much spam as possible, then

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Honest Reporting at Toys "R" Us

With antifraud law in place, nobody's playing games with financial reports. **By Michael Cohn**

The aftermath of the accounting scandals that have plagued corporate America prompted Congress to pass the Sarbanes-Oxley Act of 2002, and now public companies across the country must take extra care to ensure the integrity of their financial-reporting control systems. One such company is Toys "R" Us, the \$11 billion Wayne, New Jersey-based retailer that calls itself "the world's biggest toy store." Although it is in the business of child's play, Toys "R" Us isn't playing around in terms of complying with the law and assuring its investors that its numbers are legitimate.

The Sarbanes-Oxley Act calls for a slew of new requirements that public companies, accounting firms, and financial analysts must meet regarding the disclosure of off-balance-sheet transactions and transactions involving management and principal shareholders. The law prohibits personal loans to executives, as well as insider trading by executives during pension blackout periods. It also safeguards against conflicts of interest by investment analysts who get too cozy with corporate executives and sets criminal penalties for fraud and alteration of documents. The law also establishes independent audit committees and prevents external auditors from providing many lucrative services for clients. Finally, it mandates timely public disclosures and requires CEOs and CFOs to certify their periodic financial reports personally.

New software has emerged to help companies automate compliance with the rules; one of the most important aspects is documenting the internal financial controls that guard against fraud. Section 404 of the Sarbanes-Oxley Act says companies must document and independently test their controls, as well as have an external auditor certify them. At Toys "R" Us, a tool called Risk Navigator from

Paisley Consulting documents the company's financial controls, reducing the risk of unauthorized transactions slipping through the cracks.

Before it chose Risk Navigator, Toys "R" Us examined all the programs offered by the Big Four accounting firms and found that Risk Navigator best met its need for simplicity. "The process of going through Sarbanes-Oxley is cumbersome enough," says Michael Pretsch, director of internal audit at Toys "R" Us. "We certainly didn't want to make it more cumbersome with a complex software tool that people would get frustrated with."

In addition, Paisley was the only company that didn't require a consulting arrangement. "What an opportunity we would miss if we had somebody else go through this analysis and documentation effort," says Pretsch.

The company ran several pilot programs in key areas to ensure that its documentation approach would satisfy its needs and those of its external auditor, Ernst & Young. Toys "R" Us worked with Paisley for more than six months and began rolling out Risk Navigator in Octo-

ber 2003. About 100 users will be using it.

Risk Navigator integrates with workflow processes and approval levels at Toys "R" Us. The company can designate various people within each geographic area, account level, and business process level as certifiers of a particular business process and the controls associated with it. Risk Navigator also helps Toys "R" Us with risk assessment. "We measure risk based on significance and likelihood," says Tim Welu, CEO of Paisley Consulting.

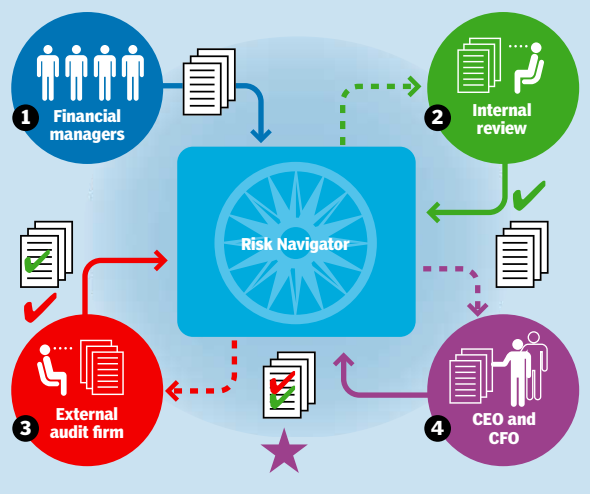
Risk Navigator is an IBM Lotus Domino-based tool, but Toys "R" Us doesn't need to run Domino or Lotus Notes. Instead, Pretsch chose to have the software hosted externally on Paisley's IBM eServer xSeries 335 servers, and Toys "R" Us accesses it via Internet Explorer. Paisley charged Toys "R" Us a one-time setup fee of \$3,000, plus \$3,000 per month for hosting the software.

Pretsch's long-term goals are to broaden the documentation and analysis efforts to other areas, such as compliance and efficiency controls to improve its operations. He doesn't think Toys "R" Us differs much from other types of businesses that need to comply with the Sarbanes-Oxley Act.

"No matter what type of industry you're in or how large or small your company is, the basic tenets of the act apply the same way," he says. Now Toys "R" Us can be sure that the only monkey business that's going on is in the stuffed-animal department.

It's the Law

Designed to rout out corporate fraud and abuse, the Sarbanes-Oxley Act of 2002 calls for tighter oversight of public companies' financial reporting. Software like Paisley Consulting's Risk Navigator is helping businesses comply. (1) Financial managers document financial-control procedures, (2) internal-review teams test and approve their work, (3) external audit firms verify accuracy, and (4) CEOs and CFOs sign off on the financial statements before submitting them to the SEC.



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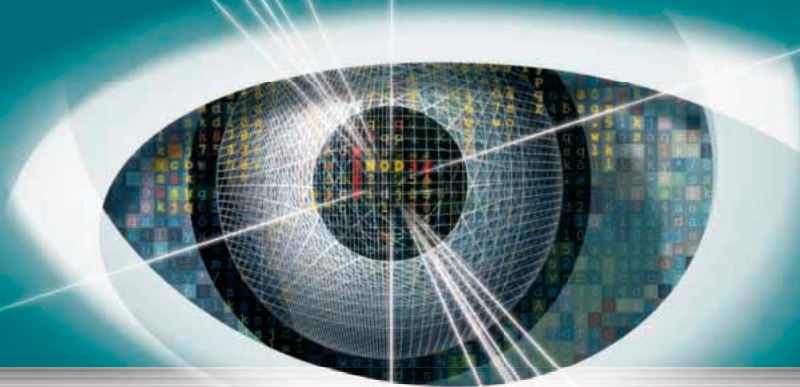
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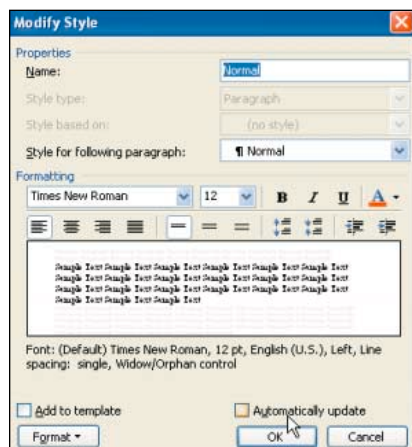
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EXPERTS AND READERS**Word Formatting
Changes Mysteriously**

When I select a portion of a document in Word 2002 and apply a formatting command like *Indent*, Word applies the format to the whole document. I can correct this using *Undo* (Ctrl-Z), which removes the formatting from the portion of the document other than the selected paragraph. I don't understand why Word at first seems to ignore the selected portion, then pays attention the second time. How can I get the desired effect without having to go through a two-step process?

PAT PHILLIPS



TO MAKE SURE that formatting is applied only where you want, uncheck the *Automatically update* box.

You've accidentally configured your copy of Word so that any time you change some text that's formatted using the *Normal* style, the change is propagated to all other text that uses the *Normal* style. Since most of the other styles are based on *Normal*, this can affect the entire document. You can easily turn off the feature in question. Open the *Styles and Formatting* pane by selecting *Styles and Formatting* from the *Format* menu. Click on the *Normal* style, click on the pull-down arrow on the right-hand side, and select *Modify* from the resulting menu. Uncheck the box titled *Automatically update* and click on *OK*. Now you can tweak the formatting of text with the *Normal* style without having your

modifications affect the entire document.

—Neil J. Rubenking

**Windows XP Gags on a
Windows 9x Filename**

A customer asked me to transfer Word-Perfect files from an old computer running Windows 98 SE to his new Windows XP machine. I copied all the old files to a 256MB Sony Memory Stick and transferred them to the new computer. The process worked like a charm for all files except one. I couldn't delete or rename the file or delete the directory it was in, so I had to format the Memory Stick. The filename is *Con.spouse.wpd*. The error messages I got were as follows: *The file, as specified in the execution parameters, cannot be opened and Cannot copy file. The filename you specified is invalid or too long. Specify a different filename.*

I then opened the file on the old computer and saved it as *Conspouse.wpd*. After that, I had no trouble transferring it. In case I run into this situation again, I'd like to know what was wrong with the original filename and how I can check other files.

KEN BUCKNER

In Windows or DOS, you can't create or use a file whose name matches a standard DOS device such as COM1, COM2, LPT1, LPT2, NUL, or CON. The CON device represents the console—the keyboard and screen. The command processor in the Windows NT family is not DOS, but it has a similar limitation. Under Windows 9x, the filename limitation applies specifically to the DOS-style 8.3 filename. You couldn't create a file named *Con.wpd*, but you can create *Con.spouse.wpd*. The 8.3 filename for this file would be something like *Conspo-1.wpd*, which is no problem. But in the Windows NT family, the 8.3 filename is not relevant. The file's name, minus the extension, is *Con*, and is thus invalid.

The problem comes up only when you create a file under Windows 9x and then transfer it to an OS in the Win NT family. And it will not occur if the filename has a normal three-letter extension. To avoid such problems in the future, look for files that have either a

double extension, such as *.spouse.wpd*, or an overly long extension. Make sure the filename portion before the first period does not match a standard device name.—NJR

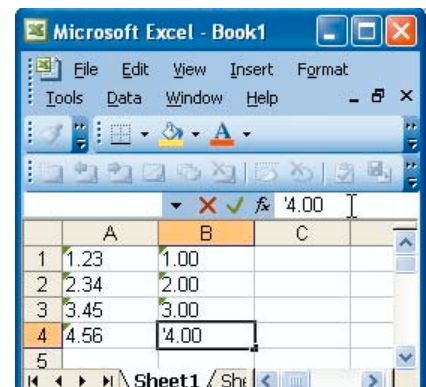
**Transform Forced Text to
Numbers in Excel**

One of my clients sends me Microsoft Excel files in which all the columns are in text format, even when they contain only numbers. I must then convert the text numbers to numeric fields for sorting and format purposes. Can you suggest an easier way to do this?

ANNA MOTELS

Apparently the numbers in the cells have been forced into text mode by prefixing each number with a single quote ('). You can change their format easily by right-clicking on a cell and choosing *Format Cells*. Excel marks such cells with a colored corner. In Excel 2002 or later, if you select one or more such cells, a Smart Tag will appear; you can click on it and choose *Convert to Number*.

There's another way to force the conversion—one that works both in earlier Excel versions and has other uses as well. To convert forced-text numbers back into



COLOR CORNERS in cells can indicate formula errors, comments, or Smart Tags.

numeric values, use this simple trick. Enter the number 1 in a cell somewhere away from the range of numeric values. Copy that cell to the Clipboard. Highlight the entire range of text numbers and select *Paste Special* from

You can tweak the formatting of Normal-styled text without affecting the entire document.

Using two monitors is a lot easier than you might expect.

the *Edit* menu. Check the box titled *Multiply*, then click on *OK*. This will replace the value of each cell in the range with each value multiplied by 1.

If the cell held a text number, it will be converted to an actual number. Cells containing nonnumeric text will not be changed. Note that you can use the same technique to multiply, divide, add, or subtract the values in the target range by the value in the clipboard. For example, you can use this method to raise or lower a list of prices by 10 percent.—*NJR*

Dual Monitors

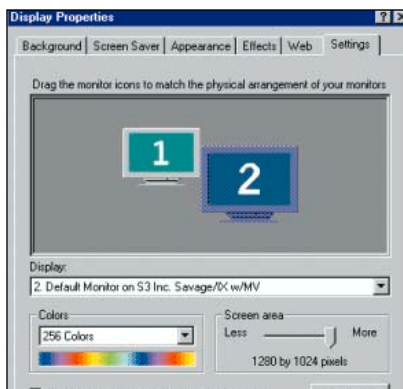
When I use my Windows 98 laptop at home, I usually plug in an external monitor and keyboard and leave the laptop sitting to the side of the monitor. I've heard you can use an external monitor and a laptop's LCD together to yield a much larger desktop. I know this is possible with desktop systems using two video cards, though I don't know how to do it. Is it possible to do this with a laptop? If so, how do I tell the computer to use two monitors?

SAM STINNETT

Using two monitors is a lot easier than you might expect. It's

actually easier with a laptop than with a desktop system. Since most laptops already have two video adapters—one for the built-in LCD and one for an external monitor—you don't even have to add a card.

Your general procedure is probably to plug the external monitor into the laptop's output connector or docking station, then use the laptop's built-in feature for cycling between



YOU CAN configure Windows to extend your desktop across two monitors.

showing images on the LCD or the external monitor or both. Taking advantage of both monitors at once takes no more work. Plug in the external monitor, right-click anywhere on your Desktop, and choose *Properties* to open the *Display Properties* dialog box. Then choose the *Settings* tab.

If your laptop can handle two monitors, you'll see both represented in the dialog box. If you right-click on each one, you'll see a menu that includes the choice *Enabled*. One of them will not be checked. Click

on *Enabled* to enable the monitor. (You may see a dialog box with a warning that some programs do not support more than one monitor. Read the details, so you'll recognize the problem if you see it, then choose *OK* to close the dialog box.) With that monitor still selected, make sure there's a check in the box labeled *Extend my Windows desktop onto this monitor*. Choose *Apply*, and

your desktop will take advantage of the additional screen real estate. It's that simple.—*M. David Stone*

Create a Huge File

In the early 1980s PC Magazine published a utility called Makebig, which let you create a very large file on your hard drive. You could use a defragmenter to move the file to the front of the hard drive, then delete the file so you could put your swap file in that space. Is there any way to do this now, with or without the utility?

DAMIEN B.

We won't guarantee that forcing your swap file into a particular location will improve performance, but you can create a file of any size using nothing more than what's supplied

with Windows. Start by converting the desired file size into hexadecimal notation. You can use the Windows Calculator in

Scientific mode to do this. Suppose you want a file of 1 million bytes. Enter *1000000* in the calculator and click on the *Hex* option to convert it (1 million in hex is *F4240*.) Pad the result with zeroes at the left until the file size reaches eight digits—*000F4240*.

Now open a command prompt window. In Windows 95, 98, or Me, you can do this by entering *COMMAND* in the *Start* menu's *Run* dialog; in Windows NT 4.0, 2000, or

XP enter *CMD* instead. Enter the command *DEBUG BIGFILE.DAT* and ignore the *File not found* message. Type *RCX* and press Enter. *Debug* will display a colon prompt. Enter the last four digits of the hexadecimal number you calculated (*4240*, in our example). Type *RBX* and press Enter, then enter the first four digits of the hexadecimal size (*000F*, in our example). Enter *W* for Write and *Q* for Quit. You've just created a 1-million-byte file using *Debug*. Of course you can create a file of any desired size using the same technique.—*NJR*

Who Is Mr. Enigma?

If you check your Windows XP Registry, you'll find something mildly alarming—an empty key named *HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Mr. Enigma*. Is it a sign of spyware? Is it the sinister alter ego of Dr. Watson? A Google search yielded no answers, just a handful of pages asking the same question. This key is present even in a pristine, new installation of Windows XP, so we decided to ask our contacts at Microsoft for help in identifying it.

After some internal research, Microsoft found the source. Despite the enigmatic name, the entry is harmless. It apparently relates to "a workaround for supporting region encoding for DVD RPC Phase 1 drives on Windows 95." There's clearly no point in retaining this key in Windows XP, and in fact, Microsoft plans to remove it, possibly in an upcoming Service Pack. As for why the name *Mr. Enigma*, the company declined to share the joke, saying it was just "too stupid." Goodbye, Mr. Enigma.—*NJR*

```

C:\temp>debug bigfile.dat
File not found
-rcx
CX 0000
:4240
-rbx
BX 0000
:000f
-w
Writing F4240 bytes
-q
C:\temp>
  
```

YOU CAN CREATE a file of any size using the Windows Debug utility.

HOW TO CONTACT US

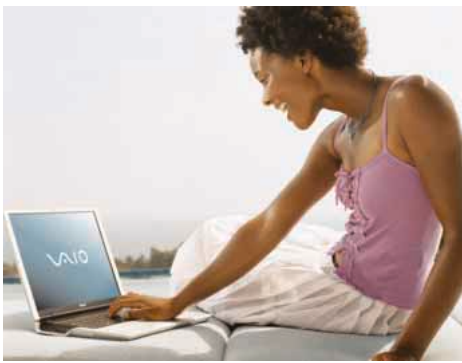
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- 1-Year Limited Warranty³

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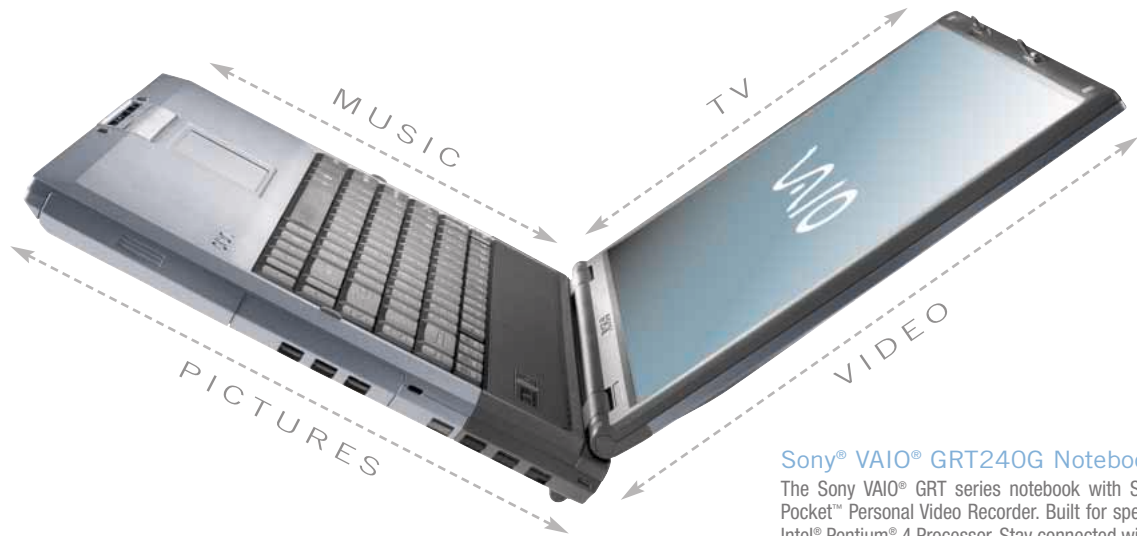
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If used with a Bluetooth-enabled mobile phone, ISP service fees apply. 11. Memory Stick PRO Duo media features vary and are dependent on the host hardware. 12. Some third-party software and devices may currently have limited functionality or not be compatible with this model. Please confirm with third-party vendor or manufacturer for compatibility. 13. On your Sony Financial Services Card, subject to credit approval. A minimum purchase of \$299.99 is required. This is a same-as-cash promotion. If balance on these purchases is paid in full before the expiration of the promotional period indicated on your billing statement and your Account is kept current, accrued Finance Charges will not be imposed on these purchases. If balance on these purchases is not paid in full, Finance Charges will be assessed from the purchase date at the Standard Rate APR of 21.99%. For Accounts not kept current, the Default Rate of 24.99% APR will be applied to all balances on your Account. 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Shipping charges may apply. Please visit www.sonystyle.com for details. 17. Requires compatible 802.11b or 802.11g wireless access point, some of which may require a fee and/or ISP. 18. Requires compatible 802.11b wireless access point, some of which may require a fee and/or ISP. This wireless LAN product has been designed to permit legal operation worldwide in regions in which it is approved. Operation on channels 12-14 is not permitted in all regulatory regions of the world. The wireless LAN feature is limited to operate on channels 1-11 and will not support channels 12, 13 and 14. This product has been tested and certified to be interoperable by the Wireless Ethernet Compatibility Alliance and is authorized to carry the Wi-Fi logo. 20. Standard ground shipping. Offer expires 3/31/04. 21. Offer valid with purchase of PCV-V100G direct from www.sonystyle.com. While supplies last.

BY JANET RUBENKING

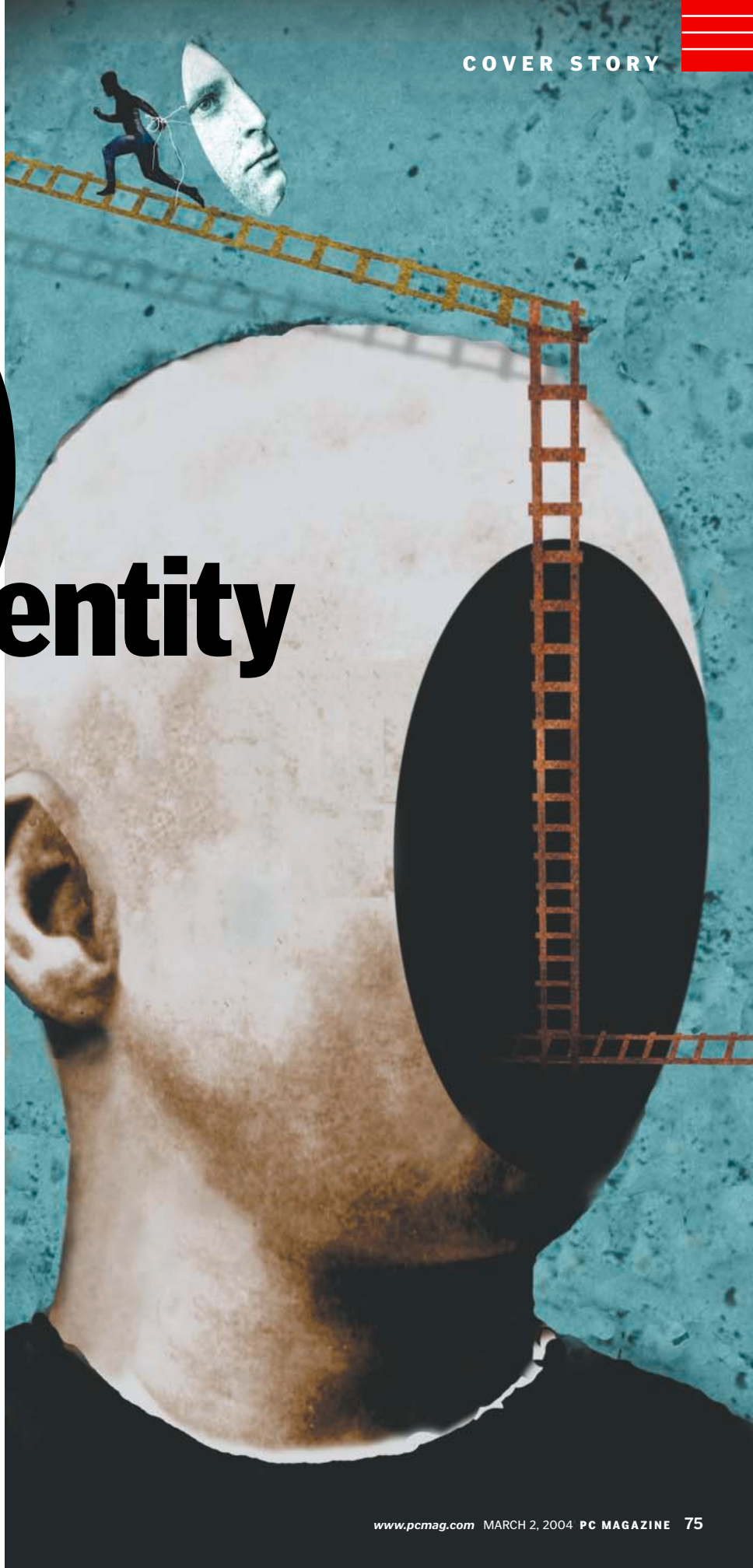
Illustrations by Michael Morgenstern

Identity

Theft: What, Me Worry?

America is a trusting nation. When safeguarding personal information, we're inconsistent at best. Apart from occasional righteous indignation about government plans to centralize vital data, most of us are, on a day-to-day basis, incredibly cavalier with the information that makes us, financially and legally speaking, who we are. We fail to safeguard vital codes, numbers, and facts, blithely handing over credit cards to clerks or waiters who take them out of our sight or filling in online forms without considering who's receiving them or whether they really need the information they're requesting.

It's no wonder that identity theft is growing at such a phenomenal rate. According



to a Federal Trade Commission (FTC) survey, one in eight respondents (12.7 percent) were victims of ID theft in the past five years. This equates to about 27 million Americans—10 million of them in 2003 alone. The figures may even be low, because reporting hasn't kept pace with the crime and many ID thefts go undetected.

Such statistics can have a paralyzing effect: Feeling helpless, we decide there's no use worrying. Or we decide it won't happen to us and live accordingly, despite the fact that the FTC found that identity theft costs an average of \$10,200 in money, goods, and services per incident.

Luckily, there are ways to minimize the risk of ID theft. If you have time to balance your checkbook, shop online, or apply for a passport, you have time to check up on your personal information and take action if something's amiss.

Such advice comes too late for Albert and Glenda Gray and Grey Todd, three people who face months, if not years, of work to clear their names, secure their finances, and restore their peace of mind. In truth, they will likely always be haunted by the fact that persons unknown to them have their personal information.

The Grays are a working couple with grown children. Understandably, given their ongoing struggles, they've asked that we withhold their ages and location. Like many victims of ID theft, they aren't certain how their identities were stolen. Their theory is that a credit card statement was taken from their unsecured mailbox in July 2002. However it happened, their first indication something was wrong was when they received a call in August 2002 from Consumer Fraud Control at Bank of America, the issuer of their credit card. The bank had noticed a change in the pattern of charges on the card and had received a change of address and phone number. Many victims aren't fortunate enough to get a warning. According to the Identity Theft Resource Center (ITRC), 85 percent of fraud victims find out about the crime

months later, when they try to use their credit and identities to make purchases, establish new accounts, or secure loans.

Bank of America outlined the steps for documenting the crime. The Grays contacted the credit-reporting agencies Equifax, Experian, and TransUnion (although the FTC states that reporting to one also alerts the others) to place a fraud alert on their account. The agencies sent reports for the couple to check for discrepancies. Furthermore, the agencies will monitor their records for fraudulent activity in the future.

Next, the Grays tried to file a police report. Since the perpetrator used their identities to make purchases hundreds of

records of all their correspondence. ID theft counselors advise victims to keep detailed logs; they also suggest tracking money spent (such as postage, phone calls, notarizations, and accountant and attorney's fees) as well.

The Grays did their homework, but the task is complex and they didn't get all the information they needed. Since their case involved mail theft, a federal offense, they should have contacted the U.S. Postal Service. Other contacts to notify are the Department of Motor Vehicles, the Social Security Administration, the FBI, and the FTC. The FTC offers an Affidavit of Identity Theft, which you can have notarized and then send to creditors and agencies.

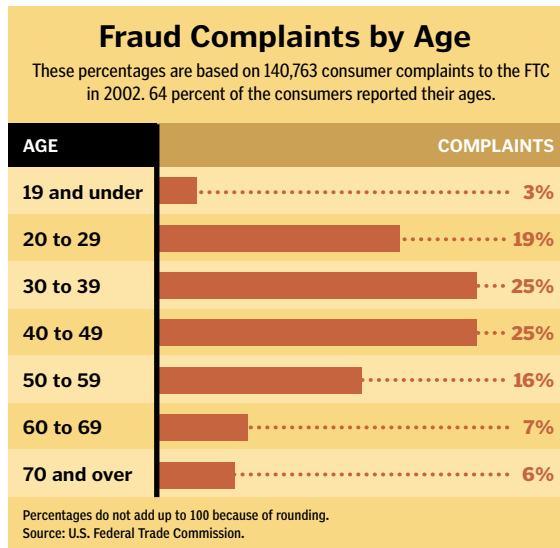
(For a detailed list of contacts, see our sidebar "Who Can Help Me?" on the following page.)

Finally, all correspondence should be sent as Certified Mail with Return Receipt Request. The task of clearing your name is long and arduous. The ITRC reports that victims average 600 hours of work over periods of several months to over a year. Unfortunately, the Grays' odyssey has just begun. To add insult to injury, Albert's wallet was stolen in November 2003, and the thief is in possession of his Social Security number, driver's license, and new credit cards.

The Grays' case is a common, low-tech type of ID theft. The Web and the proliferation of e-mail have

opened up new frontiers to the unscrupulous. Online auction fraud is the largest category of Internet-related complaints in the FTC's Consumer Sentinel database. Furthermore, criminals have found a new avenue for fraud via e-mail, a technique known as *phishing*. Phishing (also called *carding* or *brand spoofing*) is an e-mail scam using known logos from entities such as eBay, PayPal, and America Online to "phish" for personal information. The victim receives a legitimate-looking e-mail proclaiming problems with account information: "Just click on the link and provide some additional personal and financial information to clear up a few questions." Everything *looks* authentic, but you're actually being redirected to a site that's here one moment and gone the next—taking your identity with it.

Grey Todd fell victim to a PayPal e-mail scam in November 2003. This com-



miles away, their local police referred the couple to that city's police department. The city police, in turn, refused the Gray's report, so they tried their local department again, with no luck. It's not unusual for victims to find such resistance at government and local law enforcement agencies, collection companies, and businesses as they attempt to document their cases. The FTC advises persistence, including contacting your county sheriff's department or state police if your local police won't help.

The Grays didn't request a copy of their police report, so they're currently uncertain if one actually exists. They plan to rectify this oversight soon, as having copies to send to creditors and agencies helps establish one's case as a victim of fraud.

During the Grays' ordeal, Glenda kept

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puter-literate businessman (who has also requested that we print no other personal information about him) was involved in a financial transaction using PayPal. When Grey received the “PayPal” phishing message from an old company e-mail account, he acted immediately and provided very personal information, including his Social Security number and ATM PIN. After the transaction, he grew suspicious and contacted PayPal directly and was informed that he’d been scammed.

Those who are responsible for phished messages use psychological tactics to prey on their victims. They use the name of a familiar company and create a sense of urgency that gets people to act quickly. Always remember that companies like PayPal and eBay never send e-mails asking for account information.

By now you’re hopefully asking yourself what steps you can take to protect your identity. While you can never completely safeguard your identity, there are common ways to distance yourself from the crime. As they say on *The X-Files*, “Trust no one”—at least not when it comes to your personal information.

- Be suspicious of transactions you didn’t initiate.
- Ask yourself if you really need to provide your Social Security number, and don’t carry your Social Security card.
- Don’t carry your credit cards and checkbook unless you plan to use them.
- Review your credit report, and close accounts you don’t really need.
- Opt in for credit agencies’ periodic credit watches. It’s not free, but it might buy you some peace of mind.
- Take the contents of your wallet out and photocopy everything, front and back. Keep the copies in a secure place.
- When you get a new credit card, sign it immediately.
- Of course, your mailbox is an invitation to thieves. Get a locking mailbox, retrieve your mail immediately after delivery, or get a post office box. Never leave outgoing mail in your unprotected box for collection.
- When ordering checks, omit your driver’s license number, Social Security number, and consider using only the initials of your first and middle name. And if possible, pick up your checks in-person

instead of having them mailed.

- During all in-person transactions, watch the people you give your credit cards to carefully.
- If you use your credit cards online, be sure to navigate directly to the retailer’s site. Avoid following links in e-mails, even to donate to your favorite cause.
- When buying or donating online, look for Secure Sockets Layer (SSL) protection. A padlock in the bottom right-hand corner of your browser isn’t enough. Check the URL for *https://* (the *s* is for *secure*) and beware of pop-up forms. Look for businesses and organizations that follow safe online and e-mail practices and feature certifications from groups such as TrustE or ScanAlert. Note, however, that this isn’t foolproof. (For more information, see the Solutions feature “Should You Trust TrustE?” in our issue of February 17.)
- Shred all documents that contain any personal information before throwing them away. Dumpster diving isn’t just about finding quirky furniture; it’s also a favorite pursuit of ID thieves.
- Finally, keep records of all online purchases, including dates and order numbers. Keep all credit card receipts and compare them against your monthly statements. Better yet, sign up to view your account online and track it on a daily or weekly basis.

These simple steps could save you hours (or even months) of blood, toil, tears, and sweat. Even though the ITRC reports that victims are finding out about stolen IDs sooner, it’s taking them longer to eliminate negative information from their credit reports. And sometimes there are darker consequences. If a thief uses your name in committing a crime, you may find yourself on a wanted list.

In the end, as consumers, we can minimize our risks but not eliminate them. Even if we are vigilant, we’re still vulnerable to errant business and government practices. Easy credit, vulnerable databases, and trash with unshredded sensitive information are just a few things that put us all at risk. It will take a concerted and sustained effort by individuals, governments, and businesses to get the upper hand with the ID thieves. Until then, continue to worry. ☰

WHO CAN HELP ME?

GENERAL ID THEFT

Federal Trade Commission
www.consumer.gov/idtheft/

Identity Theft Prevention and Survival Site
www.identitytheft.org

Identity Theft Resource Center
www.idtheftcenter.org

Internet Fraud Complaint Center (IFCC)
www.ifccfbi.gov

National Association of Consumer Advocates (NACA)
www.naca.net/resource.htm

Privacy Rights Clearinghouse
619-298-3396, www.privacyrights.org

Social Security Administration
800-772-1213, www.ssa.gov

U.S. Department of Justice Identity Theft and Fraud information
www.usdoj.gov/criminal/fraud/idtheft.html

U.S. Department of State Passport Services
www.travel.state.gov/passport_services

U.S. Postal Inspection Service
www.usps.com/websites/depart/inspect/

U.S. Secret Service
www.treas.gov/usss/index.shtml

CREDIT BUREAUS

Equifax (www.equifax.com)
To order a report, call 800-685-1111; to report fraud, call 800-525-6285.

Experian (www.experian.com)
To order a report or report fraud, call 888-397-3742.

TransUnion (www.transunion.com)
To order a report, call 800-888-4213; to report fraud, call 800-680-7289.

CHECK FRAUD

CheckRite
800-766-2748

ChexSystems
800-428-9623 or 800-328-5121

Cross Check
707-586-0551

Equifax
800-437-5120

National Processing Co.
800-526-5380

SCAN
800-262-7771

TeleCheck
800-366-2425 or 800-710-9898—JR

Our contributors: **Janet Rubenking** is a freelance writer. Associate editor **Sean Carroll** and PC Magazine Labs project leader **Neil J. Rubenking** were in charge of this story.

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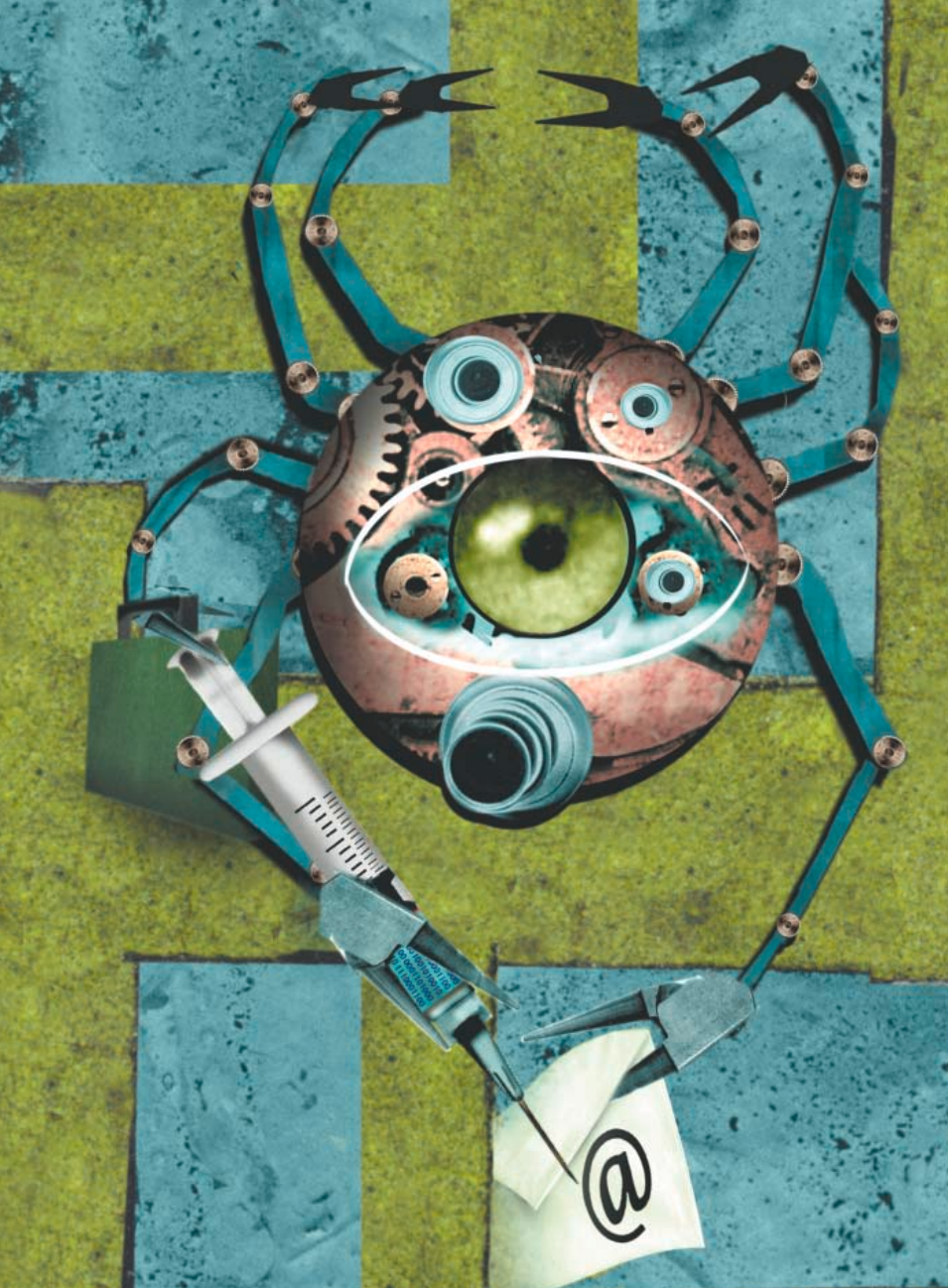
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|--|--|---|



BY CADE METZ

Keith Dunlap had never even heard of Cool-search.net. But one day last December, as he opened the browser on his home PC, the site filled his display.

The browser's Internet Options window showed his home page had been changed to the arcane address *t.rack.cc/hp.php*. Dunlap, a researcher at the Wood Science & Technology Institute in Corvallis, Oregon, reentered his old one. But when the system rebooted, his browser jumped to Superbookmark.com, another site he didn't know. Sure enough, that mysterious home page setting was back. He rebooted again, and his browser jumped to a third unwanted site: Real-Yellow-Page.com. Obviously, something was lurking on his PC, and he feared it was tracking his behavior.

Dunlap had already installed PepiMK Software's Spybot Search & Destroy 1.2 (reviewed in this story), a tool designed to detect and remove this sort of sinister software. Spybot's engine, he discovered, had been turned off. "I don't know if the spyware was to blame," Dunlap says. "But

Spybot's immunization tools were no longer running." Even when he turned it on, Spybot detected no spyware-related files. Dunlap manually removed all references to *t.rack.cc/hp.php* in the Windows Registry. He rebooted, and they came back.

Dunlap's machine was infected with CoolWebSearch, one of many spyware applications threatening the world's computing

SPY Stoppers

REVIEWED IN THIS STORY

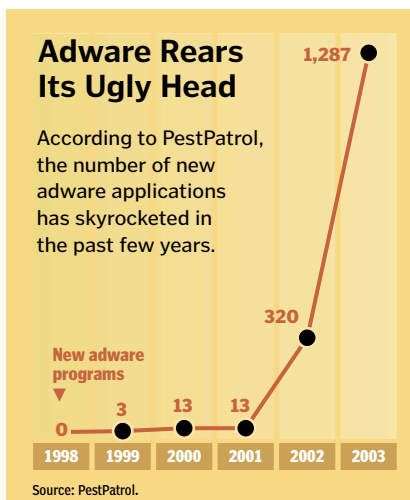
82 Ad-aware Plus 6 ●●●●● • **84** Aluria's Spyware Eliminator 3.0 ●●●●● • **84** BPS Spyware/Adware Remover 8.2 ●●●●● • **86** McAfee Internet Security 2004 ●●●●● • **86** Norton Internet Security 2004 ●●●●● • **87** Panda Platinum Internet Security 8.01.00 ●●●●● • **88** PC-cillin Internet Security 2004 ●●●●● • **89** PestPatrol 4 Home User Edition ●●●●● • **89** Spybot Search & Destroy 1.2 ●●●●● • **90** SpyCop 5.6 Home Edition ●●●●● • **90** SpyGuard 2.0 Deluxe ●●●●● • **92** SpyHunter 1.4.42 ●●●●● • **94** Spy Remover 7.1.1 ●●●●● • **94** Spy Sweeper 2.2 ●●●●● • **80** Scorecard • **80** How to Avoid Spyware • **87** 11 Signs of Spyware • **88** Spyware-Free P2P—for Free • **92** Summary of Features

devices—a late-breaking Trojan horse so nasty that only one app we tested, Lava-soff's Ad-aware Plus 6, could find it—and none could remove it. There is, however, a standalone app called CWSredder (available at www.spywareinfo.com) that can get rid of CoolWebSearch.

Spyware apps sneak onto your machine when you download many file-sharing services, open infected e-mails, or click on dubious Internet pop-up ads. They can manipulate your system, record your habits, and steal your passwords and credit card numbers. Depending on their degree of aggressiveness, they can steal your privacy or even your identity. And they can be terribly difficult to remove.

78,000 WAYS TO SPY

According to PestPatrol, which sells its own spyware remover, more than 78,000 spyware programs are on the loose. These include adware applications, which track browsing habits and serve up ads; key loggers, which record keystrokes (passwords and credit card numbers, anyone?); and Trojan horses, which provide hackers unfettered access to your PC. In the past year, PestPatrol uncovered more than 500



new Trojan horses, 500 new key loggers, and 1,287 new adware apps. In fact, Webroot Software, maker of Spy Sweeper 2.2, estimates that 80 percent of PCs are infected—and that's not including less malevolent types of spyware, such as tracking cookies. The problem is so prevalent that major utility vendors McAfee and Symantec are getting into the act. McAfee's results are already good; Symantec's are less so in this first round.

Chances are your machine is hosting spyware. If you've recently installed a free file-sharing service like Grokster or Kazaa, there's no doubt about it; such services are almost always tied to several pieces of adware. You may not realize that when you accepted your file sharer's licensing agreement, you also agreed to download, install, and run this adware. (For exceptions, see "Spyware-Free P2P—for Free," page 88.)

Even if you avoid sharing infected files, there are risks everywhere. Sometimes, Web sites or e-mail will dupe you into downloading malicious code. "You may see a message that plays off your fears, telling you that your system is vulnerable and giving you a link to a patch," says Pete Lindstrom, director of Pennsylvania-based research firm Spire Security. When you click on the link, you're often installing spyware. Other times, spyware can infest your system when you simply visit a Web page or open an e-mail. Keith Dunlap believes he was the victim of such a "drive-by download."

Note: Every year, we receive indignant calls, e-mails, and letters from adware makers and distributors claiming that

SCORECARD



Easy installation and configuration raise a program's **ease of use** rating, as does a thorough, well-indexed help system; bugs, program crashes, or other problems lower this rating. **Detection** involves the range of spyware types the product successfully detects; more credit is given for detecting severe problems like active key loggers, less for simple adware. If a product removed most of the spyware it detected, it has a **removal** rating equal to its detection rating; if not, the

removal rating is lower. A good **blocking** rating indicates that the product blocks installation of a wide variety of spyware, or at least warns when a spyware program is attempting installation. The amount of **information** these apps supply to the user varies widely; some provide an exhaustive online database of threats, some offer detailed descriptions of spyware they find, and some do neither. The **overall** rating is not an average but an aggregate based on rigorous discussions among PC Magazine Labs staff, reviewers, and editors.

- EXCELLENT
- VERY GOOD
- GOOD
- FAIR
- POOR

| | Ease of Use | Detection | Removal | Blocking | Information | OVERALL |
|---|-------------|-----------|---------|----------|-------------|---------|
| Ad-aware Plus 6 | ●●● | ●●● | ●●● | ●●● | ●●● | ●●● |
| Aluria's Spyware Eliminator 3.0 | ●●● | ●●● | ●●● | ●●● | ●●●● | ●●● |
| BPS Spyware/Adware Remover 8.2 | ●●● | ●●● | ●●● | ●● | ● | ●● |
| McAfee Internet Security 2004 | ●●●● | ●●● | ●●● | ●●● | ●●● | ●●● |
| Norton Internet Security 2004 | ●●●● | ● | ● | ●● | ●●● | ●● |
| Panda Platinum Internet Security 8.01.00 | ●●●● | ● | ● | ●●● | ●●●● | ●● |
| PC-cillin Internet Security 2004 | ●●●● | ● | ● | ●●● | ● | ●● |
| PestPatrol 4 Home User Edition | ●●● | ●●●● | ●● | ● | ●●●● | ●●● |
| Spybot Search & Destroy 1.2 | ●●●● | ●●●● | ●●● | ●●● | ●●●● | ●●●● |
| SpyCop 5.6 Home Edition | ●● | ● | ● | N/A | ●● | ● |
| SpyGuard 2.0 Deluxe | ●● | ● | ● | N/A | ●●● | ● |
| SpyHunter 1.4.42 | ●● | ●●● | ●● | N/A | ●● | ●● |
| Spy Remover 7.1.1 | ●●●● | ●● | ●● | N/A | ●●● | ●● |
| Spy Sweeper 2.2 | ●●●● | ●●●● | ●●●● | ●●● | ●●●● | ●●●● |

RED denotes Editors' Choice. N/A—Not applicable: The product does not have this feature.

their apps are *not* spyware. At *PC Magazine*, we maintain that any application that tracks your behavior without your knowledge and consent is spyware. And no, a clause buried in a privacy policy that 99 percent of users never read isn't enough to avoid the spyware appellation.

At the very least, spyware brings inconvenience. Like CoolWebSearch, the program that infested Keith Dunlap's PC, many of these tools hijack your home page. They add sites to your browser's Favorites menu. They launch unwanted windows. Taking up CPU cycles, they slow system performance and even make your PC less stable. (For more signs that you're infected, see "11 Signs of Spyware," page 87.)

But none of this is as troubling as what these programs do behind the scenes. Many seemingly innocuous adware applications track the sites you visit, with alarming accuracy. "Some spyware actually changes your DNS records so that all your Web requests go through someone else's servers," says Bruce Hughes, director of malicious-code research at ICISA Labs, the investigative arm of a security corporation called TruSecure.

The nastiest applications, including key loggers and Trojan horses, grab more valuable information. In February 2003, employees at AOL downloaded a Trojan horse that pillaged the company's customer database. In July, a 25-year-old from Queens pleaded guilty to installing key loggers on computers at Kinko's stores in Manhattan, stealing over 450 online banking passwords. And in October, hackers used key loggers at Valve Software to pilfer the source code for Half-Life 2, one of the company's best-known computer games.

These apps go beyond simple spying and actually facilitate identity theft. If you don't find *that* worrisome, reread the story on page 75, "Identity Theft: What, Me Worry?" How can you remove spyware from your system and prevent further infection? It's not easy.

IMMORTALWARE

In 2003, according to PestPatrol vice president of product development Roger Thompson, there was a huge increase in the number of *burrower* programs—apps that dig so deeply into an OS that they can't be found or removed without major surgery. Some hide behind ordinary Win-

dows filenames. Others install as "layered service providers," so that quick deletion disables your Internet connection. Still others create multiple copies of themselves across an OS; if one is removed, the others keep running. "About six months ago, we knew of only 6 burrowers," Thompson says. "Now there are more

than 40." And there are dozens of other apps that include *ticklers*—mini-programs that reinstall deleted files. You can't protect yourself from spyware like this without tools specifically designed to find and remove it.

Antispyware tools operate like anti-virus software: They find and remove

Spy Sweeper 2.2



Let's be clear: None of the applications we tested for this roundup hit the ball out of the park in terms of detecting and removing the adware, Trojan horses, key loggers, and hosts of other assorted nasties that make up the unpleasant category of applications known as spyware. They're not yet as good at their jobs as antivirus programs are, but they're nearly as important to have on your PC. Having a good anti-spyware program like Spy Sweeper 2.2 on our machines helps the editors at *PC Magazine* sleep—or surf, as the case may be—a little better at night.

Spy Sweeper is an impressive combatant in the battle against spyware—the best of all the applications we tested at finding spyware in on-demand scans. It also proved to be very good at removing it. None of the programs excelled on our tests at blocking spyware from getting on your machine in real time, but Spy Sweeper was as good as any. The fact that it is easy to use and provides you with enough information to make good choices when you're faced with spyware puts it over the top. If you already have a good antivirus and firewall system but lack specific spyware protection (and believe us, you need it), Spy Sweeper is the application you should consider first.

A close second in terms of spyware detection is Spybot Search & Destroy 1.2. Spybot won last year's Editors' Choice, and it's the recipient of an honorable mention this year. It was edged out of an Editors' Choice this year only by Spy Sweeper's slightly superior spyware removal abilities. The fact that Spybot is free may actually make it the first choice for some of our more cost-conscious readers—but please, if you use and like it, consider making a donation to keep this impressive labor of love alive. After all, identity theft—one of the worst possible consequences of a spyware infestation—can cost more than \$10,000 per incident (see "Identity Theft: What, Me Worry?" page 75).

Some readers may balk at the idea of installing and managing yet another security application. We sympathize. If you prefer to get your protection in one package, consider McAfee Internet Security 2004, another honorable mention. While we preferred Norton Internet Security 2004 in our earlier roundup of security suites (November 25, page 122), that story was weighted heavily toward antivirus and firewall capabilities. If you're in the market for a security suite and you're more worried about spyware, McAfee's offering is the one for you. McAfee Internet Security has competent core security tools and outperformed Norton by a considerable margin in this category. And when its new standalone tool is released, Spy Sweeper and SpyBot may have some tough competition in the standalone antispyware category.

only the programs their developers have already identified. And many spyware programs try to disable the tools that hunt them. Wise users install more than one anti-spyware engine (though having several configured for real-time blocking may cause problems). Even the best tools don't find all spyware. At the very least, it can be extremely frustrating when spyware causes your system to run badly or slowly or hijacks things like home page or search functions. And when you consider how much personal information your computer contains, how much someone could learn about you by virtually peering over your shoulder as your work or surf the Web, spyware should make you very worried indeed.

ALL REVIEWS BY JOHN CLYMAN

Ad-aware Plus 6

\$26.95 direct. Lavasoft, www.lavasoftusa.com.
OVERALL RATING: ●●●●●

Ad-aware Plus 6, perhaps the best-known anti-spyware product, is generally a solid solution. Although it doesn't offer total protection from threats and has a few interface features that could be improved, in our testing it did a good job of scanning, classifying, and removing spyware as well as alerting us to potentially dangerous actions as we surfed the Web.

Ad-aware has two key components: a main scanner console and an Ad-watch module that lets you monitor behavior in real time. (Lavasoft's free Ad-aware Standard Edition doesn't include the



How to Avoid Spyware

1. Make sure to run an anti-spyware application. Perform on-demand scans regularly to root out spyware that slips through the cracks. Reboot after removal and rescan to make sure no *ticklers*, which are designed to reinstall spyware, have resurrected any deleted apps. Additionally, even though we are not overly impressed with any app's real-time blocking abilities, activate whatever your app of choice offers; it's nearly always better than nothing.
2. Give your anti-spyware some backup. In addition to an anti-spyware app, make sure to run both software

and hardware firewalls and antivirus applications to protect yourself against Trojan horses (and viruses, naturally).

3. Beware of peer-to-peer file-sharing services. Many of the most popular applications include spyware in their installation procedures (see the sidebar "Spyware-Free P2P—for Free," page 88). Also, never download any executables via P2P, because you can't be absolutely certain what they are. Actually, it's a good idea to avoid downloading executables from anywhere but vendors or major, well-checked sites.

4. Watch out for cookies. While they may not be the worst form of spyware, information gathered via cookies can sometimes be matched with information gathered elsewhere (via Web bugs, for example) to provide surprisingly detailed profiles of you and your browsing habits. PC Magazine's own Cookie Cop 2 (www.pcmag.com/utilities) can help you take control of cookies.

5. Squash bugs. Web bugs are spies that are activated when you open contaminated HTML e-mail. Get rid of unsolicited e-mail without reading it when you can; turn off the preview pane to delete messages without opening them. In Outlook 2003, Tools | Options, click on the Security tab and select *Change Automatic Download Settings*. Make sure *Don't download pictures or other content automatically in HTML e-mail* is checked.

6. Don't install anything without knowing exactly what it is. This means reading the end-user license agreement (EULA) carefully, as some EULAs will actually tell you that if you install the app in question, you've also decided to install some spyware with the software. Check independent sources as well, as some EULAs won't tell you about spyware.

7. Protect yourself against drive-by downloads. Make sure your browser settings are stringent enough to protect you. In IE, this means your security settings for the Internet Zone should be at least *medium*. Deny the browser permission to install any ActiveX control you haven't requested.

8. Keep up to date on the ever-changing world of spyware. Knowing the threat will help you defeat it. There are several great sites you can visit to keep abreast of this issue. PestPatrol's Research Center (www.pestpatrol.com/pestinfo) has one of the most comprehensive lists of spyware and related threats we've seen. SpywareInfo is another good online source of information. Finally, PC Magazine's Security Scout utility (www.pcmag.com/utilities) aggregates dozens of security-specific news feeds and brings them right to your desktop.—Sean Carroll

Ad-aware's real-time blocker, Ad-watch, needs to provide more information to users.



Ad-watch real-time detection module.) Ad-watch monitors key system assets and alerts you when it detects something suspicious—for example, a known spyware process running in memory or an application attempting to change a Registry entry. Ad-watch then gives you the ability to block or permit the action.

While Ad-watch won't absolutely prevent you from downloading malicious software—unless you let it disable all downloads, including perfectly benign applications—it does give you advance warning and an opportunity to cancel installation. This real-time detection would be more helpful if the warning dialog actually provided information about suspected spyware programs and the threats they represent, as Webroot's Spy Sweeper 2.2 does. With Ad-watch, you've got to do the research for yourself. The module didn't provide real-time warnings for a few applications we installed, such as a solitaire game that includes the Aureate/Radiate engine and SideStep, which detects the use of travel price comparison services and offers its own price search instead.

Ad-watch also integrates a pop-up blocker—a useful feature, but we wish it were separately configurable. The pop-up blocker sometimes became so overzealous that it closed our primary browser window.

Ad-aware's main scanning engine is easy to use, and it detected and cleaned a reasonable portion of the threats we threw at it in testing, although it missed a number of key loggers. And like many of the products we tested, Ad-aware could not fully remove some programs, which used ticklers to keep reinstalling themselves when we rebooted. It was also squelched by the key logger SpyAgent, which actively disables many spyware-scanning tools.

For advanced users, Ad-aware offers a panoply of detailed configuration options (and the Pro version, \$39.95, offers even more). Unfortunately, Ad-aware's options interface has some redundant sections and can be a bit confusing. This situation is compounded by the frequent absence of context-sensitive help—despite a prominent question mark icon.

On the whole, Ad-aware Plus 6 offers a compelling though not bulletproof combination of real-time monitoring and on-demand scanning capabilities.

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Aluria's Spyware Eliminator 3.0

\$59.99 direct. Aluria Software LLC, www.aluriasoftware.com. ●●●●●

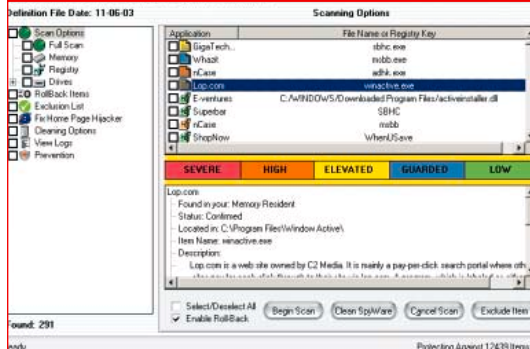
Aluria's Spyware Eliminator 3.0 wraps fast and thorough spyware scanning and good threat information in a slick, Mac-style interface. Although its preemptive blocking capabilities had limited effectiveness in PC Magazine Labs' testing, and its interface has some shortcomings, Spyware Eliminator is on the whole a competent antispyware tool—if an expensive one.

On our tests, Spyware Eliminator scanned for installed threats quickly in most cases, with solid detection results in the middle of the pack. We did, however, experience occasional lockups when scanning heavily infested systems. Scan results appear in a flat list view, color-coded by severity. Clicking on an individual trace produces a detailed description of the detected spyware. While Spyware Eliminator didn't detect the key loggers we'd installed, it did find most other spyware, and it didn't clutter the results list with lots of marginally relevant hits such as tracking cookies.

You can select traces for elimination individually or all at once, but not application by application. The tool also offers a rollback feature that correctly reenabled applications that were disabled when we removed their required adware components. This restores the adware as well, but if you want an app badly enough to live with the adware, this is a welcome ability.

Beyond its basic scanning capability, Spyware Eliminator offers some options that users access via a slightly confusing tree view, which includes some check boxes that seem to have no effect whether you select them or not. One set of options controls blocking—stopping spyware from being installed in the first place—and lets you add Web sites to restricted zones, block ActiveX controls, and restrict access to suspicious IP ranges. Although Spyware Eliminator includes a long list of blocked ActiveX controls and IP ranges,

Spyware Eliminator color-codes detected spyware by severity and provides thorough descriptions as well.



there's a lot more on the Web that this prevention doesn't cover. After we enabled these blocking options, we went surfing for trouble and unfortunately were still able to download and install a large number of spyware apps without receiving any warning.

Spyware Eliminator also includes a Winsock LSP stack-restoring tool, some evidence-erasing capabilities, and a feature that claims to prevent Internet Explorer home page hijacking, although it didn't prevent our home page from being hijacked during testing.

Like many of the products in this roundup, Aluria's Spyware Eliminator 3.0 can perform a fair job of scanning your system and disinfecting it of spyware, if key loggers and real-time blocking aren't your primary concerns.

BPS Spyware/Adware Remover 8.2

\$29 direct. Bullet Proof Soft Inc., www.bulletproofsoft.com. ●●●●●

BPS Spyware/Adware Remover is a collection of tools that provide some useful antispyware capabilities. But, given their rough edges and poor integration, they don't jell into a compelling solution.

The program's core scanning engine, while reasonably good at finding existing spyware, is slow and troubled by false positives. It took more than 4 minutes to scan a clean Windows XP installation, compared

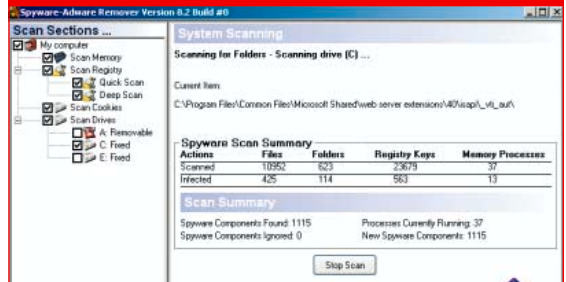
with a minute or so for the bulk of the products we tested. Even more troubling, on that pristine baseline system BPS reported (incorrectly) that Gator and two renegade dialers were installed.

Scan times grew longer—to as much as 10 minutes—when we tested BPS on infected systems. Like many of the products we examined, the scanner wasn't able to detect the key loggers we'd installed (and two of them, iOpus Starr and SpyAgent, forced BPS to shut down before it could even begin a scan).

Also like many other apps in this roundup, BPS was unable to prevent some spyware, such as istbar and RapidBlaster, from resurrecting itself on reboot, despite repeated scrubbing.

BPS offers real-time protection and blocking in a separate program that monitors processes and memory. While this

BPS Spyware/Adware Remover users should get used to this screen, as scanning is slow. We experienced several lockups in testing.



approach is similar in principle to the way many other products handle real-time scanning, BPS's execution is ineffective. The real-time monitor simply displays an ever-growing, text-only log of cautionary messages that commingle serious alerts (spyware detected running in memory) with the more mundane (tracking cookies detected). The app offers such a profusion of information, with no tools to sort or filter it, that reacting appropriately is difficult unless you really know what you're doing. As this text box grows, its responsiveness diminishes. The fact that BPS is also one of only two products here (PC-cillin Internet Security 2004 is the other) that received a rating of *poor* for spyware descriptions makes the task doubly challenging. In addition, while testing this monitoring app we experienced occasional lockups and crashes.

The BPS toolkit includes three other

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utilities: a pop-up blocker, a system hijack scanner, and a Winsock repair tool. Licensed versions of BPS Spyware/Adware Remover 8.2 are also sold under third-party brand names, such as Cyberheat Adware Remover Gold. If you're not looking for an on-demand scanner, BPS does a reasonable job of detecting spyware—and Bullet Proof Soft offers a five-day free trial so you can see if the app will do the job. But the poor integration of ancillary tools such as real-time blocking and a lack of information are unfortunate.

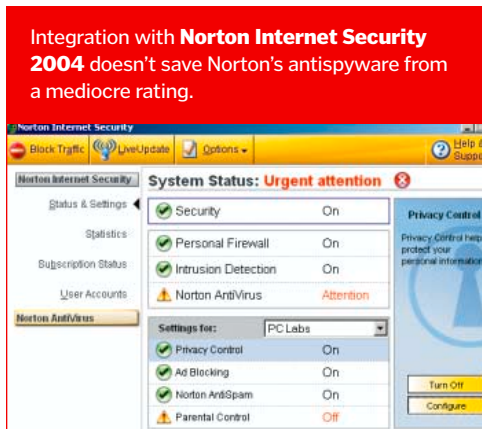
McAfee Internet Security 2004

\$69.99 direct. McAfee Security, www.mcafee.com.
●●●●●

Antispyware tools are just one part of McAfee Internet Security 2004, a comprehensive suite that includes an anti-virus scanner, antispam capabilities, a personal firewall, and more. But despite its wide focus, McAfee has not skimped on the individual components; the suite's spyware scanner is one of the better tools we tested, and it's one of only a handful of apps that successfully detected at least one of the three key loggers we had installed in testing (none caught all three). In fact, it gets an honorable mention as the best suite-based antispyware app we saw in this roundup.

McAfee's standard virus scanner can identify a few spyware components, but to cleanse your system thoroughly, you'll need to click to the Privacy Service section (also available separately for \$34.95) and select Remove Unwanted Spyware. After a few minutes of scanning, McAfee Internet Security presents an uncluttered list of all the spyware on your machine. For each spyware application, you'll need to choose whether to clean or exclude it; we do wish the app provided more information and guidance here to help users make this decision.

If you opt to remove an application, you'll have a chance to let the product use its own uninstaller (if it has one) or to let McAfee try to uninstall individual spyware components (you can select exactly which ones). While we like the degree of control this approach offers, the result is that removing a large volume of spyware takes a lot of manual effort, since you have



to select each component, and there are often many components to a spyware app.

In our testing, McAfee Internet Security found most of the spyware installed on our systems and successfully removed the majority of them, though a few resilient programs kept reappearing each time we rebooted. Our attempts to have the McAfee product uninstall SideStep locked up the removal tool, but we were able to eliminate it later using SideStep's uninstaller.

McAfee Internet Security provides a variety of real-time blocking tools, including one that can foil attempts to add toolbars to your browser without permission. Other real-time blocking tools let us designate protected files or folders, prohibited actions such as formatting a drive, and immediately displayed pop-up alerts giving us the option to permit or block the activity when we attempted to violate those restrictions. While these capabilities didn't completely prevent us from straying into trouble, their combined ef-



fect was one of the most effective approaches we saw.

As we went to press, McAfee also announced that it would soon be shipping a standalone, enhanced version of its spyware scanner, which might be available by the time you read this. That's encouraging news, given that the company's current scanner is already worthy of an honorable mention.

Norton Internet Security 2004

\$69.95 direct. Symantec Corp., www.symantec.com.
●●●●●

Spyware blocking, detection, and removal turn out to be weak components of the otherwise excellent Norton Internet Security 2004, which earned an Editors' Choice award in our recent roundup of Internet security suites (November 25). Like the other suites in this roundup, Norton includes a firewall, antivirus and antispam scanners, parental controls, and privacy-monitoring capabilities that watch for transmission of sensitive personal data. But in the realm of antispyware tools, this suite is no substitute for the more robust packages reviewed here. If you want an Internet security suite that includes strong spyware capabilities, consider McAfee Internet Security 2004 instead.

Norton's spyware monitoring, like Trend Micro's PC-cillin Internet Security 2004, is bolted onto Symantec's standard virus-scanning engine—though in the case of Norton, spyware scanning is enabled by default. While this integration offers the advantage of making spyware scanning an integral part of your regular antivirus sweeps, Norton's engine just isn't very effective at coping with spyware.

When we scanned a variety of infested systems, Norton detected only a handful of the lurking spyware products. It presented its results in a simple list, with no detailed information about the threats, although double-clicking led to a Symantec Web page with more information on each item. This additional detail turned out to be crucial, since Norton was unable to remove a significant number of the few spyware products it managed to identify, urging us instead

to follow the provided manual-removal instructions to disinfect our system. While having this backup is a good idea, we don't think a security suite should force us to use it so often.

Norton also did little in our testing to help us avoid installing problematic software. To its credit, it did detect and block the browser hijacker Lop the moment we clicked on the download link, and its script blocking curtailed (but did not entirely eliminate) the undesired browser modifications that FindTheWebsite-YouNeed foisted on us. This, however, was its only success in that regard.

Like PC-cillin, Norton includes a privacy protection feature that lets you enter sensitive personal information such as your bank account numbers and block Internet traffic containing these secrets.

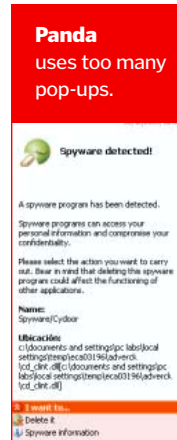
While we've often been bullish on

Norton's security products (and we recommend Norton Internet Security 2004 as a whole), when it comes specifically to antispysware, we're more bearish.

Panda Platinum Internet Security 8.01.00

\$39.95 direct. Panda Software, <http://us.pandasoftware.com>. ●●●●●

Panda Platinum Internet Security 8.01.00, like software from McAfee, Symantec, and Trend Micro, is more than an anti-spyware tool: It's a full security suite that includes firewall, antivirus, antispam, and parental-control features. In our testing, Panda's proactive spyware-blocking capabilities were the best in this roundup at



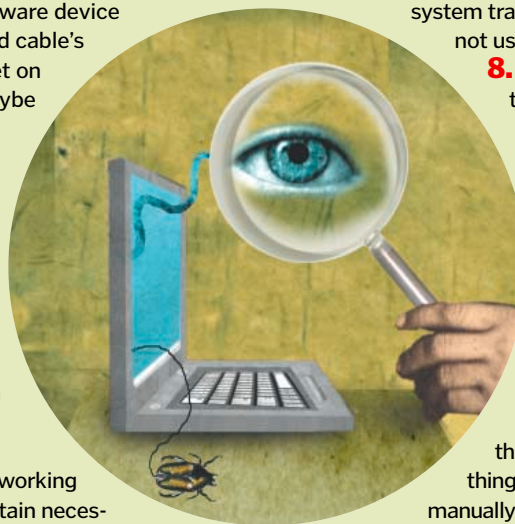
foiling spyware in real time. But its database seems to be less stringent in its definition of spyware than some, and its scanning features were not as effective as those of many other products in this roundup.

We installed Panda on some spyware-infested systems and immediately began receiving pop-ups notifying us of suspicious processes running in memory and giving us the opportunity to delete each one. While the instant feedback was reassuring, the sheer number of

individual alerts we had to navigate made us wish for a single screen that would let us view all the detected threats and bulk-manage them—our one complaint about an otherwise excellent user interface.

11 Signs Of Spyware

1. You find a new finger-size hardware device connected between your keyboard cable's plug and the corresponding socket on the back of your computer. Or maybe someone recently offered you "a better keyboard."
2. Your phone bill includes expensive calls to 900 numbers that you never made—probably at an outrageous per-minute rate.
3. You enter a search term in Internet Explorer's address bar and press Enter to start the search. Instead of your usual search site, an unfamiliar site handles the search.
4. Your antispysware program or another protective program stops working correctly. It may warn you that certain necessary support files are missing, but if you restore the files they go missing again. It may appear to launch normally and then spontaneously shut down, or it may simply crash whenever you try to run it.



5. A new item appears in your Favorites list without your putting it there. No matter how many times you delete it, the item always reappears later.
6. Your system runs noticeably slower than it did before. If you're a Windows 2000/XP user, launching the Task Manager and clicking the Processes tab reveals that an unfamiliar process is using nearly 100 percent of available CPU cycles.
7. At a time when you're not doing anything online, the send or receive lights on your dial-up or broadband modem blink just as wildly as when you're downloading a file or surfing the Web. Or the network/modem icon in your system tray flashes rapidly even when you're not using the connection.
8. A search toolbar or other browser toolbar appears even though you didn't request or install it. Your attempts to remove it fail, or it comes back after removal.
9. You get pop-up advertisements when your browser is not running or when your system is not even connected to the Internet, or you get pop-up ads that address you by name.
10. When you start your browser, the home page has changed to something undesirable. You change it back manually, but before long you find that it has changed back again.
11. And the final sign is: Everything appears to be normal. The most devious spyware doesn't leave traces you'd notice, so scan your system anyway.—Neil J. Rubenking

On one of our heavily infested test-bed systems, Panda detected the elusive key logger SpyAgent right off the bat. When we removed it, however, we lost our Internet connection as well.

Running a full system scan produces a complete list of detected spyware that you can view at a glance, and clicking on a spyware app takes you to Panda's Web site, which tells you more about it. Panda does

not provide a facility for scheduling scans at regular intervals (only about half the apps we tested do this), though you can set the program to run on system start-up.

When we set up Panda on a clean system and began surfing dangerously, the software blocked a number of actions effectively. In addition to detecting and eliminating adware and spyware bundled into seemingly harmless programs, it managed to detect Lop the moment we completed the download—when the program was still in a temporary directory—and prevented execution. Panda includes some administrative touches that could be helpful in a small-business or home network environment, such as optional password protection for scanner features and the ability to send a warning via e-mail when the program detects spyware on a system.

If a security suite with strong real-time blocking capabilities appeals to you, Panda Platinum Internet Security 8.01.00 should make your short list, right after McAfee Internet Security 2004.

PC-cillin Internet Security 2004

\$49.95 direct. Trend Micro Inc., www.trendmicro.com.



Trend Micro's PC-cillin Internet Security 2004 suite is, first and foremost, a personal firewall and virus scanner, but its virus detection capabilities have been beefed up to scan for and block other types of malware as well. PC-cillin's real-time blocking capabilities, however, are not as effective at handling as wide a variety of spyware as most of the stand-alone products we tested.

PC-cillin's interface is polished and professionally executed. While it's easy to

Spyware-Free P2P—**for Free**

The best way to deal with spyware is to avoid getting it in the first place. But that doesn't have to mean giving up file sharing, a prime source of spyware for the unsuspecting. You can find lite, hacked, or alternative versions of all the major P2P clients that are free of the unwanted code. Furthermore, the clients in some lesser-known networks never had spyware to begin with. Here are some clients you can get free of charge and free of that nasty spyware headache.

Easily the most popular P2P network, Fast Track typically has more than 3 million users online, compared with a million or fewer for the nearest competitors. Kazaa, the most popular Fast Track client, however, loads what seems like 3 million pieces of spyware, making **Kazaa Lite K++** a must-have (download sites change constantly; do a search). Not only is it free of malicious bloat, but it works just as well as the original app. For an even more streamlined and simpler Fast Track experience, try the **iMesh Light** client (www.imesh-light.com), although it may provide fewer search results and slower downloads than those of Kazaa Lite K++.

An innovative spyware-free network of choice for many is eDonkey-2000, which lets clients download a file from other clients even while those clients are still in the process of getting the file. This idea has evolved into an even better technology—a veritable P2P revolution called Bit Torrent. This technology doesn't waste bandwidth having clients search for files; rather, the network produces *torrents*, or links to new files that are posted on Web sites such as SuprNova.org. Click on one of these torrents and your Bit Torrent client will begin downloading the desired file from machines that have complete versions, called *seeds*, as well as from machines that are in the process of downloading the file. Because the file comes down in random bits, even a machine beginning a download can potentially help someone finish one.

A popular standalone Bit Torrent app is The Shadow's **Experimental Bit Torrent Client** (<http://bt.degreez.net>), which lets you adjust upload bandwidth. But if you want a client that will pull extra duty, try **Shareaza** (www.shareaza.com), which can also access eDonkey2000 and even the Gnutella network. Remember Gnutella? A powerful, simple way to access that network, with Fast Track-like multiple download sources, is **Xolox** (www.xolox.nl), which does everything the for-pay BearShare Pro does—but free.

A couple of other spyware-free networks worth checking out (*along with their associated clients*) are **Ares** (www.softgap.com) and **Filetopia** (www.filetopia.com). Ares has become popular for its ease of use and decent selection. Paranoid types will love Filetopia, which adds the benefit of some anonymity through encryption. Filetopia therefore also helps avoid human spies such as those from well-known four-letter entertainment organizations.—*Konstantinos Karagiannis*

PC-cillin's well-polished interface can't hide its lack of antispysware abilities.



use on the whole, you'll have to dig a bit to enable scanning for spyware, which is disabled by default. To turn this on, you need to select System | Scan Settings | Real-time Scan and check the *Scan for spyware* check box.

We found PC-cillin's active blocking reassuring. When we initiated a download containing a dangerous payload, PC-cillin popped up to deny access or quarantine the application, just as it would if you'd received an e-mail containing a virus. When it did detect

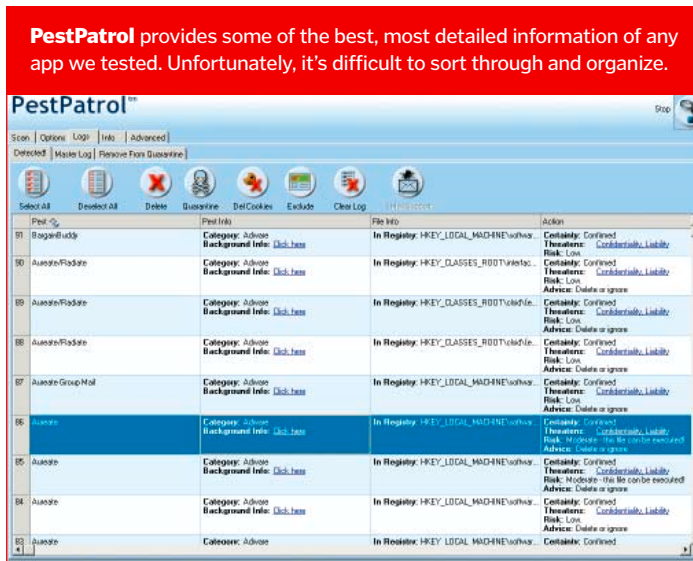
spyware, it prevented us from installing the offending application. That said, this may actually instill a false sense of security in many users, as a number of spyware programs slipped past this cordon in testing.

PC-cillin's on-demand scanning facilities were less well suited to handling today's proliferation of spyware. Although the scanner identifies a number of serious threats, it provides virtually no information you can use to ascertain what a given piece of spyware might be doing or what actions would be appropriate. Files simply appear in a list—you must process them one by one—and some of our attempts to quarantine or delete files were unsuccessful, with no reason provided. It turns out that the app is unable to remove spyware that is running at the time of the removal attempt—a notable weakness.

Additionally, PC-cillin doesn't alert you to products, such as the Alexa toolbar, that live in the gray area some users would consider spyware. And it didn't protect our browser from being hijacked by FindTheWebsiteYouNeed.

In an attempt to thwart spyware from a different angle, PC-cillin lets you enter various personal secrets such as Social Security numbers and credit card numbers. It then monitors Internet traffic, warning you if a program attempts to send this data elsewhere.

PC-cillin's antispysware capabilities look good, but a slick interface will be cold comfort to users who discover they're infested by all the spyware the application misses.



PestPatrol 4 Home User Edition

\$39.95 direct. PestPatrol Inc., www.pestpatrol.com.



PestPatrol 4 Home User Edition distinguishes itself with the best pest descriptions in the business, so you can make truly informed decisions about how to handle the spyware you find on your machine. It's also among the best in terms of actually finding spyware. On the other hand, the program's interface is complex, its scanner is slow, cleanup can monopolize memory, and it's got little to boast about in the area of real-time blocking.

With options galore and an interface that includes features like nested tabbed dialogs, PestPatrol is far more suitable for confident users than novices. But once you start scanning, you'll probably be impressed with the results. Not only does PestPatrol uncover a large amount of spyware, but it also provides excellent information to help you decide how to proceed. For each spyware trace, PestPatrol reports the program's name, type (pure spyware, adware, and so on), location, and risk level, as well as suggested action. Not enough? Click for more information and you'll find a highly detailed assessment of the threat. (Anyone can view the same information in PestPatrol's Pest Research Center, at www.pestpatrol.com/pestinfo.)

This deluge of information would be even more useful if PestPatrol provided better ways to sort, filter, and organize it—or a one-click way to let you select all the traces associated with a particular spyware element, as in products like PepiMK Soft-

ware's Spybot Search & Destroy 1.2 and Rizal Software's Spy Remover 7.1.1. We particularly missed this capability when we attempted to quarantine a large number of pests on one heavily infested system, which eventually led to a "low virtual memory" warning, then an "out of system resources" error, ultimately forcing a restart.

PestPatrol's MemCheck utility is designed to block spyware installations in real time, but we found that most spyware wasn't deterred—although MemCheck did hinder the install of both Grokster and Kazaa, both of which install a particularly egregious amount of spyware if left unchecked. In fact, PestPatrol performed worst on real-time blocking among all the apps we tested that claimed to have that feature.

PestPatrol takes an interesting approach to ferreting out key loggers. Instead of scanning for signatures, the program's utility KeyPatrol sniffs out processes that are monitoring keystrokes. But as with most tools we tested, the key logger SpyAgent actually prevented KeyPatrol from running long enough to report its presence.

PestPatrol takes an interesting approach to ferreting out key loggers. Instead of scanning for signatures, the program's utility KeyPatrol sniffs out processes that are monitoring keystrokes. But as with most tools we tested, the key logger SpyAgent actually prevented KeyPatrol from running long enough to report its presence.

Spybot Search & Destroy 1.2

Free (donation requested). PepiMK Software, www.safer-networking.org.



PepiMK Software's Spybot Search & Destroy 1.2 did a very good job of identifying threats in our testing, though like most products in this roundup, it was unable to eliminate everything and didn't perform well against the key loggers we installed. Spybot's record for blocking



spyware installs in real time is among the best in this roundup. That, combined with reasonable removal abilities and an array of helpful ancillary tools for system monitoring, earns this free application—which was an Editors' Choice winner last year (April 22)—an honorable mention.

Spybot operates in two different modes: easy and advanced. Easy mode exposes the scanning, cleaning, rollback, immunization, and definition update operations. Scan results appear in a simple list that commingles serious threats with lesser concerns, such as tracking cookies. Fortunately, Spybot lets you right-click to select or deselect a set of related components and add them to an exclusion list, to be ignored in future scans. A left click provides additional information about the threat you've selected.

When Spybot can't eliminate a running process, it alerts you and configures itself to run immediately when Windows reboots, before your desktop or taskbar even appears. In most cases, this tactic was sufficient to clear away the spyware in question, though a few programs, such as PeopleOnPage, managed to reinstate themselves despite repeated removal attempts. But Spybot performed poorly against the key loggers we installed and—like most scanners—was disabled entirely when we ran it on a system infected with SpyAgent.

Running automatically on reboot sometimes inexplicably switched Spybot from easy into advanced mode, which exposes many more configuration options for savvy users but may be overwhelming for novices. Advanced mode also lets you use tools such as a start-up manager and a BHO (browser helper object) monitor, which lets you see all installed browser extensions; both let you disable individual entries in the lists they generate.

Spybot includes a slightly confusing immunization feature that's supposed to help protect Internet Explorer and block bad downloads, but its success on our tests was mixed. Immunization resulted in some sites being blocked via an entry in the system's HOSTS file; in other cases, as with Gator and SideStep, it resulted in a warning when we initiated a download.

Spybot's strong scanning, good removal record, and useful utilities make it an excellent choice. The fact that it's free increases its appeal. If you decide that Spy Sweeper 2.2's slightly superior re-



moval abilities suit your needs better, Spybot still makes an impressive backup.

SpyCop 5.6 Home Edition

\$69.95 direct. SpyCop LLC, www.spycop.com.



Unlike most of the antispyspware tools in this roundup, SpyCop 5.6 Home Edition doesn't try to do it all. Instead, the program focuses on defeating one specific class of spyware: key loggers. With that narrow focus, a primitive interface, a lack of real-time blocking abilities, and a high price, SpyCop isn't for everyone. But if you need a specialized tool that can outwit key loggers—a particularly sneaky category of spyware—SpyCop is worth a look. The software's secret weapon against key loggers is its "super stealth" mode, which obliterates all other running Windows processes (save your work first!) to ensure that spyware with active countermeasures against scanners can't interfere with its operation.

In our testing, SpyCop's super stealth mode was one of the few ways we were successfully able to scan and disinfect a system with the key logger SpyAgent, which shuts down most antispyspware tools when it detects them running. Other scan results were mixed: SpyCop

detected Keylogger Pro but not iOpus Starr. And while the app found a small number of traditional spyware products such as Cydoor, it certainly won't provide the broad coverage you'll get from most other antispyspware products.

Scanning with SpyCop is a time-consuming affair that required 10 minutes or more, although you can reduce the time for subsequent runs by telling SpyCop to scan only files that are new or have changed since its last run. But the method it uses to do this—checking the archive bit—is so easily spoofed that we can't recommend using this quicker scan method. You can also configure the program to run when your screen saver kicks in.

SpyCop's interface is simple, but its design is far from user-friendly. Scan results in particular leave a lot to be desired. They appear in two small, fixed-size list boxes and provide little information to help you decide how to proceed. All SpyCop shows is a filename; double-clicking brings up a dialog with a button that promises more information but simply launches a Google search—which seems a bit slapdash, given the app's price.

If you opt to remove a file, SpyCop does so by renaming it with a .spy extension (VeryBadThing.dll becomes VeryBadThing .dll.spy). The tool has no built-in rollback feature, though you could manually restore the file's original extension by removing the .spy.

SpyCop offers a free-evaluation version, but this scans only for a random subset of spyware. If you need a tool specifically to detect and remove key loggers, SpyCop may be for you. For more general antispyspware solutions, other products in this roundup offer more balanced feature sets and cost less.

SpyGuard 2.0 Deluxe

\$49.95 direct. Guardiansoftware.biz,

www.spyguard.com. ●●●●●

SpyGuard 2.0 Deluxe is as much an evidence eliminator as an antispyspware utility; sadly, its capabilities in the latter area fall short of those provided by almost every other application in this roundup. Plenty of other products can more thoroughly detect and eliminate malicious programs lurking on your system while providing better tools and information for using them effectively.

SpyGuard's main interface is a tabbed dialog, from which you navigate a sea of



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| PDAs | | Printers | | Accessories | |
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check boxes to select the capabilities you wish to enable. SpyGuard scanned our test-bed systems rapidly and was able to detect a number of common spyware programs, including Aureate and Cydoor, as well as a number of key loggers, but it also missed a number of common nuisances, such as Bonzi Buddy. And it makes no attempt to warn you about tracking cookies, though its evidence elimination features let you indiscriminately remove cookies and a variety of other traces from your system.

Unlike most of the products we tested, SpyGuard pops up a dialog each time it finds a spyware trace on your system, so you can't get an overall picture of the results and perform bulk operations. In the case of a seriously infested machine, this could result in an extremely slow removal process, even given that SpyGuard doesn't detect as many types of spyware as its competitors. SpyGuard links individual spyware definitions to the online database at Spyware-Guide.com, but we

are disappointed by the program's help system, a single short page of HTML describing its capabilities.

Removing detected spyware, as with many utilities, required multiple reboot-and-rescan cycles—and in the end SpyGuard was unable to eliminate SaveNow completely. Some other programs we tested it against were disabled but not fully removed, as we found when “DLL not found” warnings popped up at awkward times. SpyGuard lacks the ability to roll back removals.

SpyGuard's spyware-blocking capabilities are limited, too. Although a check box claims to let you protect your Registry against dangerous components, we didn't find it had any appreciable prophylactic effect. Another check box lets you have SpyGuard ensure that your Internet Explorer start page is set to what you want, but unlike Spy Sweeper, Spyguard doesn't prevent home page changes in real time. The program does not provide a live-update feature.

Although SpyGuard 2.0 Deluxe might be useful if you're looking for a way to clear traces of activity on your PC, its limited abilities to deter spyware and its lack of options should lead you to look elsewhere when it comes to stopping these snooping apps.

SpyHunter 1.4.42

\$29.99 direct. Enigma Software Group Inc., www.enigmasoftwaregroup.com. ●●●●●

SpyHunter was always one of our favorite video games (admit it, the music is running through your head), so we're extra disappointed that Enigma Software Group co-opted the name to put out such a mediocre product. SpyHunter 1.4.42 provides no blocking capabilities, offers only brief descriptions of detected spyware, and includes virtually no help or documentation. Its scanning was extremely slow and, on heavily infected systems, sometimes seemed to freeze entirely. These limited capabilities and minimal configuration options make it

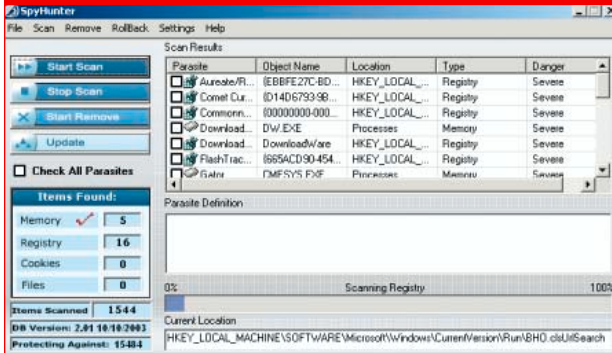
SUMMARY OF FEATURES

Spyware Stoppers

| ■ YES □ NO | Ad-aware Plus 6 | Aluria's Spyware Eliminator 3.0 | BPS Spyware/Adware Remover 8.2 | McAfee Internet Security 2004 | Norton Internet Security 2004 | Panda Platinum Internet Security 8.01.00 |
|--|-----------------|---------------------------------|--------------------------------|-------------------------------|-------------------------------|--|
| Direct price (tested configuration) | \$26.95 | \$59.99 | \$29.00 | \$69.99 | \$69.95 | \$39.95 |
| Can scan automatically on Windows start-up | ■ | ■ | ■ | ■ | ■ | ■ |
| Built-in scan scheduling | □ | ■ | □ | ■ | □ | ■ |
| Can automatically detect and download updates | ■ | ■ | □ | ■ | ■ | ■ |
| Scans memory and running processes | ■ | ■ | ■ | ■ | ■ | ■ |
| Scans removable media | ■ | ■ | ■ | ■ | ■ | ■ |
| Scans Windows Registry | ■ | ■ | ■ | ■ | ■ | ■ |
| Indicates spyware trace type/severity | ■ ■ | ■ ■ | ■ □ | ■ □ | □ □ | □ ■ |
| Displays descriptions of found spyware | ■ | ■ | □ | □ | ■ | □ |
| Provides online database of spyware | □ | □ | □ | ■ | ■ | ■ |
| Removes spyware | ■ | ■ | ■ | ■ | ■ | ■ |
| Removes key loggers | ■ | ■ | ■ | ■ | ■ | ■ |
| Removes Trojan horses | ■ | ■ | ■ | ■ | ■ | ■ |
| Removes tracking cookies | ■ | □ | ■ | ■ | □ | □ |
| Can recover removed software | ■ | ■ | ■ | ■ | ■ | ■ |
| Logs activity and removal | ■ | ■ | ■ | ■ | ■ | ■ |
| Real-time blocking and prevention | ■ | ■ | ■ | ■ | ■ | ■ |
| Can block Registry modification | ■ | □ | □ | ■ | □ | □ |
| Can block ActiveX downloads | ■ | ■ | □ | □ | ■ | ■ |
| Can block browser helper object (BHO) installation | □ | □ | □ | ■ | □ | ■ |
| Can block home-page hijacking | □ | ■ | □ | ■ | □ | ■ |
| Can detect spyware installs in real time | ■ | ■ | ■ | ■ | ■ | ■ |
| Can fix general browser vulnerabilities | □ | ■ | □ | □ | □ | ■ |
| Can block tracking cookies | □ | □ | ■ | ■ | ■ | □ |
| Can block transmission of personal info | □ | □ | □ | ■ | ■ | □ |
| Antivirus tools | □ | □ | □ | ■ | ■ | ■ |
| Antispam tools | □ | □ | □ | ■ | ■ | ■ |
| Firewall | □ | □ | □ | ■ | ■ | ■ |
| Start-up manager | □ | □ | ■ | □ | □ | □ |
| BHO manager | □ | □ | ■ | □ | □ | □ |
| Parental controls | □ | □ | □ | ■ | ■ | ■ |

RED denotes Editors' Choice. * The application can scan CDs but not floppy disks. N/A—Not applicable: The product does not provide any real-time blocking.

SpyHunter's simple interface reflects its minimal feature set and configuration options.



hard for us to recommend SpyHunter, even though it was one of the better apps at spyware detection.

Even under the best of circumstances, SpyHunter's scan speed was tediously slow: On a pristine Windows XP system,

the interface deftly masks complex functions, but in SpyHunter's case the interface is simple because the features are minimal. You can click on a button to start a scan, or pull down a menu to scan just a subset of the system (memory,

Registry, cookies, or drives). The scan results appear as list box items with severity ratings. You can select items one at a time or all at once, but you can't easily select all traces associated with a single spyware product. In some cases, dozens will be.

Sometimes a simple

it required nearly 11 minutes. And on some of our infected machines, we had to cancel scans that appeared to have hung after half an hour or more. When it finally did manage to complete a scan, it detected spyware quite respectably, but its removal results were mediocre at best.

SpyHunter's help system is disappointing, consisting of a Windows file containing just two paragraphs of text.

Although SpyHunter includes a live-update capability, it doesn't tell you when or whether a new program file is available. You have to click the Program Update button, reinstall, and reboot, without knowing whether you're going to get a newer version or not. Checking to ensure you have current spyware definition files is more seamless.

Compared with many other products offering richer features at similar prices, SpyHunter offers little reason to choose it.

Our contributors: **Cade Metz** is a senior writer at *PC Magazine*, and **John Clyman** is a contributing editor. **Konstantinos Karagiannis** is a senior editor of *PC Magazine*. Associate editor **Sean Carroll** and PC Magazine Labs project leader **Neil J. Rubenking** were in charge of this story.

Download this table at www.pcmag.com.

| PC-cillin Internet Security 2004 | PestPatrol 4 Home User Edition | Spybot Search & Destroy 1.2 | SpyCop 5.6 Home Edition | SpyGuard 2.0 Deluxe | SpyHunter 1.4.42 | Spy Remover 7.1.1 | Spy Sweeper 2.2 |
|----------------------------------|--------------------------------|-----------------------------|-------------------------|---------------------|------------------|-------------------|------------------|
| \$49.95 | \$39.95 | Free | \$69.95 | \$49.95 | \$29.99 | \$15.95 | \$29.95 (1 year) |
| ■ | ■ | ■ | □ | □ | ■ | □ | ■ |
| ■ | ■ | ■ | □ | □ | □ | □ | ■ |
| ■ | ■ | ■ | ■ | □ | ■ | ■ | ■ |
| ■ | ■ | ■ | ■ | □ | □ | □ | ■* |
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| □ □ | ■ ■ | ■ □ | □ □ | ■ □ | ■ ■ | ■ □ | ■ □ |
| □ | □ | ■ | ■ | ■ | ■ | □ | ■ |
| ■ | ■ | □ | □ | ■ | □ | □ | ■ |
| ■ | ■ | ■ | □ | ■ | ■ | ■ | ■ |
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| ■ | ■ | ■ | □ | ■ | ■ | ■ | ■ |
| ■ | ■ | ■ | □ | ■ | ■ | ■ | ■ |
| ■ | ■ | ■ | □ | ■ | ■ | ■ | ■ |
| □ | □ | □ | N/A | ■ | N/A | N/A | □ |
| ■ | □ | ■ | N/A | □ | N/A | N/A | □ |
| □ | □ | □ | N/A | □ | N/A | N/A | ■ |
| □ | □ | ■ | N/A | ■ | N/A | N/A | ■ |
| ■ | ■ | □ | N/A | □ | N/A | N/A | ■ |
| □ | □ | ■ | □ | □ | □ | □ | □ |
| □ | ■ | □ | □ | □ | □ | □ | ■ |
| ■ | □ | □ | □ | □ | □ | □ | □ |
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| □ | □ | ■ | ■ | □ | □ | □ | □ |
| ■ | □ | □ | □ | □ | □ | □ | □ |

Spy Remover 7.1.1

\$15.95 direct. Rizal Software, www.rizalsoftware.com. ●●●●●

Rizal Software's Spy Remover 7.1.1 takes a minimal approach to tackling spyware. It has few features, lacks blocking capabilities, and didn't find the key loggers we installed—or much of the other spyware. On the plus side, its scanning capabilities are easy to use, and it organizes results effectively.

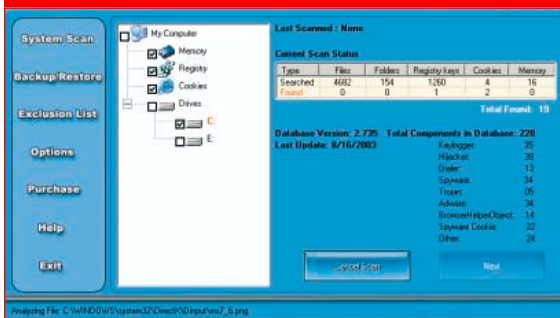
Spy Remover's biggest advantage is its straightforward interface, which ranks with the best in this roundup. Check the items you wish to scan—memory, Registry, cookies, or disk files—and press Scan Now to begin. When the results are ready, Spy Remover presents them in a convenient tree view that organizes spyware by type, specific program, and associated components. No other program we tested makes it so easy to get a clear picture of the spyware detected on your system, and you can easily eliminate all traces of a specific program or class of spyware by selecting a check box.

We wish the excellent results list provided more insightful information about each of the detected apps, though. This would help users make more informed decisions on what course of action to take. But at least you can back up your changes and roll them back for all products you removed in a given session, if the removal broke an associated app that you need or want.

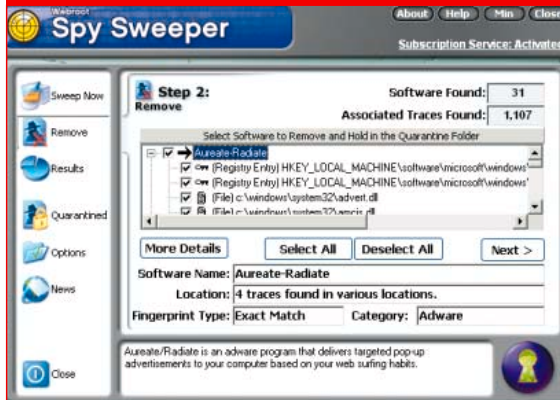
If Spy Remover is unable to remove a component that's currently running, the app will queue it for removal on the next system boot—but unlike most of the products we tested, it doesn't specifically tell you that a reboot may be required to complete the disinfection. The application was about average at removing detected spyware.

Our testing also exposed a few rough edges in Spy Remover. The program's Live Update capability worked at some times and not others (giving us a cryptic "division by zero" error or telling us that our "connection was forcefully rejected"). Additionally, removing spyware on one of our test-beds also resulted in a nonfunctioning Internet connection. While this is a common aftereffect of removing certain

Spy Remover gives the best view of the spyware it detects on your system. Unfortunately, it doesn't detect much.



fast scans, conveniently organized results, and impressive spyware removal abilities characterize Editors' Choice **Spy Sweeper**.



types of spyware, we didn't encounter this problem with the other apps on identical tests.

In a crowded field, Spy Remover does not set itself apart from the pack, and its detection and removal abilities are subpar. On the other hand, its ease of use may appeal to less technically savvy users.

Spy Sweeper 2.2

One-year subscription, \$29.95 direct. Webroot Software Inc., www.webroot.com. ●●●●●



Webroot Software's Spy Sweeper 2.2 is the most effective standalone tool for detecting, removing, and blocking spyware. Although the program didn't perform perfectly in our testing, it was successful in inhibiting most spyware and was one of only three products that were able to scan a system successfully with the key logger SpyAgent installed.

Spy Sweeper's Active Shields feature aims to protect you while you're surfing and warns you when your system loads

spyware into memory, when your browser home page is changed, or (if you desire) when a site places tracking cookies on your system. The memory scanner detected most spyware as the apps were attempting to install.

Spy Sweeper provided particularly informative descriptions of the programs and the option to scan the system now, scan later, or ignore a spyware app entirely. In a few cases, however, the pop-up window intended to warn us away from a program was hidden behind the installation window until after installation was complete. Spy Sweeper also didn't warn us when we installed CommonName, though it did identify that app during a later scan. Whenever a site or application tried to reset our Internet Explorer home page, a Spy Sweeper dialog popped up to ask if we approved of the change.

We like Spy Sweeper's scanning capabilities. They're thorough and relatively fast, and the results are organized into a convenient hierarchy so you can see at a glance what spyware was detected without having to wade through every Registry key, file, or cookie that the scanner detected (though this information is available should you desire it). One caveat: You can't resize Spy Sweeper's fixed-size window, which shows only a few lines of information at a time. This can be irritating when you're working with a badly infected machine.

Although scanning itself took just a minute or two, on some of our heavily infected test-beds Spy Sweeper took half an hour or more to quarantine the installed spyware. And while it succeeded in eliminating most of the undesirable software on our systems, we were unable to eliminate a handful of products, which managed to use ticklers to revive themselves after each reboot.

Webroot also makes a free version of Spy Sweeper, without the live-update capabilities. Spy Sweeper's combination of ease of use, reasonable price, and above-average blocking and removal capabilities makes it an excellent choice for users who want a standalone application. ☰

"Qurb is the only spam fighter we've seen that stops 100 percent of junk e-mail straight out of the box. Impressive? You bet."

-- CNET Reviews, March 3, 2003

Stop All Spam. Period.

"Qurb couldn't be more elegant or simpler to use."

-- PC Magazine
May 27, 2003

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SAFE Computing, UNSAFE PCs

BY NEIL J. RUBENKING

If you give away your own secrets, is it still identity theft? Every time you use a public computer, you leave behind little bits of yourself: AutoComplete data, passwords, surfing history, temporary files—personal data that's fully accessible to the next user. This is a problem both for the user and for the public computer's owner. Software vendors

approach this problem from many different angles. Here are four new products with distinctive approaches to safeguarding data in an unsafe world.

Administering public computers, whether in classrooms, Internet cafés, or in a business “hot desk” environment, is a thankless job. Every new user logging on could change the computer's configuration accidentally, mischievously, or maliciously. If a student deletes key files or installs a pornographic screen saver, that's probably just an annoyance. If a hacker installs a key logger and steals passwords from other users, the computer owner could be liable. Yet stringent user policies can pointlessly

block innocuous activities without truly protecting the computer. FSLogic Protect, a finalist in *PC Magazine's* 2003 Technical Excellence awards, is an excellent solution to this thorny problem.

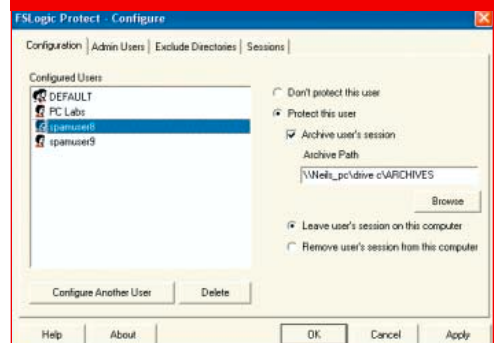
FSLogic Protect 1.0 (\$80 per workstation; volume discounts) works in tandem with the NTFS file system—and only NTFS—under Windows 2000, XP, or Server 2003. After installation (typically by the administrator of a shared workstation), it transparently intercepts all file-write requests and stores the data in the

current user's “session” without changing the underlying file. When a program reads file data, Protect supplies it from the underlying file, incorporating any modifications found in the user's session. Every user has an independent session, and the base file configuration never changes.

The administrator can configure Protect via a GUI, a command line interface, or direct API function calls. For Internet café situations, Protect can simply discard the session when users log off. Classroom configurations can store each student's session on that student's assigned workstation and restore it at log-on. In a roaming worker scenario, each worker's session resides on a server and automatically transfers to any workstation when that worker logs on. If necessary, the administrator can configure specific folders to give users direct access to the underlying file system, so they can share specific files. FSLogic Protect guards the privacy of individual users while keeping them from damaging shared computers. (FSLogic Inc., www.fslogic.com. ●●●●●)

If your company uses a software-only virtual private network (VPN), you can walk up to any computer and log on to your e-mail server, manipulate private files, and generally do anything you could do from your office. The problem is, while your communications are encrypted over the VPN, you leave behind all kinds of possibly sensitive—and unencrypted—information on the PC. **Twingo Secure Desktop 2.1.1** (\$49 per user, direct) can insulate you from this kind of data leakage.

FSLogic Protect admins can decide whether to save each user's session and whether to create an archive.



Unlike FSLogic Protect, Twingo does not have to be preinstalled by the public computer's administrator. When you walk into an Internet café, you download the tiny client utility either from Twingo's Web site or your company's. Twingo Secure Desktop appears, with just enough functionality to let you launch the browser and log on to your VPN. While you're working on Secure Desktop, any saved data is encrypted and written to a file called the Secure Vault. On closure of the Secure Desktop, Twingo first overwrites and then deletes the Secure Vault, leaving no trace of your session. A software key logger installed on the public computer can't trap your keystrokes—and couldn't retain them even if it did. After a short period of inactivity, Twingo automatically shuts down and erases your private data.

If your company implements the server-side Twingo Configurator, the administrator can configure the client to store the encrypted contents of your Secure Vault between sessions, much as FSLogic Protect saves sessions. With the current version of Twingo, the Secure Vault cannot be saved between sessions, a major inconvenience. A single-user version that includes this ability to retain session data should be available soon. Twingo Secure Desktop ensures that your Virtual Private Network really is private. (Twingo Systems Inc., www.twingosystems.com. ●●●●●).

With P.I. Protector Mobility Suite 3.0 (\$30 direct), your private information stays in your pocket. PIP will keep you from leaving bits of your identity in each public computer you visit. Use PIP at the office, then take it along for e-mail and Internet access on public computers. PIP requires a computer running Windows 98 SE, Me, 2000, or XP with Internet Explorer and Outlook Express 5.5 or later. A version that supports Outlook, AOL,

and Eudora is planned for the first half of 2004. (If you need Outlook support right away, consider Migo, a similar product from Forward Solutions, www.4migo.com.)

PIP works with almost any kind of a removable storage device, from a USB flash drive to a FireWire-equipped digital camera. Upon installation, PIP copies your e-mail account (messages and contacts) to the removable device. It also copies personal Internet data such as History,



Favorites, temporary files, cookies, Auto-Complete entries, and URLs typed at the Address bar. After transfer, it can overwrite and delete the originals.

To check your e-mail or surf the Web privately, plug your portable device into any computer and launch PIP, which resides on the device. All of your private data remains on the device; none gets written to files on the computer. After you shut down PIP and pocket your device, you'll leave no trace of your activities. You can also designate specific data files for synchronization between the device and one or more PCs.

PIP 3.0's UI is streamlined and enhanced. Version 3.0 adds an option to encrypt all stored data, but because of performance issues, this is turned off by default. The option pro-

ducts against theft of passwords and other personal information by Registry-based key loggers installed on a public computer (protection against file-based key loggers is planned for a future version). (imagine LAN Inc., www.imaginelan.com. ●●●●●).

Products that can eradicate all traces of your online activity have their place, but on your own computer they may be overkill. Features like AutoComplete, recently used file lists, and cookies were invented to ease and enhance your browsing experience, after all. **FreeToGo 1.2** (\$24.95 direct) lets you choose between convenience and privacy with the flip of a switch. Turn on the Internet Privacy switch to enable FreeToGo's protection. When you turn it off again, FreeToGo erases all traces of your browsing activity during that particular session and displays a detailed list of its erasures.

FreeToGo can also reverse changes to temporary files (both Internet Explorer and Windows), home pages, favorites, browser history and cookies, recently-used lists in Windows Media Player and RealPlayer, URLs typed in the Address bar, AutoComplete data for Web forms, and history entries in Recent Documents, the Start menu's Run dialog, and Google's search bar. During private sessions, new items are available, but when you turn off the switch, FreeToGo erases the changes. You can, however, configure it to leave some categories alone.

For greater security, FreeToGo can overwrite files multiple times before deletion, in accord with Department of Defense standards. It can delete all the content in the tracked areas, but be sure to deselect items like home page and Favorites before clicking on Delete All. Conversely, if you decide that a given session didn't need protection, you can choose to turn off the switch without erasure. As long as you remember to turn it on, FreeToGo will keep private browsing private on your home or office computer. (FreeToGo Inc., www.freetogo.com. ●●●●●). ☰

Our contributors: Associate editor **Sean Carroll** and PC Magazine Labs project leader **Neil J. Rubenking** were in charge of this story.



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- 256MB DDR SDRAM⁵
- 40GB hard drive
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IBM ThinkCentre A50p

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel Pentium 4 Processor with HT Technology 2.80GHz
- Microsoft Windows XP Professional
- 256MB DDR SDRAM¹
- 40GB hard drive • CD-RW
- Intel Extreme Graphics 2
- Integrated 10/100 Ethernet
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
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IBM ThinkCentre M50

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel Pentium 4 Processor with HT Technology 2.80GHz
- Microsoft Windows XP Professional
- 512MB DDR SDRAM¹
- 40GB hard drive • CD-ROM
- Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
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IBM ThinkCentre M50

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery
- IBM Embedded Security Subsystem 2.0 – Strongest security as a standard feature

System Features:

- Intel Pentium 4 Processor with HT Technology 3.00GHz
- Microsoft Windows XP Professional
- 512MB DDR SDRAM¹
- 40GB hard drive • DVD-ROM
- Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
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Distinctive IBM Innovations:

- The smallest IBM desktop without compromise: 62% smaller than a standard IBM desktop

System Features:

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- Microsoft Windows XP Professional
- 512MB DDR SDRAM¹
- 40GB hard drive • CD-ROM
- Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service¹⁰

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ServicePac® Service Upgrade:¹⁰
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IBM ThinkCentre S50

Distinctive IBM Innovations:

- The smallest IBM desktop without compromise: 62% smaller than a standard IBM desktop
- IBM Embedded Security Subsystem 2.0 – Strongest security as a standard feature

System Features:

- Intel Pentium 4 Processor with HT Technology 3.00GHz
- Microsoft Windows XP Professional
- 512MB DDR SDRAM¹
- 40GB hard drive • DVD-ROM
- Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service¹⁰

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BY LOYD CASE AND DAVE SALVATOR

Explicit Graphics

One of the coolest jobs in all of computerdom is held by David Kirk, the chief scientist at graphics chip developer nVidia. Forty-three-year-old Kirk, a computer scientist by training, spends his days noodling with complex algorithms with one goal in mind: building the graphics engines that will drive the next generation of computer games, business simulations, medical imagery, and more. His ultimate objective: total 3D realism.

Everything you need to know about the making of special effects for entertainment and business.

“There are many more kinds of visual effects we can’t do yet, including wind, rain, and snow,” says Kirk. “The real world is boundlessly complex and always changing and in motion. Realistic simulation and rendering of a convincing synthetic world—convincing enough that we can’t tell the difference from reality—is still at least ten years away.”

Creating the illusion of three dimensions on a two-dimensional computer display takes not only a significant amount of brainpower but also plenty of horsepower. Fortunately, graphics technology has been accelerating at a phenomenal rate compared with microprocessor development. Even today’s terminology highlights the importance of 3D graphics; the spec often listed on a PC box after the CPU is the GPU,

or graphics processing engine.

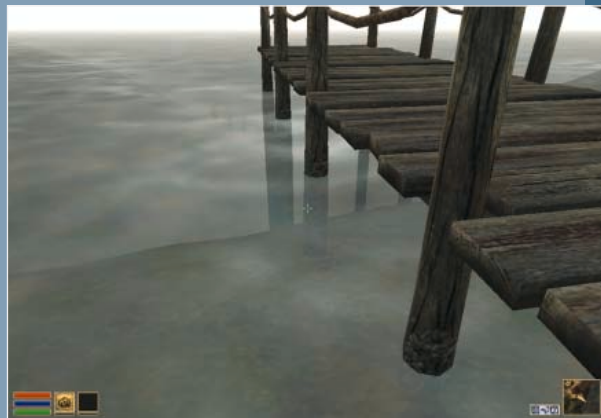
What’s driving this frenzy of innovation? The short answer: games. If you’ve seen any of the games on the market today, such as *Max Payne 2* and *Splinter Cell*, you know why. (And if you haven’t seen them, get out from under that rock!) But 3D is also reaching beyond entertainment to the corporate desktop. Microsoft is currently working on a sophisticated 3D graphics engine for Longhorn, the version of Windows expected in 2006.

Kirk’s work is part of the flourishing innovation taking place today in the graphics industry. In this story, we’ll take you on a tour of the graphics technologies inside today’s newest PCs and give you a preview of some of the awesome effects you can expect this year and next.

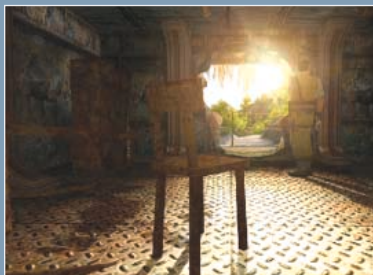
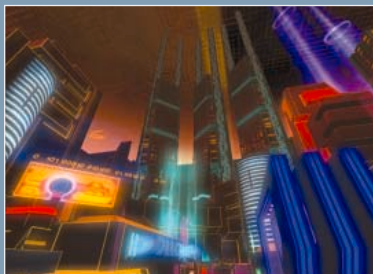
REVIEWED IN THIS STORY

- 104** Shader Programs: Cinematic Realism on Demand
- 105** Creation Tools: Now for Developers and Artists
- 106** Microsoft Longhorn: 3D for the Office
- 106** The Hardware Players: ATI and nVidia
- 107** PCI Express: Busting the Bandwidth Bottleneck
- 108** Just-in-Time Compilation: For Optimal Performance
- 109** Finding—and Rendering—Nemo

ILLUSTRATION BY RANDY LYHUS



SHADER SPECIAL EFFECTS: The realism of images in today's computer games is leaps and bounds beyond what we saw in the games that dazzled us just a few years ago. That all began when shaders hit the scene. Compare the screenshots of water shown above, taken from *Morrowind*, with the shader turned on (left) and off (right). In the additional images from *Tron*, *Far Cry*, and *S.T.A.L.K.E.R.*, notice the light, shadows, and reflections, all done through shaders.



Shader Programs: Cinematic Realism on Demand

The massive number crunching required to create the illusion of 3D takes place inside a 3D GPU, but the first games to use one (circa 1991) were pretty boring. That's because the GPU processed data the same way all the time via its *fixed-function pipelines*. As a result, the 3D effects in games seemed canned.

Since then, fixed-function pipelines have been replaced by *shaders*—small programs that game developers can write. Shaders operate on individual pixel and vertex data to create effects like those you see in the water scene above. They give developers an unprecedented degree of creative freedom. And the programmability of the latest graphics processors, such as the ATI Radeon 9700 and its newer cousins or the nVidia GeForce FX series, delivers a level of cinematic realism rivaling that of Hollywood movies.

Shaders give developers all the ingredients they need to cook up today's hottest games. Watch shaders in action and you'll know why the computer games industry is just starting to heat up. Games expected to launch this year—*DOOM 3*, *Half-Life 2*, *S.T.A.L.K.E.R.*—will be feasts for the eyes.

You can also see shaders do their stuff if

you're into home video or photo editing. The powerful shader hardware built into the ATI Radeon 9800 XT and the nVidia GeForce FX 5950 graphics cards can accelerate digital photo and video editing and special effects. For example, why wait for your system's CPU to run a blur filter? The filter—a special effect—could run much faster on the GPU using a shader program. The ATI Radeon 9800 and 9600 lines of GPUs also use shader hardware to improve quality in digital video streams.

Shader programmability is just beginning to emerge on motherboards with integrated graphics chips. This began with the ATI Radeon 9100 IGP chipset for the Pentium 4 processor. Until then, Intel's Extreme Graphics line—still used in very low-cost desktop systems and notebooks—was the most common integrated solution for the Pentium 4. But it delivers subpar 3D performance and doesn't have programmable shaders.

The latest mobile GPUs, the ATI Mobility Radeon 9600 Pro and the nVidia GeForce FX 5700 Go, bring sophisticated graphics to midrange and high-end laptops. What better way to enjoy a long commute than firing up an awesome game?

Creation Tools: Now For Developers and Artists

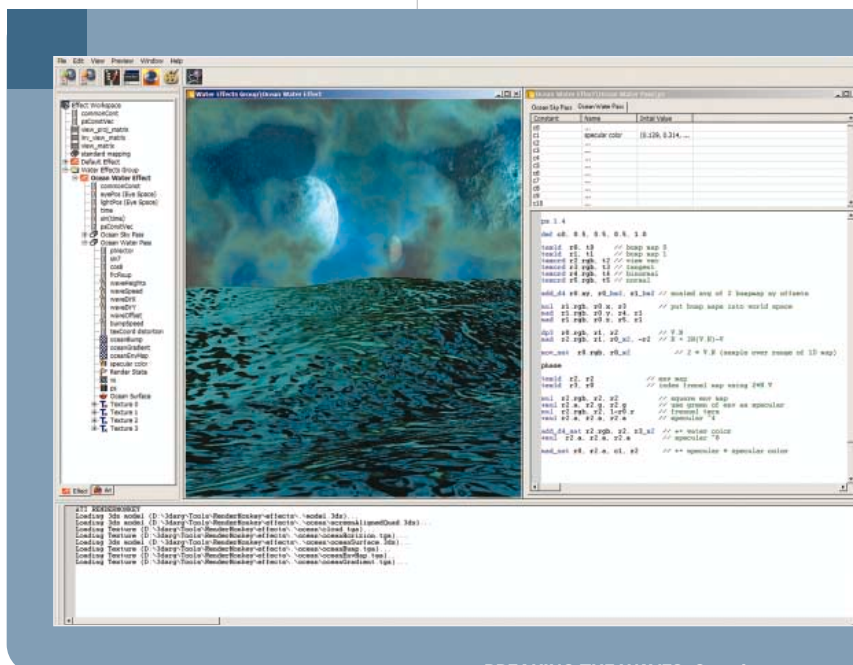
Even the best hardware is useless without supporting software, which currently trails the superheated 3D hardware product development cycle by 18 months. To shorten the lag, Microsoft is improving its development tool, *Microsoft DirectX*, which lets programmers write a single version of a game for any graphics card. Prior to the launch of DirectX in 1995, games were developed for specific graphics cards. With DirectX, any game can run on any PC hardware.

DirectX 8: Game developers are always looking to push the envelope and make their games slicker than the competition's, so they need programming flexibility. (Before DX8, all graphics hardware was fixed-function.) Microsoft delivered creative freedom with its programmable vertex and pixel shaders in DX8. Released in late 2000, DX8 gave developers a collection of 127 commands for building custom shader programs. DX8 launched a new generation of programmable graphics hardware, but it was hard to program, and tools for artists to preview and manipulate rendered shaders in real time didn't exist. As a result, shader-enabled titles were very slow to hit the market.

DirectX 9: In 2003, games like *Splinter Cell* and *Halo* appeared, validating the shader concept, but didn't become easier to program until DX9, released in late 2002, and its High Level Shader Language (HLSL) arrived. This new language has a syntax that resembles the C programming language, familiar to most programmers. And 3D modeling tools, such as Alias Wavefront's *Maya* and Discreet's *3D Studio Max*, create easy interfaces that devel-

opers can use to build shaders. This allows artists as well as programmers to create custom shaders and effects.

But it will be some time before DX9-class hardware is widespread, especially on low-end PCs. Currently, the ATI Radeon 9500, 9600, 9700, and 9800 series of graphics cards and the nVidia GeForce FX line of GPUs support DX9.



BREAKING THE WAVES: Creating computer games is made dramatically easier with powerful tools like ATI's *RenderMonkey*. Notice the shimmery effects of the ocean scene shown here.

Recently shipped game titles require DX9 to be installed on your PC. Some game installers can upgrade DirectX for you, but not all. DX9.0b, the latest version, is available as a free download from Microsoft at www.microsoft.com/directx.

Just as important are real-time visualization tools, such as ATI's *RenderMonkey* (shown above) and nVidia's *CgFX Viewer*, which let artists preview and tweak shader programs in real time. These tools, available as free downloads from the companies' Web sites, let artists and programmers visualize shaders in action before committing them to code.

Also last year, nVidia introduced its own shader language, called *Cg*, which is very similar to HLSL but with several important differences. With *Cg*, developers can write shaders in a single language and

then output code that runs on graphics cards supporting DX8, DX9, or OpenGL (see "3D on Board" for details, page 107).

Previously, developers were forced to write several versions of their code for different GPUs. nVidia has its own optimized *Cg* compiler for its own GPUs, but ATI has not followed suit.

nVidia also created plug-ins for the major 3D digital content creation tools: *Maya*, *3D Studio Max*, and *Softimage's XSI*. With the plug-ins, artists can work with *Cg* shader programs from inside these applications, further streamlining the creation of 3D games.

OpenGL: OpenGL, a 2D and 3D graphics application programming interface (API), introduced a high-level shading language in 2003 with Version 1.5, which will expand further when Version 2.0 launches this year. It is used primarily in workstation applications, and special graphics cards can accelerate OpenGL functions.

Very few games are written in OpenGL, although id software is using it for the upcoming *DOOM 3*, which is one of 2004's most anticipated games. Developers will be able to license the *DOOM 3* engine to create their own games. Keep an eye out for this one.

MORE ON THE WEB

The topic of 3D graphics can be as daunting as it is fascinating, but if you want learn more about what makes this technology tick, head over to *ExtremeTech* (www.extremetech.com). There you'll find a comprehensive 3D Pipeline Tutorial and loads of other articles that explore 3D graphics in depth.

Microsoft Longhorn: 3D for the Office

The 3D graphics in today's desktop PCs is all about games, but the technology will expand to office applications when Microsoft ships its next version of Windows, code-named Longhorn, in 2006. For now, though, Windows' 2D interface is stuck in the Windows 3.1 era, except for animation effects and smoother fonts. Longhorn will have a completely rewritten interface, code-named Avalon,

a window in 3D space (see the photo below). Each application will draw its screen updates to a back buffer instead of directly to the screen. Then the Desktop Compositing Engine will compose the desktop for every frame of animation using each application's back buffer. When the entire desktop is ready to be updated, it will be page-flipped on-screen, and the compositor will then

prepare the next frame of animation.

Avalon will have two *experience levels*: Tier 1 and Tier 2. This segmentation is necessary because of the large performance gaps between aging 3D graphics hardware and the latest-generation GPUs. Tier 1 will require only minimal 3D hardware acceleration and will deliver minimal 3D performance. It will offer new visual effects but will closely resemble the Windows XP desktop and offer features like high-resolution scaling for high-resolution displays. Tier 1 will also use translucency, so you can see through windows to what's behind them.

Tier 2 will require more powerful hardware, such as that offered by the ATI Radeon 9800 and the nVidia GeForce FX 5950. The extra horsepower will be put to work delivering additional 3D effects and animations. Microsoft has demonstrated some possible effects, such as windows that appear to float and can be grabbed with a mouse.

Cool indeed, but Microsoft trails Apple when it comes to 3D interfaces. Apple's OS X already has many of the 3D features promised for Longhorn via the Quartz compositing engine. Longhorn is still quite a ways out, so we have few details on its 3D technology. But based on what we've seen so far, it'll be worth the wait.



FLIPPING OUT: Longhorn, the version of Windows slated for release in 2006, will have the Desktop Compositing Engine, which can create 3D effects like translucency, warping, and floating windows. The interface, code-named Avalon, will offer two modes: one for systems with standard graphics capabilities and one for those with fire-breathing graphics cards.

that will finally use the 3D acceleration power of your graphics card, rendered using what Microsoft calls the *Desktop Compositing Engine*.

Today, the Windows interface is single-buffered, meaning that one screen update is painted on top of the last. But 3D graphics use a rendering method called *page flipping*, in which graphics memory is allocated so it contains two full screens. The first is called the *front buffer*. The *back buffer* contains the screen information for the next frame of 3D animation.

When content in the back buffer is ready to be displayed on-screen, the 3D card does a page flip, swapping the buffers. Now what was the back buffer is on-screen as the front buffer. And what was the front buffer becomes the back buffer, where it is cleared for the next frame of animation. This technique also goes by the term *double buffering*.

Avalon will use multiple back buffers and will update the screen only when the entire desktop is ready. This method will enable animation effects such as moving

The Hardware Players: ATI and nVidia

For the past few years, two companies have been driving 3D graphics processor technology: ATI Technologies, based in Toronto, and nVidia Corp., based in Santa Clara, California. nVidia ceded the performance edge when the ATI Radeon 9700 Pro appeared in the fall of 2002.

The volume leader in graphics chip sets is Intel, surprisingly, by virtue of the fact that the Intel Extreme Graphics core is built into certain versions of the 845 and 865 chip sets for Pentium 4 motherboards. Often, though, a 3D card is in the system's AGP slot, so the Intel graphics core is never used. Since integrated graphics can keep costs down, they're found in low-cost systems. In 3D gaming, the Intel Extreme Graphics yields subpar performance, and it does not support pixel or

vertex shaders. Serious gamers should spring for a dedicated graphics card.

ATI Technologies: ATI was the first company to introduce a graphics card that could run games based on DX9—the Radeon 9700. Since then, the company has developed several graphics chips, including the Radeon 9600 and 9800 series. It also supplies chips to graphics card companies such as Connect 3D and ASUS.

ATI's midrange graphics chip, the Radeon 9600 XT, supports DX9 but has fewer pixel pipelines and lower performance than the Radeon 9800 XT. Still, it's built on a more advanced manufacturing process than the 9800 XT (0.13-micron versus 0.15-micron), and the 9600XT's core clock speed is 500 MHz, compared with 412 MHz on the 9800 XT. The entry-level 9200 line of GPUs is based

3D on Board

The hottest graphics cards available today are bursting with 3D features. Here's a rundown.



| | ATI Radeon 9800 XT | nVidia GeForce FX 5950 Ultra |
|-------------------------------------|--------------------|------------------------------|
| Full DirectX 9.0 support | Yes | Yes |
| Pipelines/Texture units | 8 / 1 | 4 / 2 |
| Pixel shader version | 2.0 | 2.0+ |
| Memory interface (width) | 256-bit | 256-bit |
| Maximum full-scene anti-aliasing | 6X | 8X |
| Maximum anisotropic filtering | 16X | 8X |
| Floating-point precision (textures) | 24-bit | 16- or 32-bit |
| Process technology | 0.15-micron | 0.13-micron |
| Core clock | 412-MHz | 475-MHz |
| Memory clock | 730-MHz DDR | 950-MHz DDR |

on the older Radeon 8500 architecture, so it supports only DX8.1 shader technology.

The ATI All-in-Wonder line of cards includes a TV tuner and TiVo-like recording capability. At the high end is the \$400 ATI All-in-Wonder Radeon 9800 Pro, but you can find the entry-level All-in-Wonder Radeon 9000 for under \$100.

nVidia: nVidia's product line starts with the \$70 nVidia GeForce FX 5200 and goes up to the \$450 GeForce FX 5950. Unlike ATI, nVidia does not make its own graphics cards. Instead, it sells its chips to partners such as Leadtek and Abit.

The flagship nVidia GeForce FX 5950 is built on a 0.13-micron process technology. The feature set is essentially identical to that of the older GeForce FX 5900 series, but the core and memory clocks are slightly higher, at 475 MHz and 950 MHz, respectively. Like the 5900, the 5950 requires two slots—the AGP and the adjacent PCI slot—to accommodate the bulky cooling system.

The company also manufactures a line of core logic with integrated graphics for AMD Athlon processors. Dubbed the nForce, nVidia's graphics core offers modest 3D performance and does not support pixel or vertex shaders.

The latest GPUs from both ATI and nVidia can layer many texture effects without compromising image quality. This is because texture data is handled as floating-point data. Previous generations of hardware treated texture data as less precise integer data, even though the internal calculations were done in floating-point format. Today's DX9 chips

support floating-point texture data.

ATI's chips process all texture data in a 24-bit floating-point format, while the nVidia GeForce FX line processes data in either 16-bit or 32-bit floating-point. This difference has created some headaches for software developers. As a result, soft-

ware written for ATI cards often runs slower on nVidia hardware.

The GeForce FX 5700 is a substantial improvement over the GeForce FX 5600 series. nVidia has increased the number of vertex-processing units from one in the 5600 series to three in the 5700. That plus the increased clock rate more than triples the theoretical vertex (geometry) throughput. Cards based on the 5700 also support higher-speed DDR-II memory, substantially increasing overall memory bandwidth. These improvements have raised nVidia's midrange product from an also-ran to a chip that can closely compete with the ATI Radeon 9600 XT.

The nVidia GeForce FX 5200, an entry-level card, can run DX9 applications, but the execution of true DX9 shader programs is often abysmally slow. Think of the 5200 as a "DirectX 8.1+" product. Games that don't require high frame rates, such as some sports games, perform adequately. When it comes to pushing graphics technology forward, the competition between ATI and nVidia is anything but fun and games.

PCI Express: Busting The Bandwidth Bottleneck

Powerful programming tools, operating systems, and GPUs are useless without high-speed interconnections between the CPU, GPU, and memory. Today's graphics cards fit into AGP (Accelerated Graphics Port) slots, with most new systems supporting AGP 8X's data rate of 2.1 gigabytes per second (GBps). (The 8X means eight times the speed of the original AGP standard's 266 MHz—quite slow by today's standards.) AGP Pro is the same as AGP 8X but adds

power delivery capability for some professional graphics cards.

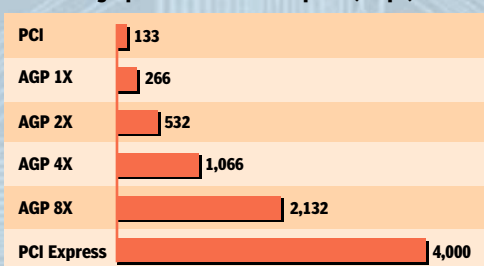
PCI Express will replace both AGP and today's PCI slots with a high-speed serial interface. Future graphics hardware will support 16-lane PCI Express, for an effective data rate of 4.0 GBps. It will also be able to write data back to memory, something AGP doesn't do very well.

These features will open opportunities for games in which complex shader programs need fast access to data in

No More Bottlenecks

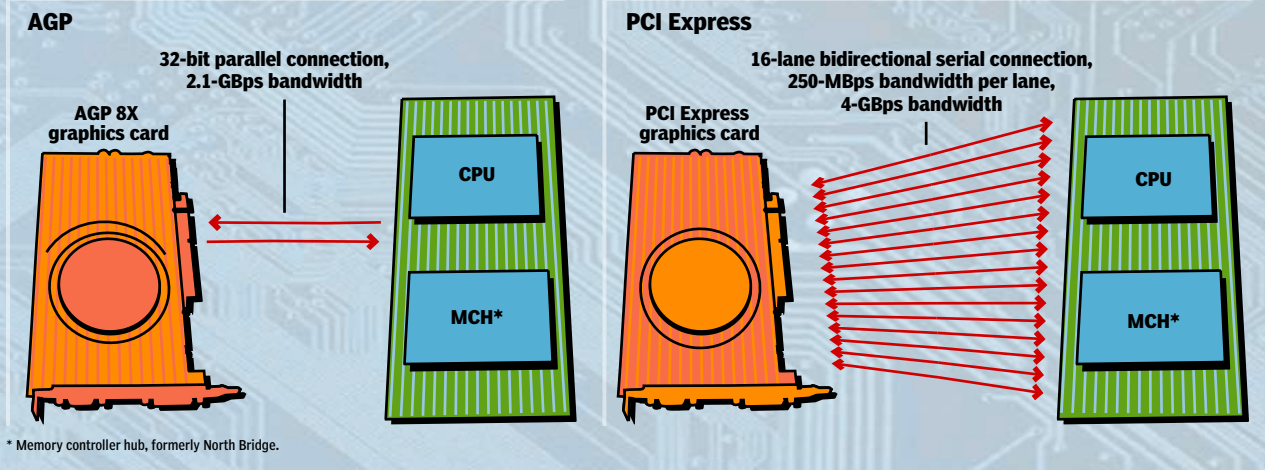
Computer games have come far since 1996, when data on the PCI interconnect between the graphics card and the motherboard still poked along at 133 MBps (theoretically, at least). Soon, data will race through the PCI Express bus at about 4 GBps. That speed boost makes all the difference when you're slaying dragons or infiltrating enemy territory.

Maximum graphics interconnect speed (MBps)



The Fastest Track

The emerging PCI Express interconnect delivers bandwidth at a snappy 4 GBps via 16 pairs of serial connections. The architecture enables data to travel in both directions simultaneously, giving developers more freedom to create complex games. AGP is a parallel connection with lower bandwidth.



system memory. We should see the first PCI Express graphics cards around mid-2004, at the same time PCI Express motherboards are becoming available.

Both ATI and nVidia are working on their next-generation GPUs, which will need the faster throughput and supplied power of the PCI Express bus. This performance boost is necessary because the size and complexity of these next-generation GPUs will only increase.

As the clock speed and performance of next-generation graphics chips increase, so do the power requirements. As a result, the heat output from these chips will also increase, presenting a serious cooling challenge. Next-generation motherboard designs, such as the Intel BTX, will help alleviate this problem.

Memory performance also needs to scale to meet the load that current- and next-generation GPUs are generating. The first DDR-II memory chips are already being used in some graphics cards, and higher-speed DDR is on the way. (With DDR, memory with a physical clock rate of 300 MHz has an effective clock rate of 600 MHz, hence the name *double data rate*.)

A specialized form of DDR memory, called Graphics DDR or GDDR-III, may make its way into some graphics cards before midyear. This type of memory clocks in excess of 500 MHz—effectively 1 GHz, since it's DDR. And when you have that kind of speed, nothing can slow you down.

Just-in-Time Compilation: For Optimal Performance

Computer games need to be not only realistic in detail but also quick in rendering that detail. They don't have the luxury of animated movies, which can take hours to render a 30-second sequence, a process known as *off-line rendering*. (See the sidebar "Finding—and Rendering—Nemo.")

Since the action in a computer game is live, the scenes need to be rendered in real-time at 30 frames per second, minimum. That's where *just-in-time (JIT) compilation* comes into play.

Usually, a game is compiled into the ones and zeros of machine language just once, when the final code for the application is built. But the vertex and pixel shader programs in DirectX are compiled every time a game is played. This lets driver updates include more efficient compilation techniques. Players then get faster, higher-quality graphics with just a driver update instead of waiting for a new version of the title.

Both ATI and nVidia use shader optimization techniques so that the shader program can achieve its maximum com-

putational efficiency. Today's DX9 graphics data is created using floating-point formats, allowing for much greater precision. This is important when the application wants to layer many different pieces of shader code on the same pixel.

DX9 allows for *partial-precision hints*. A game developer can embed these hints in the code to tell the graphics card to use lower precision without altering the look of a scene. This can result in performance increases in some hardware, such as the nVidia GeForce FX series. ATI's GPUs don't use partial-precision hints, which puts them at a slight performance disadvantage relative to the nVidia cards when an application allows for partial precision. Since ATI doesn't support 16-bit floating-point precision, all rendering takes place at 24-bit precision even if the application uses partial-precision hints.

nVidia says it will reduce precision—and speed up performance—only in instances where image quality won't be adversely affected. But the company also goes a step further: nVidia's drivers will substitute different code for the actual

Our contributors: **Loyd Case** is technical director and **Dave Salvador** is senior technology analyst at ExtremeTech. Executive editor **Carol Levin** and associate editor **Jeremy A. Kaplan** were in charge of this story.

shader code the developer used. While nVidia maintains that this won't affect image quality, there are no guarantees.

Additionally, tweaks like these can be somewhat fragile. If a game is patched, or a mod created for a game, it might not work properly with this type of on-the-fly optimization. The result may be incorrectly rendered images. This would require the release of a new driver to patch the problem. There have been reports of compatibility issues with a few game modifications.

The benefit of this technique is faster frame rates, assuming the optimizations create shader code that runs faster than the original code the developer wrote. And most of the time, speed is the name of the game. ☰

REAL-TIME RENDERING:

First shown as a movie that took hours to render, this photo-realistic animation of crystal balls can now be rendered in real time at about 30 frames per second using DirectX 9 and an ATI Radeon 9800 Pro graphics card. Such just-in-time rendering is essential for today's slick computer games. Notice the reflections and shimmering effects, both of which require intensive computation.



ATI RADEON

Finding- And Rendering- Nemo

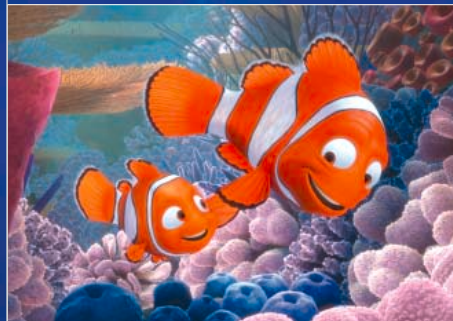


3D animation studios such as DreamWorks, PDI, Pixar, and Sony Imageworks, as well as special-effects houses such as Industrial Light & Magic and Rhythms and Hues, use off-line

rendering to work their magic. Artists and programmers build and animate 3D models, then organize them into individual frames, which are sent to rendering farms of graphics workstations.

The emphasis is on quality, not speed, and the rendering of a single 720-frame, 30-second animation sequence can take many hours to complete. When you stop to consider that a 90-minute movie has nearly 130,000 frames in it, movies that are all CG animation, like *Finding Nemo* and *Shrek*, are that much more impressive. This type of rendering produces a linear sequence that will be exactly the same every time you play it.

Games, on the other hand, use real-time rendering, since the animation sequence depends on what the game player decides to do. In this case, frame rate takes precedence over image quality.



One of the goals of graphics chip developers is to deliver 3D graphics and effects that rival those of big-budget Hollywood movies. This ambition is beginning to materialize in current games like *Splinter Cell* and in upcoming games like *DOOM 3*, *Half-Life 2*, and *S.T.A.L.K.E.R.*

Because of the fundamental differences between real-time and off-line renderers, however, Hollywood will always be a step or two ahead of the games. Vertex and pixel shaders and the flexibility they bring to developers will help close this gap.



I AM JOHNSONVILLE SAUSAGE.

I AM SO MUCH MORE THAN A HOT DOG. I HAVE VISIONS OF BRATWURSTS BEING GRILLED ALL OVER THE WORLD. WHICH MEANS I HAVE TO FILL MORE ORDERS. I HAVE TO TRACK MORE INVENTORY. BUT I WOULD RATHER SPEND TIME PERFECTING MY NEW TOP-SECRET SAUSAGE FLAVOR.



I AM JOHNSONVILLE SAUSAGE WITH EVERY LINK ACCOUNTED FOR.

I AM A CISCO AIRONET 1100 SERIES WIRELESS ACCESS POINT. I CAN USE WIRELESS TECHNOLOGY TO LINK FORKLIFTS TO PALLETS AND PALLETS TO LOADING DOCKS SO INVENTORY CAN BE TRACKED IN REAL TIME. I CAN TURN A FAMILY-OWNED COMPANY INTO A LEAN, MEAN, SAUSAGE-SELLING MACHINE. I AM MORE THAN A CISCO AIRONET 1100 SERIES WIRELESS ACCESS POINT.



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A recent study concluded that employees spend an average of 75 minutes per day using office computers for non-business related activity (surfing porn, gambling, shopping or even searching for sex online). That translates into an annual loss of \$6250 per employee or more than \$300,000 per year down the drain for a company of just 50 employees.

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And unlike many filtering and blocking tools, Spector CNE records everything they do in exact visual detail. So, you have absolute proof that goes way beyond just knowing they visited porn.com.

Take control of employee PC and Internet abuse with Spector CNE. It'll be the best software investment you make this year.

I pass
company secrets
via the web

I surf porn websites
from behind
my cubicle walls

I shop online
after closing
my office door

small-business SECURITY

For cash-strapped, IT-barren companies, all-in-one security appliances offer affordable protection. Here's how to make one work for your network.

BY DAVIS D. JANOWSKI AND OLIVER KAVEN

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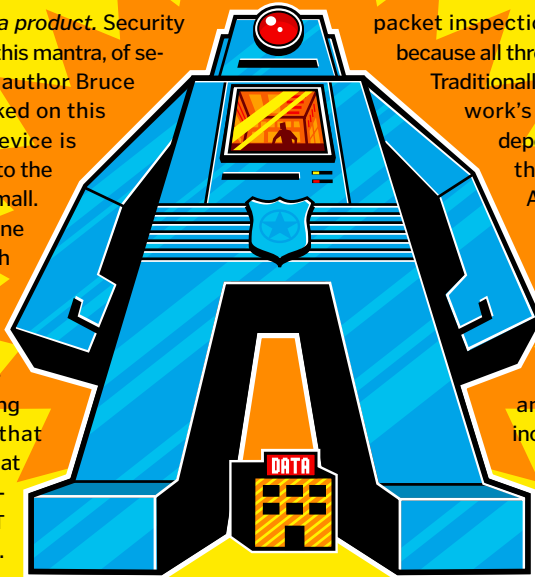
ecurity is a process, not a product. Security experts often referred to this mantra, of security technologist and author Bruce Schneier, while we worked on this story. Their point: No device is going to be the static, bedrock answer to the security needs of a business, large or small.

This certainly applies to the all-in-one security appliances reviewed here. Each combines three key technologies: a firewall and protection from spam and viruses. For some, the idea of appliances implies simple “set-it-and-forget-it” devices, with all-encompassing protection. The reality, however, is that they're more complex than this, and that they're affordable and effective solutions only when combined with IT expertise and enforced security policies.

For small and medium-size businesses that are strapped for cash and have virtually no full-time IT staff, an all-in-one appliance is one of two affordable and relatively simple security options. The other is outsourcing security services entirely. Businesses that don't want any of the headaches involved with protecting their networks themselves should consider outsourcing. For more on this, see the sidebar “Managed Security Services” on page 119.

Appliances put more of the responsibility on you, but some businesses just don't want to leave their network security in the hands of an outside source. Appliances range in price from \$1,000 to \$5,000, are easy for qualified consultants or VARs to set up, and are relatively simple to manage and update over time. And when you pick an all-in-one solution, you have only a single manufacturer to deal with, rather than three.

There are many types of security appliances, but for this story we chose only ones that contain the triad of services—a stateful



packet inspection firewall, antispam, and antivirus—because all three are necessary to offer true protection. Traditionally, a firewall was the tool to insure a network's security. But with the explosion of dependence on both the Internet and e-mail, the firewall can no longer go it alone. A firewall has to be combined with other tools to keep malicious content and attacks out of your network.

WHAT APPLIANCES DON'T HAVE

Predictably, a few trade-offs come with the attractive price of these appliances. For one, the three components included in a device aren't always best-of-breed. To remain competitive and affordable, these products' manufacturers have sometimes either developed the key applications themselves or acquired less expensive alterna-

tives to what enterprises might use to protect their networks.

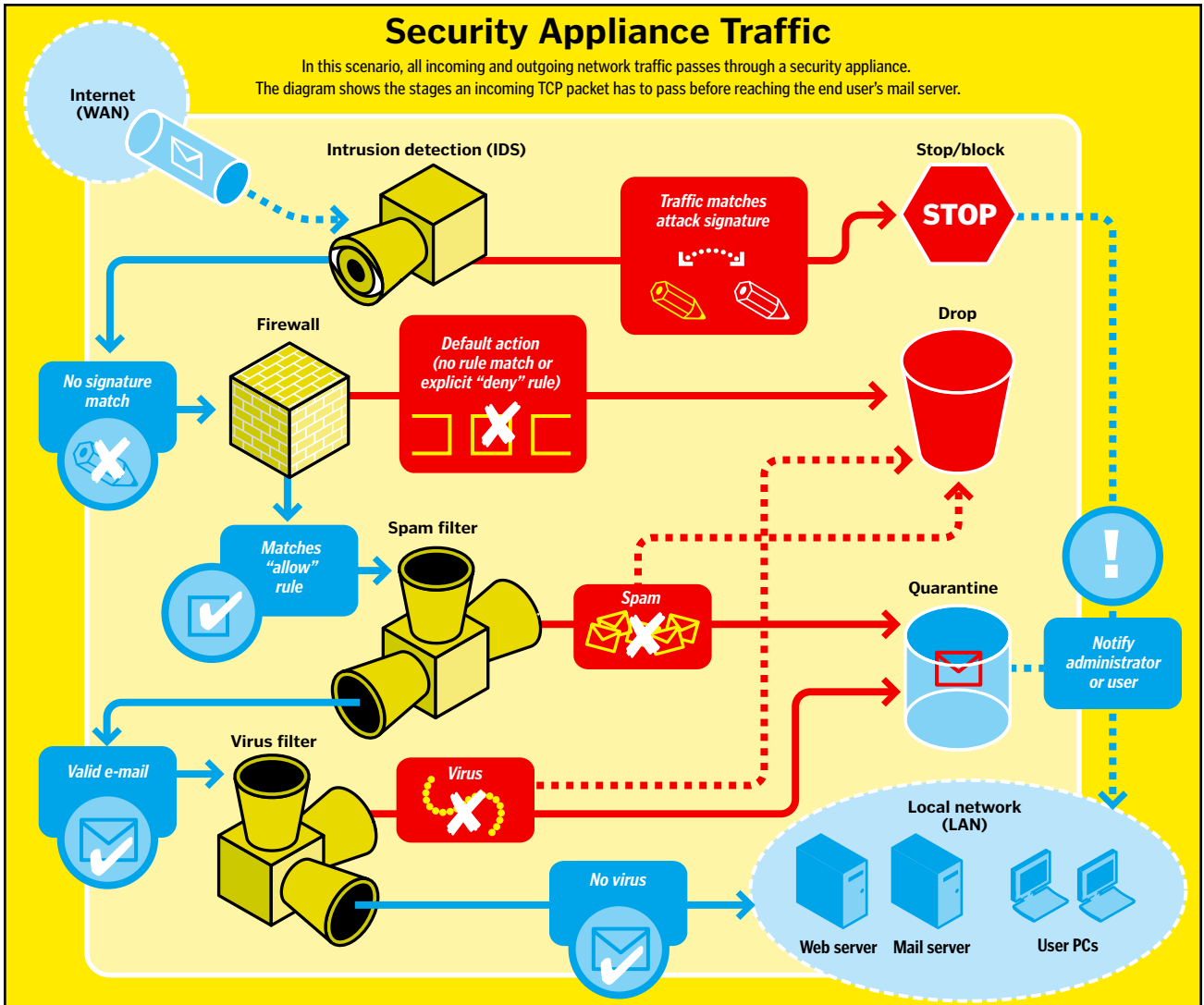
The various functions also have been configured to run on their own, straight out of the box, something IT security professionals are less than enthusiastic about. Because situations vary from business to business, depending on security policies and employees' needs and work environments, the built-in configurations likely won't work for everyone and will need to be tweaked.

Finally, with all three components (firewall, antispam, and antivirus) in one place, such a device becomes a single point of failure. If, say, the device's WAN port goes down, all three services are unavailable. To guarantee uninterrupted service, you would need to choose a higher-end device that supports failover—or have a second identically configured appliance in the closet. But if you choose to go with any of the products in this roundup, for complete redundancy you would need two devices, which may not be an option for small companies with tight budgets.

REVIEWED IN THIS STORY 114 Barbedwire Minesweeper 100 ●●●●● 117 Fortinet FortiGate 60 ●●●●● 117 Multi-Tech RouteFinder Internet Security Appliance ●●●●● 118 ServGate EdgeForce ●●●●● 120 Symantec Gateway Security 5420 ●●●●● 115 Scorecard 116 Summary of Features 118 Expertise Required 119 Managed Security Services

Security Appliance Traffic

In this scenario, all incoming and outgoing network traffic passes through a security appliance. The diagram shows the stages an incoming TCP packet has to pass before reaching the end user's mail server.



JUST ONE PIECE OF THE PUZZLE

You get what you pay for. And as long as you've properly configured it to match your environment, an all-in-one security appliance should adequately keep your network secure. It certainly will keep the network more secure than not having any security, or relying on a NAT (Network Address Translation) router for protection. Just make sure you also have enough in your budget to cover the costs of a competent consultant or VAR—preferably one with significant security expertise in addition to network experience—to configure, manage, and maintain the device.

One last point to keep in mind: Any security solution should be

accompanied by a clear set of security policies set by your company. These policies vary, from prohibiting Internet downloads, for example, to establishing standards on password creation, and they can go a long way to ensuring that your hardware meets the real-world needs made on your network. The SANS (SysAdmin, Audit, Network, Security) Institute is a great resource for getting started creating policies (www.sans.org/resources/policies).

Following are reviews of five security appliances meant for small to midsize businesses. We've selected products that can accommodate the basic Internet security needs of companies with 100 employees or fewer, though a couple of them can certainly handle more.

MORE ON THE WEB

Log on to pcmag.com for more reviews, news, and opinions.

Our contributors: Associate editor **Davis D. Janowski** and PC Magazine Labs project leader **Oliver Kaven** were in charge of this story.

ALL REVIEWS BY OLIVER KAVEN

Barbedwire Minesweeper 100

\$4,995 direct. Barbedwire Technologies, www.barbedwires.com. ●●●●●

The Barbedwire Minesweeper 100 is the most configurable unit in this roundup, and its feature set is wide-ranging. Those who manage basic networks and want a largely hands-off solution would probably be overwhelmed by this product; the ServGate or Fortinet appliance might be

more their speed. But for those anticipating growth to their businesses and in turn their networks, the Minesweeper is a solid choice.

Barbedwire has done a consummate job engineering a device that blends open-source and commercial applications, all of them controlled from a single sophisticated interface. The box's intricate network and security services include content and spam filtering, virus protection, intrusion detection, and flex-

ible routing capabilities.

Initial access to the device is provided via an SSL-capable browser and requires only the adjustment of a local workstation's IP address to match the Minesweeper's factory default. Once logged into BW-Tracker, the Web-based user interface, you have a choice among three levels of depth (or expertise) when using the configuration menu—an intelligent option.

The Basic level is the default; it allows access to the minimal options necessary for building a simple, working system. The Advanced and Expert settings ratchet up the number and scope of options available on the submenus to include system-level functions.

A basic unit setup provides for configuration of three physical interfaces and numerous virtual Ethernet interfaces. Once a default gateway is configured, the basics are complete. Configuring the remaining components is significantly more involved, though.

The included stateful packet inspection firewall is configured with default routes that allow Internet access for client PCs attached to the internal Ethernet interface. The device can also be configured to handle more complex environments.

The Minesweeper allows for packet-level fine tuning. Route verification via

ServGate EdgeForce



Our mission in this story was to find a small-business security appliance best suited to the needs of an organization with no more than 100 employees. It had to provide an SPI firewall, along with antispam and antivirus services, and demand just a modicum of required IT expertise to set it up and maintain it—all at a reasonable price. A tall order!

Though we found no silver bullet among the five products we reviewed, the ServGate EdgeForce provides the most balanced trade-offs. It presents an evolved and capable firewall and combines that with a mature antivirus package. And while we have yet to discover a panacea in terms of antispam, the included solution is the simplest to set up among those reviewed.

Two other products stand out but may be overkill for our target audience. Both the Barbedwire Minesweeper 100 and the Symantec Gateway Security 5420 provide comprehensive feature sets that go far beyond the three key technologies we required. A 100-person company or larger that is on a trajectory for steady growth and has full-time IT staff will find either of these products capable of filling the security bill now and into the future.

reverse path filtering can be enabled to catch spoofed packets that do not belong on your network. And you can log these packets to your syslog server.

Within the content-filtering section you'll find controls for most of the available security applications, including antispam, antivirus, and Web filtering.

The Minesweeper can be configured to work as either a mail relay or a final-destination mail server. The latter is an option only for smaller businesses with

mail loads of reasonable size. If your mail volume causes CPU and memory constraints on the appliance, you are better off configuring a forwarding relay.

The appliance uses the spam-filtering engine SpamAssassin, from McAfee, with its threshold-based system. This permits the administrator to assign a cutoff level, which classifies an e-mail as spam once a number of criteria are met. The Minesweeper also provides a blacklist/whitelist system to include or exclude

SCORECARD



The rating for **deployment and initial setup** reflects all the steps needed to integrate the appliance into an existing or new network infrastructure. For **network integration**, we weigh the device's ability to integrate seamlessly into different scenarios; this includes gateway functions, available network topologies, and remote VPN connectivity.

Basic configuration involves the complexity of the tasks needed to set up core components and essential services on the device. For **advanced configuration** we evaluate the features and capabilities that aid in setting up more complex

network functions and custom security tasks. The **management interface** rating reflects the interface's overall ease of use. Alternative device access methods such as SSH and serial-port connections also factor into this rating.

The **ongoing firewall, antispam, and antivirus management** ratings reflect whether the system provides a practical platform for performing everyday tasks in each category; effectiveness of antispam and antivirus handling and queue and quarantine management play a significant role as well. Finally, the **overall** rating is not an average but an aggregate based on analysis by PC Magazine Labs staff and reviewers.

| | Deployment and initial setup | Network integration | Basic configuration | Advanced configuration | Management interface | Ongoing firewall management | Ongoing antispam management | Ongoing antivirus management | Logging and reporting | OVERALL |
|---|------------------------------|---------------------|---------------------|------------------------|----------------------|-----------------------------|-----------------------------|------------------------------|-----------------------|---------|
| Barbedwire Minesweeper 100 | ●●● | ●●●●● | ●●● | ●●●●● | ●●● | ●●●● | ●●● | ●●● | ●●●●● | ●●●● |
| Fortinet FortiGate 60 | ●●●●● | ●●●● | ●●●●● | ●● | ●●●● | ●●●● | ●●● | ●●● | ●●●●● | ●●● |
| Multi-Tech RouteFinder Internet Security Appliance | ●●● | ●●● | ●●● | ●●● | ●● | ●●● | ●● | ●●●● | ●●● | ●●● |
| ServGate EdgeForce | ●●●●● | ●●●● | ●●●●● | ●● | ●●●● | ●●●● | ●●●● | ●●● | ●●● | ●●●● |
| Symantec Gateway Security 5420 | ●●●● | ●●●● | ●●● | ●●●● | ●●● | ●●●● | ●●● | ●●●● | ●●●●● | ●●●● |

RED denotes Editors' Choice.

SUMMARY OF FEATURES

Small-Business Security Appliances

Download this table at
www.pcmag.com.

| ■ YES □ NO | Barbedwire Minesweeper 100 | Fortinet FortiGate 60 | Multi-Tech RouteFinder Internet Security Appliance | ServGate EdgeForce | Symantec Gateway Security 5420 |
|---|-------------------------------|-----------------------|--|--------------------|-----------------------------------|
| Direct price, with spam and virus control for 50 users | \$4,995 | \$995 | \$4,998 | \$3,995 | \$7,165 |
| GENERAL | | | | | |
| System OS | BT SecOS 2.4 | FortiOS 2.8 | Linux | Linux | Linux |
| Network ports | Three 10/100 | Seven 10/100 | Three 10/100/1000 | Two 10/100 | Six 10/100/1000 |
| Unit is rack-mountable/can be configured for failover | ■ ■ | □ ■ | ■ □ | ■ ■ | ■ ■ |
| MANAGEMENT AND INTERFACE | | | | | |
| Management access via console/HTTPS/SSL | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ | □ ■ ■ | ■ ■ ■ |
| Network diagnostics tools in GUI | ■ | ■ | ■ | ■ | □ |
| Includes DHCP/DNS server | ■ ■ | ■ ■ | ■ ■ | □ ■ | □ ■ |
| Firmware can be updated through GUI | ■ | ■ | ■ | ■ | ■ |
| System configuration can be downloaded/restored | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ ■ |
| Time synchronization via NTP | ■ | ■ | ■ | ■ | ■ |
| SPAM FILTERING | | | | | |
| Incoming/Outgoing | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ ■ |
| IMAP4/POP3/SMTP | ■ ■ ■ | ■ ■ ■ | □ □ ■ | □ ■ ■ | ■ ■ ■ |
| Scans text/HTML | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ ■ |
| By keyword in subject line/in message body | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ □ |
| Message format/header analysis | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ ■ |
| Word proximity analysis | ■ | □ | ■ | ■ | □ |
| Blacklist/whitelist for e-mail domain | ■ ■ | ■ ■ | ■ ■ | □ □ | ■ ■ |
| Blacklist/whitelist for IP | ■ ■ | ■ ■ | ■ ■ | □ □ | □ □ |
| RBLs/Reverse DNS lookup | ■ ■ | ■ ■ | ■ ■ | □ □ | ■ ■ |
| SPAM HANDLING | | | | | |
| Messages can be quarantined/blocked/marked | ■ ■ ■ | □ ■ ■ | ■ ■ □ | ■ ■ ■ | □ ■ ■ |
| Quarantined messages can be forwarded to recipient | ■ | N/A | ■ | □ | N/A |
| Notification to sender/recipient | ■ ■ | ■ ■ | □ □ | ■ □ | □ □ |
| Spam settings systemwide or per user | Systemwide | Systemwide | Systemwide | Systemwide | Systemwide |
| VIRUS PROTECTION | | | | | |
| Incoming/Outgoing | ■ ■ | ■ ■ | ■ ■ | ■ □ | ■ ■ |
| IMAP4/POP3/SMTP | ■ ■ ■ | ■ ■ ■ | □ ■ ■ | □ ■ ■ | ■ ■ ■ |
| FTP/HTTP | ■ ■ | ■ ■ | □ □ | ■ ■ | ■ ■ |
| Infected files can be cleaned/deleted/quarantined | ■ ■ ■ | □ ■ ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ □ |
| Quarantined messages or files can be forwarded to recipient | □ | ■ | ■ | □ | N/A |
| Notification to sender/recipient | ■ ■ | ■ ■ | ■ ■ | □ □ | □ ■ |
| FIREWALL | | | | | |
| Stateful packet inspection | ■ | ■ | ■ | ■ | ■ |
| NAT route mode/Flat network mode/Bridge | ■ ■ □ | ■ ■ ■ | □ ■ □ | ■ ■ ■ | ■ ■ □ |
| Protects against SYN attacks/UDP and ICMP floods | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ ■ |
| Firewall activity can be scheduled | □ | ■ | □ | ■ | ■ |
| User authentication locally/through LDAP/through RADIUS | ■ □ □ | ■ ■ ■ | ■ □ ■ | ■ ■ ■ | ■ ■ ■ |
| VPN | | | | | |
| IPsec/PPTP | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ □ |
| Simultaneous tunnels supported | IPsec, 1,000; PPTP, 100 | 100 | 100 | 30 | 1,000 |
| Supports IKE with certificate/with preshared key | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ ■ |
| LOGGING AND REPORTING | | | | | |
| Logs activity for spam/antivirus/VPN | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ |
| Logs general traffic/system events | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ ■ ■ |
| Reports are live/downloadable | ■ ■ | ■ ■ | ■ ■ | □ ■ | ■ ■ |

RED denotes Editors' Choice. N/A—Not applicable: The product does not have this feature.

recipients from filtering altogether.

What we like most about the Minesweeper's handling of spam is the ability not only to delete or reject it but also to quarantine it by putting it in a separate queue for examination. And individual users can examine their own spam queues and determine the validity of individual e-mails—a unique and indispensable ability. Setting this up, however,

is no small feat. Barbedwire uses an open-source application called SquirrelMail for Web-based access to regular e-mail or quarantined spam. Administrators have to configure individual user accounts to make spam review available to them.

Web content filtering is provided by Cerberian, a subscription-based service that relies on a database of millions of categorized URLs. Administrators can

also set up remote access via an IPsec PPTP VPN with preshared keys.

The Minesweeper's antivirus engines include both a commercial product from Sophos and the open-source Clam Anti-Virus. Two other technologies based on open-source software are also included: Snort, with a customized Web-based GUI, for intrusion detection and Nessus for vulnerability assessment.

The Minesweeper is the only device that provides a context-sensitive, hyper-link-enabled help system—something all the appliances ought to have. Automated backup capabilities for your configuration files, built-in DHCP and DNS servers, and Tripwire file protection are other notable perks.

The many features and configurability of this product are no doubt impressive, but these are the very factors that take the product beyond the classic definition of an appliance; it is not a device that can be easily dropped into a network. If the sophisticated features interest you, just be willing to spend some time setting them up.

Fortinet FortiGate 60

\$995 direct. Fortinet Inc., www.fortinet.com.



Fortinet's product is a standout for a few reasons. First, it is physically the smallest device in our roundup (about the size of a home router). This is due mostly to its using ASICs—specially designed integrated circuits—to carry out its functions rather than relying on a hard drive as all the other products do. It is also by far the least expensive of the products reviewed.

The Fortinet FortiGate 60, however, is not a standout in terms of features. While

IP settings to that of the FortiGate, you can easily access the intuitive, responsive, and secure Web configuration interface.

Configuring your firewall comes next. Here you are presented with a set of pre-configured and customizable common service entries for IP, TCP, UDP, and ICMP traffic. Fortinet's developers have added a convenient feature for developing your firewall's rules: Content Profiles.

Using the profile settings, you can determine what level of scrutiny you want to apply to the traffic passing through the device. For instance, you can decide whether virus scanning, Web content, or script checks should be applied. This enables you to designate, for example, that traffic originating from a trusted external host does not have to be scanned for spam but only for viruses.

Since the device does not include a hard drive, quarantining suspicious files or e-mail is not possible; this severely limits the unit's spam-filtering capabilities. In addition, Fortinet's approach to spam filtering is laborious.

Rather than inspecting incoming and outgoing mail based on the format or other characteristics that might identify the content as spam, Fortinet deploys several manual filtering mechanisms, including the content block and block list.

With the content block, administrators can manually create filters for keywords such as *Viagra* or *mortgage*; these words will trigger the filters, and the e-mail will be tagged with an identifier in the subject line. Or the block list can be used to

match predefined strings against e-mail headers to identify spam based on sender or domain information. Besides being labor-intensive to set up, these approaches are far less effective in catching a lot of today's spam.

Fortinet's antivirus engine, on the other hand, is impressive. Protection for FTP, HTTP, IMAP, POP3, and SMTP traffic is ensured by examining the content stream based on virus signatures, file size thresholds, and block patterns. The antivirus engine supports common compression formats up to 12 layers deep and differentiates among file types. Administrators can also set limits on the allowed file size

for each type of traffic.

We were pleased to find that Fortinet pushes updates for its antivirus and attack definition databases out to its device—the only manufacturer to do so. All the latest updates are installed with-



D Multi-Tech RouteFinder Internet Security Appliance **E** Symantec Gateway Security 5420

out having to schedule updates when a new threat emerges. Other impressive tools include a network intrusion engine that offers comprehensive protection from syn floods, port scans, buffer overflow weaknesses, and many other types of attacks. Administrators can even upload custom signature lists.

Finally, the FortiGate provides a built-in four-port switch in addition to its two WAN ports and DMZ port. This provides you with connectivity for servers or other network devices that you cannot place behind a firewall.

For small companies that can accept its required labor and limitations, the FortiGate can offer solid protection on the cheap.

Multi-Tech RouteFinder Internet Security Appliance

\$4,998 direct. Multi-Tech Systems Inc., www.multitech.com. ●●●●●

Multi-Tech Systems' product is second only to that of Barbedwire in complexity. Although we like its feature set, the device is not as well-rounded, and its interface is sometimes confusing.

As the name implies, the Multi-Tech RouteFinder Internet Security Appliance (we evaluated the model RF760VPN) is used in a routed network configuration. Unlike the Fortinet and ServGate devices, the RouteFinder does not offer a transparent mode, meaning it cannot be simply configured as a network bridge. But with a knowledgeable IT hand it can be easily adapted to almost any routed environment, including LAN-to-LAN connections for branch offices and remote-client connections via VPN.



A Fortinet FortiGate 60 **B** ServGate EdgeForce **C** Barbedwire Minesweeper 100

the ASIC-based architecture makes the unit less vulnerable to failure (no moving parts), it also limits the feature set.

While the overall device and most of its components are fairly easy to deploy, its spam filtering can be time-consuming to configure. And the product generally lacks some of the flexibility found in its competitors, the most critical aspect being the ability to quarantine attachments or files.

Installation is pretty straightforward. Once you've adjusted your workstations'

Expertise Required

SIMULATING A TYPICAL SMALL-BUSINESS ENVIRONMENT

The focus of our testing was the setup, installation, configuration, and ongoing management of the security appliances. We deployed each unit in our test network and went through the same installation and configuration tasks that any IT administrator in a small or medium-size business would.

Our network consisted of four servers and two workstations, including an Apache-based Web server and a Courier Mail-based SMTP server. We used Courier IMAP and SquirrelMail for users' mail access.

Our DNS servers were running Bind 9. We configured each appliance firewall to allow all traffic outbound and to accept connections for the above-mentioned services inbound.

TRADE-OFFS AND ROOM FOR IMPROVEMENT

None of the appliances is perfect; achieving a balance between ease of use and strong protection is a tall order in any circumstances. And attaining maximum protection in a

particular area can be technically challenging.

We were surprised that not one device includes a pre-configured spam quarantine facility that is sortable or searchable. The Barbedwire Minesweeper 100 is the only unit to provide such flexibility—but only with significant configuration. In the real world, this can mean an unacceptable workload for the administrator, especially one who is assigned the task of locating a valid e-mail the device may have stopped. Given a moderate volume of 200 spam messages a day, at the end of one week an administrator would have to weed through 1,400 e-mails to locate a single message. Imagine the burden on a staffer or consultant! Ideally, users should be able to control their own spam mail queues, which should reside on an outside server or gateway device, not on the company's internal mail server.

Overall, we are impressed with the appliances' firewall and antivirus capabilities. Three of the five appliances can both clean and quarantine infected files. And all the appliances provide advanced features allowing administrators to create rule sets that are significantly less cluttered and easier to read. The Barbedwire and Symantec products are extremely flexible in this regard.—*Analysis written by Oliver Kaven*

A Web-based setup wizard, accessible once you adjust your workstation's IP address to match that of the RouteFinder, is used to configure your basic LAN and WAN settings and provide a default security policy for allowing internal hosts access to the Internet.

The subsequent tuning of your network interfaces (LAN, WAN, and DMZ) is simplified by the included group configuration capabilities. This in turn makes configuring more complex firewall packet filters easier and your list of firewall rules less cluttered. The RouteFinder also includes preconfigured service entries for most common network services.

POP3 and SMTP virus protection is provided by Kaspersky Labs antivirus software, and affected mail is quarantined. The system can be configured to inform the sender, recipient, or administrator via e-mail if a virus is detected.

The product uses McAfee's spam-filtering engine SpamAssassin as part of the integrated Qmail mail server; it can be used to perform checks of blacklists. The spam engine also provides a null check option that prevents the relaying of e-mail that does not contain a sender address. Another feature, reverse DNS checks, tries to resolve the domain name part of a sender's e-mail address and relay the e-mail only when the device receives

a matching answer. This option, however, can lead to many false positives.

Additional message filtering is provided by an attachment-blocking option that blocks specified file types and pattern checks in the address, subject, or body of an e-mail. IT administrators or consultants proficient in building creative pattern match expressions using wildcards can customize the device's filtering ability.

Unlike ServGate's unit, the RouteFinder gives administrators the handy option of forwarding any quarantined mail to any user with the click of a button. Yet finding the right mail to forward can be a challenge; neither the spam quarantine nor antivirus queue can be sorted or searched. With spam volumes reaching hundreds of messages a day, finding one false positive can be an almost impossible task.

The RouteFinder includes a very capable intrusion detection engine, which by default can detect many types of attacks on your network including DOS attacks, buffer overflow attacks, port scans, and DNS attacks.

In addition to its IDS system, the RouteFinder deploys four proxy servers. The HTTP proxy provides filtering for Web site banners, JavaScript, and cookies by default. Aside from building a blacklist of forbidden URLs—a tedious undertak-

ing—administrators can create a whitelist and allow users access to only a handful of Web sites, a handy feature for companies that merely need access to a few B2B sites.

A socks proxy server with user authentication options and a DNS proxy are also available, making the RouteFinder a good option for those who want to connect application servers. The built-in SMTP proxy is also very easy to configure and accepts mail for multiple domains, with the ability to create individual SMTP routes for the responsible mail servers.

A final feature we like is the online help system, which is context-sensitive on a configuration page level.

Overall, the RouteFinder has considerable potential because of its many configurable options. We just wish the interface made it easier for administrators to take advantage of those options.

ServGate EdgeForce

\$3,995 direct. ServGate Technologies Inc., www.servgate.com. ●●●●●



The ServGate EdgeForce impresses us with its simple configuration and fully featured spam filtering and virus control. Because of this, and because the product's well-integrated services are easy for small businesses to use, it earns our Editors' Choice.



Both the spam-filtering and antivirus engines are provided by McAfee and are available as add-ons to the EdgeForce base unit. Although the spam-filtering component, SpamAssassin, is included in other appliances we reviewed, the EdgeForce's version is the easiest to set up and use, because the configuration options are pared down. Still, as straightforward as the EdgeForce is, it needs an experienced IT administrator or consultant to configure it.

Setup is fairly simple. After providing your management workstation with an IP address on the same subnet as the EdgeForce's default IP, you can complete the configuration via the Web interface. The second step is to choose the device's operational mode, whether NAT (Network Address Translation) routing mode or transparent mode.

In NAT routing mode, your internal network is typically configured in a private IP address space, and the EdgeForce's external interface has a public IP address with access to a gateway on your ISP's network. In this mode, network traffic is routed through the EdgeForce by translating internal IP addresses to the one valid external IP address.

Using transparent mode, you can just drop the unit into any existing network, without having to change routing or IP configurations. The EdgeForce can even handle a flat network configured with static IP addressing. This also allows the device to be set up on a private departmental LAN, inside an existing firewall.

After the initial setup is complete, you can start with the more intricate part of the configuration. The EdgeForce's Web-based interface is reached via secure HTTP and is easy to navigate.

You can assign names to IP addresses for both the internal and external network interfaces. These address entries can be grouped and then used in configuring the stateful packet inspection firewall policies. A database of existing standard network protocols and services helps speed the process of configuring policies as well.

Configuring the antispy engine is no more difficult. SpamAssassin examines incoming or outgoing POP3 or SMTP mail, depending on the selected mode of operation. In the Advanced Settings section, you can set a threshold level the system should use when identifying spam.

SpamAssassin works by assigning scores to characteristics of suspected

Managed Security Services

If your small business doesn't have full-time IT support staff, and you'd feel safer asking a specialist to handle security than tackling it on your own, consider outsourcing security to a *managed security service provider* (MSSP). MSSPs can provide a variety of services, such as firewall and VPN, content filtering, spam filtering, virus protection, and intrusion detection/prevention services.

Consolidation and acquisitions in the MSSP market these past few years have enabled providers such as AT&T, Cable & Wireless, and Level 3 Communications to build comprehensive offerings. This kind of plan may be easiest to implement, because the same source provides all Internet security services.

Trust is the most important criterion for selecting an MSSP, since you are giving away the keys to your networked kingdom. Your provider must help you determine the proper security policy and then implement it correctly and promptly. You should fully understand the process of security policy updates and the service commitments being promised. You should also evaluate the security of the provider, because that could potentially affect the privacy and security of your network and corporate data. Ask the provider for documentation of its security measures, policies, and procedures. You may even want to search the Internet for any news related to breaches of its security.

THE RANGE OF OFFERINGS

Many small businesses elect to have an MSSP secure the perimeter between their networks and their Internet links. The MSSP is usually responsible for firewall installation, management, and round-the-clock event monitoring. Most MSSPs, such as Genuity, Guardent, and TruSecure, can install *customer-premise equipment* (CPE) firewalls. AT&T and ClearPath also offer network-based firewall services, in which you don't have

to buy a CPE firewall but rely on equipment the MSSP has on its side of the network connection. Although this may be the easier option, you should be aware that you will almost certainly be locked into a multiyear contract.

Managed antivirus services can take various forms, from desktop scanning to scanning hosted e-mail and network traffic before it leaves the ISP network, or relying on CPE gateway devices. All solutions should present the small business with a central management console to be used for configuration, software updates, policy enforcement, and recovery of quarantined files and messages. The frequency of virus definition updates can also be a key factor in selecting a provider.

If you outsource your e-mail, you may be able to add spam filtering to your existing contract (for a fee). If you are about to begin outsourcing your e-mail, make sure that potential providers offer antispam features, like those offered by BlueTie Business, Critical Path, and Sprint. If you host your own e-mail server, or if your e-mail service provider does not offer acceptable spam-filtering services, check out the companies that specialize in such services, such as Brightmail and Postini.

POTENTIAL COSTS

Because each business's needs and existing infrastructure vary so significantly, it's tough to estimate what an MSSP might cost. Consider the following a very basic frame of reference. For a company with 50 employees, MSSP TruSecure quoted us a fee of \$1,500 a month for a managed firewall, plus another \$100 a month for an e-mail firewall that filters out spam and viruses. That's \$19,200 a year.

Given the costs of this hypothetical example, you might conclude that buying a security appliance is a no-brainer. But keep in mind that on top of the price of an appliance, in all likelihood you'll need to pay a consultant to set it up and maintain it.



spam mail. These range from malformed headers to the use of embedded code meant to identify the recipient. When an e-mail's scores surpass the selected threshold, it is identified as spam and can be either blocked, quarantined on the device itself, or tagged in the subject line as "***SPAM**" and forwarded.

Forwarding tagged mail to the intended recipient would require every user to create rules on his or her e-mail client to collect the tagged mail in a dedicated folder. Forwarding such tagged e-mail to a dedicated administrative e-mail account highlights the device's shortcoming of not having a sortable or searchable quarantine queue. Both forwarding scenarios, however, will ultimately pass the spam e-mail on to the internal mail server, which is fundamentally undesirable. We would have preferred to see an individual spam quarantine queue for each user on the device. This would let users control their own spam, with less reliance on the administrator to recover false positives, and would relieve the company's e-mail server.

Despite these shortcomings, the EdgeForce's spam solution is the easiest to configure and the most effective among the products we reviewed.

The EdgeForce antivirus engine scans SMTP, Web-based e-mail, and even FTP files, using a signature database in conjunction with an attachment blocker. A virus-infected item can be cleaned or deleted, with the option to quarantine it should the cleaning be unsuccessful.

We are impressed that the EdgeForce provides Web caching and filtering, encompassing both internal block lists and the integration of Websense as a filtering service. This can increase employees' productivity and considerably relieve your Internet connection by keeping a lid on Web surfing you deem inappropriate.

An integrated VPN offers IPsec and PPTP connectivity options, using either an IKE or RSA remote-public-key infrastructure for the VPN's IPsec portion.

All in all, the EdgeForce is a hearty, well-organized product that neatly integrates all traffic-filtering components into one security appliance.

Symantec Gateway Security 5420

With 50-node license and 1 year maintenance, \$7,165 direct. Symantec Corp., www.symantec.com.



The Symantec Gateway Security 5420 is similar in scope to the Barbedwire Minesweeper 100, providing tremendous flexibility and scalability but with significantly more polish (and a bit more in the price tag—\$2,170 more). If you expect substantial growth or have a complex small or midsize business network, and you also have an administrator or consultant with significant security knowledge at your disposal, consider the 5420.

The rack-mountable unit is the largest appliance in our roundup and has six physical Ethernet ports on the back and an LED display accompanied by a six-button keypad on the front bezel. Unlike with any of the other products, when configuring the unit for the first time you can assign an IP address using the keypad and retrieve the initial, randomly generated password from the display. You can also use the panel to reboot, shut down, or reset the device to factory defaults.

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Once the IP address is set, all subsequent configuration tasks are performed through SGMI (Secure Gateway Management Interface), a Java applet running in a secure Web browser connection. For administrators who want to configure multiple 5420 devices from one console, Symantec provides a centralized management option through SESA (Symantec Enterprise Security Architecture).

If you are logging on to the management interface for the first time, a wizard prompts you to complete a few basic configuration tasks. These include specifying licensing information, IP address settings for all interfaces you have connected, gateway and time zone settings, and the creation of default policies for FTP, HTTP, and SMTP traffic. You can also choose which system features you wish to enable (VPN, antivirus, load balancing, and so on). The wizard then helps you write the appropriate firewall rules to accommodate your requirements. This is very convenient and can be completed even by inexperienced IT administrators, but matters get significantly more complicated from here.

The main configuration interface separates the unit's configurable options into five categories: Policies, Location Set-

tings, System, Monitoring, and Reports. Each of these hosts a complex structure of configuration pages with a tremendous number of options.

We understand that integrating all of these options into one interface is a big challenge. But we often found ourselves searching for a particular configuration screen, and this can quickly grow tiresome.

The Policies and Location Settings sections are where administrators will spend most of their time, because these sections provide access to network- and traffic-specific configurations. Here administrators can establish *network entities*, which can define hosts, groups of hosts, domains, or subnets. Any entity can later be used in the Policies section to define a source or destination for network traffic.

NAT support comes in two forms: dynamic NAT and static one-to-one NAT. Administrators can define NAT pools—groups of replacement IP addresses, which can then be used with tunneled or non-tunneled connections. One especially noteworthy feature is the H.323 Alias function. This allows the 5420 to support audio and video applications such as Microsoft NetMeeting by locating the hidden address of an H.323 destination node with-

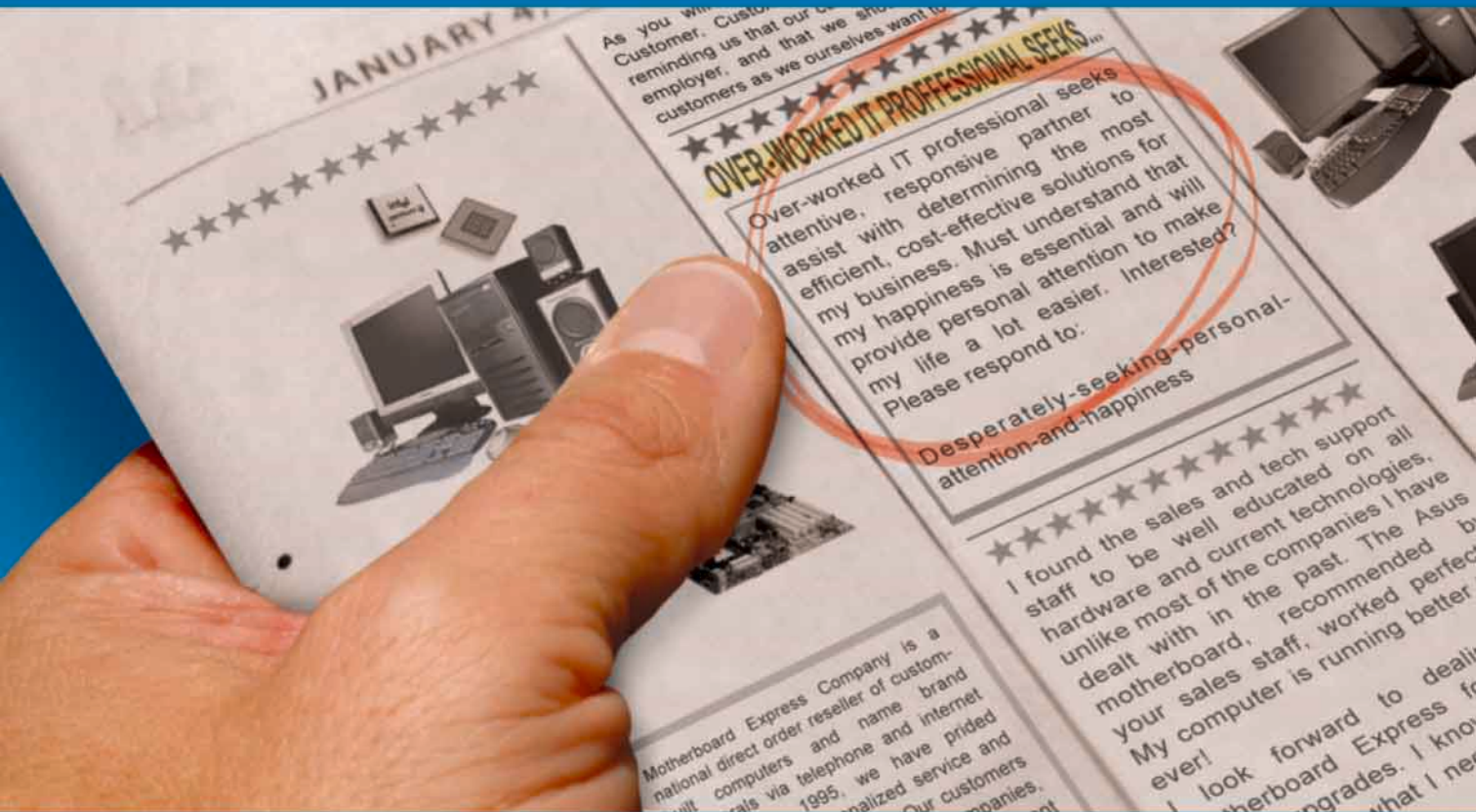
in a packet. It's a nifty feature if you rely on Internet communications protocols.

LiveUpdate is also part of the 5420. Much like Symantec's desktop security software, it lets the 5420 run scheduled updates of the antivirus signature files and content-filtering database by logging on to the Symantec update site.

Rules in the Policies section, in conjunction with proxy settings, are used to control spam entering your network. We are surprised, however, that the product's spam abilities lack the depth of configurability options found in most other parts of the system. In fact, most of the spam-filtering options require the administrator to define attachment names, domains, or patterns manually, a method of spam control easily outpaced by today's volume of spam. We are also disappointed that the 5420 does not allow quarantining of spam or virus-infected files, a feature that should be included in an otherwise well-rounded security appliance.

Overall, the 5420 is an extremely multifaceted if complex device that can be integrated into almost any network environment with the help of security professionals. But it's best suited for medium-size or enterprise businesses. ■

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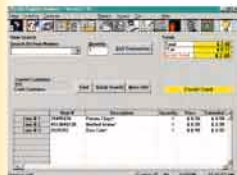
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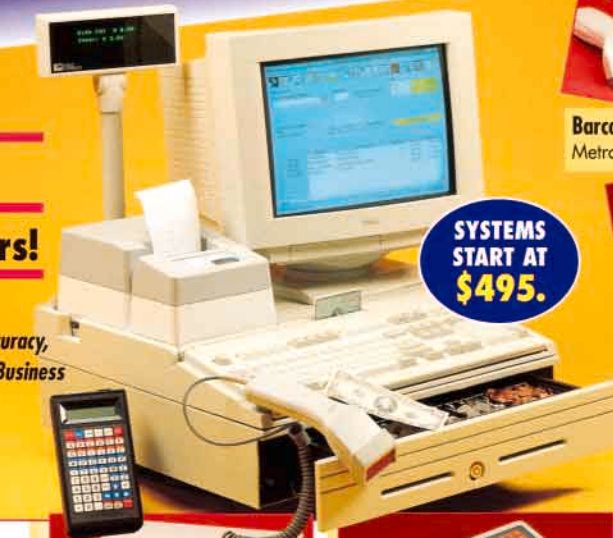


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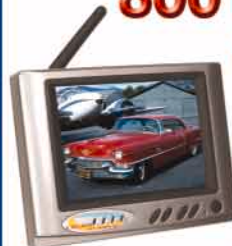
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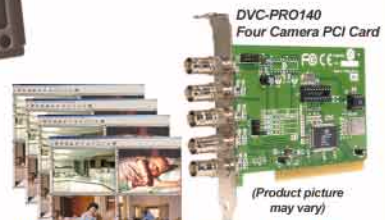


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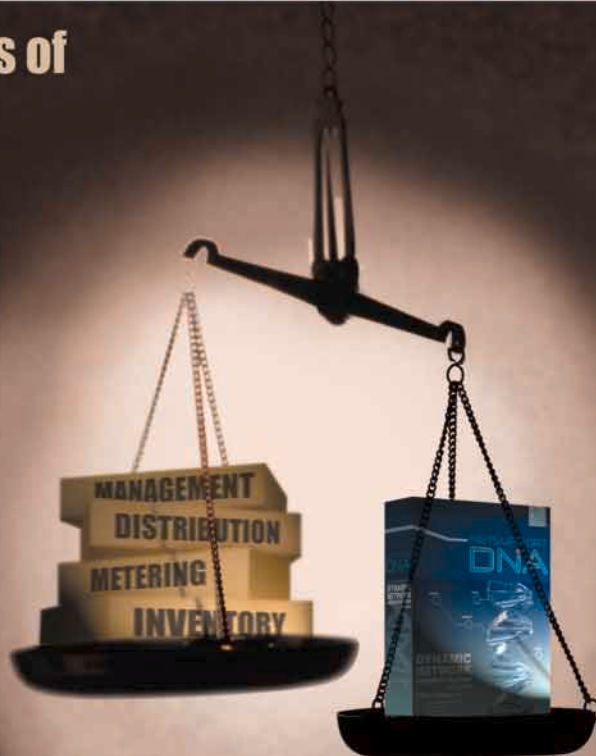
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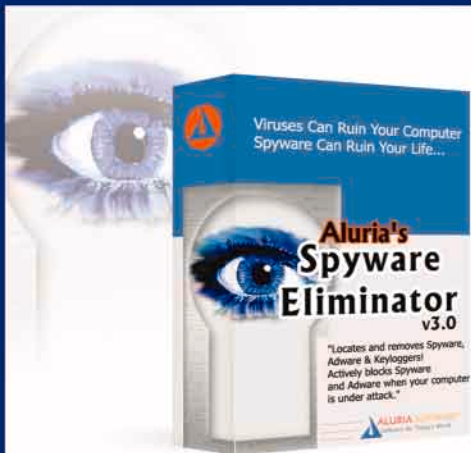
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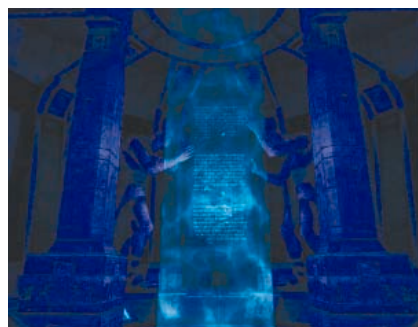
TECHNOLOGY ON YOUR TIME

Online Games Revisited

BY PETER SUCIU

Part of the appeal of massively multiplayer online role-playing games (MMORPGs) is that they are built around *persistent worlds*—which means these online universes can change and develop. They are occupied by thousands of users who are able to affect the virtual environments; a static setting probably wouldn't keep most players interested for long. The most popular MMORPGs have recently undergone plenty of additions and improvements. Even experienced players will find reasons to keep coming back.

Watch for new online games based on *The Matrix* and *The Lord of the Rings*. Other fantasy games in the wings include a full-blown EverQuest sequel and Microsoft's *Mythica*. Online, there are always new worlds to conquer.



DARK AGE OF CAMELOT: TRIALS OF ATLANTIS

Dark Age of Camelot: Trials of Atlantis

If adventures on land are starting to feel a bit dry, take things under the sea in the newest expansion for this popular game.

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See Personal Technology for more Quick Clips and Gear & Games reviews.

And check out the vastly improved look: The team at Mythic Entertainment gave the entire game a face-lift that adds realism.

The fabled lost continent can now be accessed via

recently unlocked portals, but not all of the secrets of Atlantis will be immediately available. The ancients of this long-dead society foresaw their civilization's decline and set up a series of difficult trials to challenge future cultures. The new desert and forest locations, in addition to the undersea settings, promise to be a nice change from the traditional English- and Celtic-styled world while offering new adventures and quests for experienced players.

\$29.99 list; monthly fee, \$9.99. Mythic Entertainment Inc., www.trialssofarlantia.com.



EverQuest: Evolution



The king of online games keeps pounding away. A full sequel will be released later this year, but Sony Online Entertainment has been steadily improving the existing world of EverQuest with better graphics and even premium content. The most recent expansions

for EverQuest make up the Evolution package: Planes of Power, Legacy of Ykesha, and Lost Dungeons of Norrath. They have been optimized to run on less bandwidth, making for a quick-paced game with fewer lengthy downloads.

These expansions introduce new classes, races, spells, and items, along with other player features. Planes of Power also delivers a new back story for the EverQuest world, which adds challenges and opportunities beyond mere day-to-day questing. This notoriously addictive game remains fresh and exciting.

\$29.99 list; monthly fee, \$9.99. Sony Online Entertainment Inc., <http://everquest.station.sony.com>. ●●●●●

The New and Improved The Sims Online

Launched in the fall of 2002, The Sims Online hasn't been quite the breakout hit Electronic Arts hoped it would be. But the game is steadily attracting a growing number of players. To keep these arrivals and the original inhabitants happy, the developers have been making continual improvements. If your idea of a perfect



EVERQUEST: EVOLUTION

THE NEW AND IMPROVED THE SIMS ONLINE



life is a fairy tale combined with *The Stepford Wives*, look no further than *The New and Improved The Sims Online*.

Among the most interesting features of the New and Improved game world is your ability to hit the virtual job market, where you can see your Sims actually go to their jobs instead of merely working off-screen. This adds a new economic level to the game: With more wealth, players can set up businesses, build even more impressive dream homes, and throw wild parties.

And now, Fido isn't left behind: Pets have been added for more mischievous fun. You

can employ service Sims to help take care of your pets and aid in the management of your properties and daily activities. \$29.99 list; monthly fee, \$9.99. Electronic Arts Inc., www.thesimsonline.ea.com. ●●●●●

PlanetSide: Core Combat

Many online worlds are about exploration and building, but *PlanetSide: Core Combat* is about strife and conflict. With this expansion, the new, massive underground war zones and accompanying head-to-head combat in subterranean cities have taken a good fighting game and made it even better. Along with these locations, you'll discover ancient technology, including vehicles and weapons that can be used by *PlanetSide's* various factions.

The new environments aren't just bombed-out buildings. You'll see a variety of hostile settings, such as volcanic lava flows and ice caverns, each putting your chance for victory

in question. If living in a world of peace and prosperity isn't your thing, a trip to the Core Combat world may be more your speed. But easily discouraged players should be aware that efforts to make a difference and turn the tide almost always seem to be defeated.

\$29.99 list; monthly fee, \$12.99. Sony Online Entertainment Inc., <http://planetside.station.sony.com>. ●●●●●



PLANETSIDE: CORE COMBAT

Star Wars Galaxies: An Empire Divided

This game is set in a dark time. Darth Vader and the Emperor have destroyed the once-powerful Jedi order, but the fragile Rebel Alliance has just scored its first decisive victory with the destruction of the Death Star. What era could be more exciting for fans of that galaxy far, far away?

Recently added to the game are player-controlled cities that allow for greater



STAR WARS GALAXIES: AN EMPIRE DIVIDED

cooperation with others, including protection from rival forces. You can still choose your own path: Help the Rebel Alliance in its epic struggle, or sign up for a stint with the Imperial Navy.

Unfortunately, you can't actually head to the stars just yet. Space ships will be part of an expansion to be released later this year. Till then, you can always take up moisture farming on Tatooine.

\$49.99 list; monthly fee, \$14.99. LucasArts, <http://starwarsgalaxies.station.sony.com>. ●●●●●

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| ●●●●● | VERY GOOD |
| ●●●●● | GOOD |
| ●●●●● | FAIR |
| ●●●●● | POOR |

OTHER ONLINE WORLDS

Here are some brief updates on a few of the many other MMORPGs.

Anarchy Online: Shadowlands

With the *Shadowlands* expansion pack, *Anarchy Online* players can travel to an alternative dimension and explore more than half a dozen distinct regions, each with its own unique look and varied quests. This world is more focused on fantasy than on the hard science fiction of the original game. Funcom Inc., www.anarchy-online.com.

Asheron's Call 2

Set hundreds of years after the original game, this sequel puts players in a world that has faced a huge catastrophe that has scarred the lands. The game revolves around rebuilding

the world and attempting to unravel the mystery of the devastation. Microsoft Game Studios, www.asheronscall.com.

EVE Online: The Second Genesis

Although the game's original publisher closed its doors, *EVE Online* continues to flourish. It features a dynamic economy, Machiavellian politics, and a hostile universe to conquer—good swash-buckling stellar fun.

Playnet, www.eve-online.com.

Lineage

The American version of the hugely popular Korean MMORPG never caught fire as wildly as its creators hoped. That hasn't kept things from jumping in this medieval world of never-ending conflict and strife.

NCsoft, www.lineage-us.com.

Ultima Online

The granddaddy of MMORPGs is showing its age—like a fine wine from a classic vintage. The developers at Origin have kept a steady supply of fresh content for the world of Britannia, with plenty of intrigue and adventures.

Electronic Arts Inc., www.uo.com.

World War II Online

When this game first launched in 2002, it was very buggy and bound to crash; it required nightly patches. After numerous updates, *World War II Online* probably has the steadiest new content of any online game. Look for a constant stream of new vehicles to command, including aircraft, tanks, and even capital ships.

Playnet, www.wwiionline.com.

GEAR & GAMES



Cable Kit

Tired of lugging that messy bird's nest of connecting cables along with you on every trip? Among the myriad products designed to make the traveling life a bit easier, the **Zip-Linq 6 in 1 Road Warrior Kit** stands out. This handy package includes a USB mouse, a USB light, and extensions for networking, modem, and USB connections; all offer unique, ultrasturdy cables that retract easily and resist tangles.

—Carol A. Mangis

\$59.99 direct. Zip-Linq, www.ziplinq.com.



DVD Player Plus

Your DVD player is old, you want a progressive-scan unit anyway, and you'd like to stream your MP3 files from your PC to your home stereo system. The **Amoisonic Netplay NDP9200** solves all three problems. A PC Card slot provides a wired Ethernet connection, or you can add wireless 802.11b capability. In addition, the Netplay displays JPEG photos and plays MPEG video. Amoi is a Chinese manufacturer relatively new to the U.S.; the Gateway Connected DVD Player and GoVideo D2730 have the same functions and similar appearances, but Gateway has a better recognition factor.—Bill Howard
\$220 street. Amoi Electronics, www.amoisonic.com/english. ●●●●●



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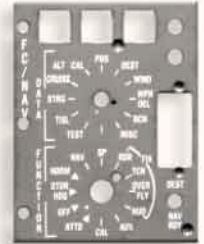
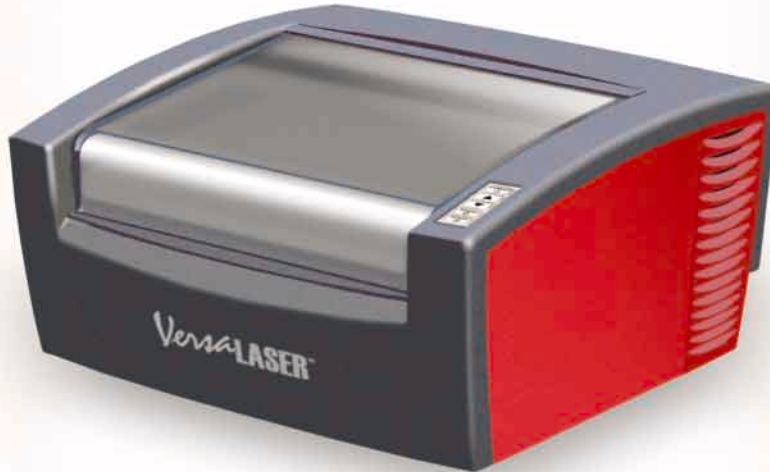
The **Slim Devices Squeezebox** is a digital media receiver that plays your PC's MP3 files on your stereo. Unlike similar devices from HP, Linksys, SMC, and others that take over your TV set as the visual interface to show what tunes you've picked, the Squeezebox uses a 2-line, 40-character fluorescent display that's integrated into the compact case. The features are first-rate, including both 802.11b and 802.11g wireless and wired Ethernet, analog and digital output, a remote that lets you spell out song names, and the ability to work with Linux servers as well as PCs and Macs. The device is compatible with MP3 and AAC formats but unfortunately not WMA files.—BH

\$299 direct. Slim Devices Inc., www.slimdevices.com. ●●●●●

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Take Control?

By Peter Suci

The basic mouse/keyboard combo works well for controlling just about every PC game. But there are plenty of situations where the mouse doesn't roar. For some new solutions, read on.

Belkin Nostromo Speedpad N52

The Belkin Nostromo Speedpad N52 combines keyboard and game pad functions, so you'll never have to search for the button you need. Used in combination with a mouse, this controller has a WASD layout for movement (forward, strafe left, backward, strafe right), along with a tappable jump button, and it also provides an eight-way directional pad. Up to 104 functions can be programmed on 14 keys, but you can't easily type text messages to other team members.

\$49.99 list. Belkin Corp., www.belkin.com.

●●●●●

Logitech Attack 3 Joystick

Perfect for casual gaming, flight simulations, and even driving games, the Logitech Attack 3 Joystick is far superior to just a mouse and keyboard. The handle fits both right and left hands and the plug-and-play **LOGITECH ATTACK 3** setup is a breeze, with 11 programmable buttons and even a throttle control. The Attack 3 provides responsive control with a lower spring force to accommodate gaming novices, and the weighted base feels solid and sturdy.

\$29.95 list. Logitech Inc., www.logitech.com.

●●●●●

Logitech Extreme 3D Pro Joystick

The Logitech Extreme 3D Pro Joystick, designed for use with flight simulations, features a weighted base, an eight-way hat switch, and throttle controls, along with 12 ideally placed, programmable buttons and a rapid-fire trigger. A twist handle simulates rudder control for flying games, and a single centering spring in the body of the controller makes for smooth and accurate movement. The lack of force feedback will probably turn off more



NYKO PC AIR FLO

experienced digital flyboys, though.

\$34.99 list. Logitech Inc., www.logitech.com. ●●●●●

Nyko PC Air Flo

The innovative Nyko PC Air Flo has a built-in fan to alleviate sweaty palms, and a 10-foot USB cable, which means you have room to stretch out. This gaming device offers dual analog sticks that provide 360-degree motion, an eight-way POV hat, and 13 responsive action buttons. It does a decent job simulating the controls of a console game pad, but it is best used with sports games; it does only a passable job with shooters and adventure games.

\$24.99 list. Nyko, www.nyko.com. ●●●●●

Saitek Cyborg 3D Force Feedback

The Saitek Cyborg 3D Force Feedback joystick shakes, rattles, and rolls with action and flight games, adding another dimension to the experience. The ambidextrous design is fully customizable for the perfect fit, and the smart-technology software provides limitless programming options for the four thumb buttons, four base buttons, rapid-response trigger, and eight-way POV hat. This is serious hardware for serious gamers.

\$59.95 list. Saitek Industries Ltd., www.saitekusa.com. ●●●●●

Saitek R440 Force Wheel

The Saitek R440 Force Wheel uses TouchSense technology to provide realistic response to the road, and the full-size pedals and gearshift paddles might make you forget you're just playing a game. It has four wheel-mounted buttons, gas and brake pedals, and twin gearshifts that give you access to buttons for switching views and pulling up menus.

\$79.95 list. Saitek Industries Ltd., www.saitekusa.com.

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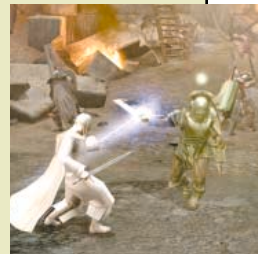
Goldfish Aquarium

In this new screen saver, 12 lifelike goldfish swim. Customize your screen with the fish you prefer and embellish their aquatic abode with plant life, rocks, and bubbles. Dynamic lighting silhouettes the fish in nighttime views, but these little beauties never sleep: They're there to entertain.—*Carol Ellison*

\$19.99 list. Encore Inc., www.encoresoftware.com. ●●●●●

The Lord of the Rings: The Return of the King

It's already conquered the box office, so why not the PC? The game closely follows the movie, and voice acting by the film's actors draws you in even more. Controls



and AI are much better than in EA's The Lord of the Rings: The Two Towers, and now there is a much-appreciated cooperative mode: You and a buddy can take on the orcs at Pellenor Fields together.—*Tricia Harris*

\$49.99 list. Electronic Arts Inc., www.ea.com. ●●●●●

MobiTV

MobiTV (available on the Sprint PCS network) offers TV for mobile phones, and it's a surprisingly effective, affordable, and appealing service. What you get is the same thing you'd see and hear on your television set—not just video clips or selected content. The company wisely chose to favor audio quality over the image,

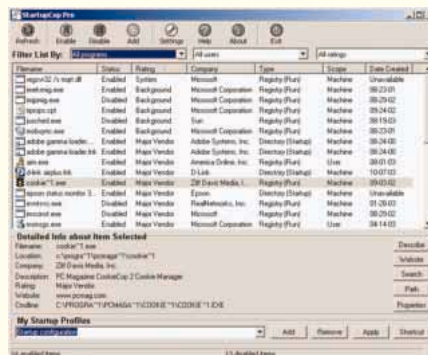
which streams at around 1 fps. But MobiTV works: A digital phone with a tiny display can be an effective tool for broadcast video.—*Bruce Brown*

\$9.99 a month (requires Sprint PCS Vision service). Sprint Spectrum LLP, www.sprintpcs.com. ●●●●●

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Lesson of TV season: Sex not selling

Does demise of 'Skin,' 'Coupling' portend anything?

Thursday, November 6, 2003 Posted: 9:25 AM EST (1425 GMT)

LOS ANGELES, California (Reuters) -- Attention TV programmers: Perhaps the biggest lesson of the fledgling fall season is that it takes more than sex to sell a show in prime time.

Days after NBC threw in the towel on its libidinous new comedy "Coupling," Fox has pulled the plug on its porn-themed drama of forbidden romance "Skin," marking a rare failure for Hollywood super-producer Jerry Bruckheimer.

Also this week, NBC officially canceled its critically acclaimed but struggling



"Skin" came from very successful producer Jerry Bruckheimer, whose hits include the "CSI" shows and "Without a Trace." But "Skin" never caught on.



VICTORIA'S SECRET

▲ **Maybe not on TV...** (CNN.com)

▼ **Aborted takeoff!** (southwest.com)




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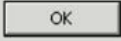
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▼ **Mind your own business!** (AOL Instant Messenger)

AOL Instant Messenger 

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▼ **Indeed.** (al.com)

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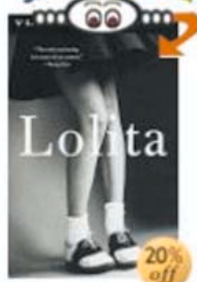


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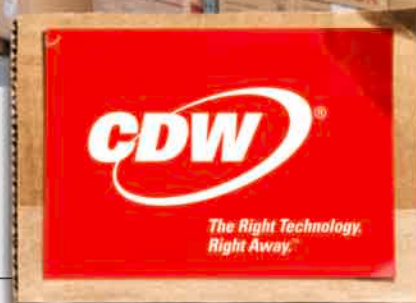
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