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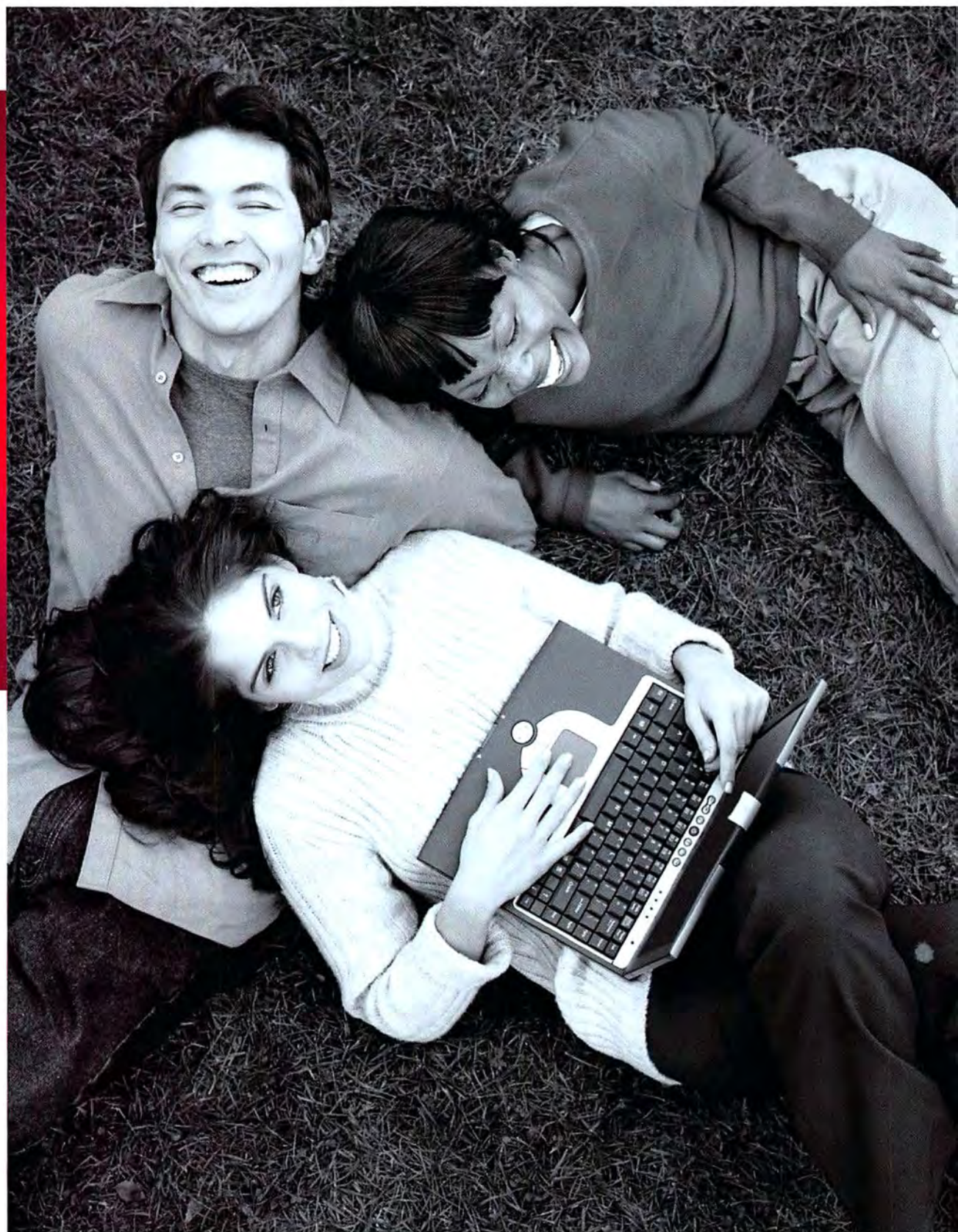
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Peer-to-peer networking gained notoriety as the basis for music file sharing on Napster. But the same technology, abetted by new tools, promises to bring businesses major benefits in collaboration, data sharing, and other essential tasks. We take an in-depth look at the pluses and minuses of peer-to-peer as an alternative to the traditional corporate model of client/server networking.



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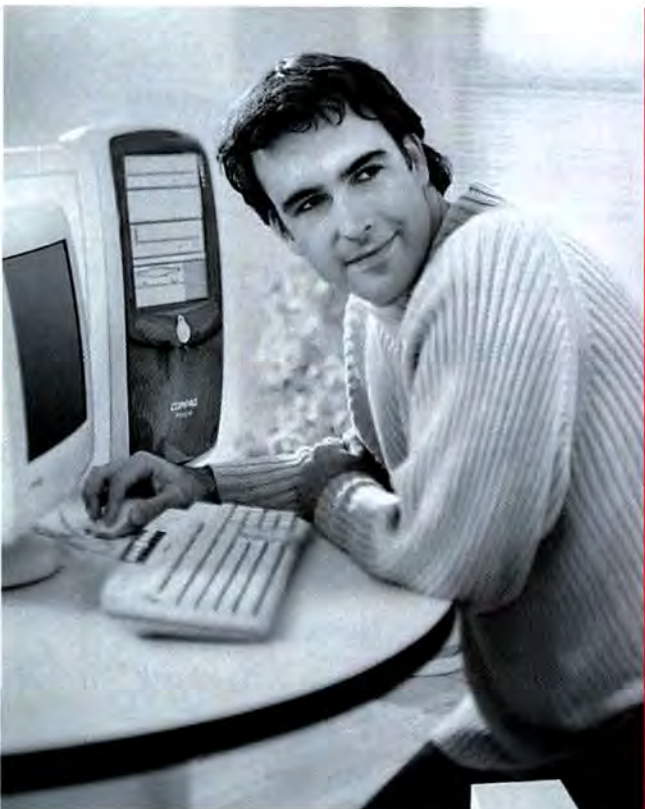
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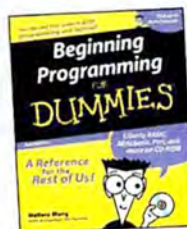
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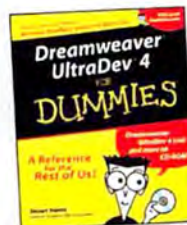
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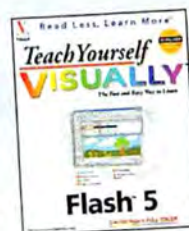
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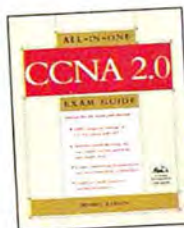
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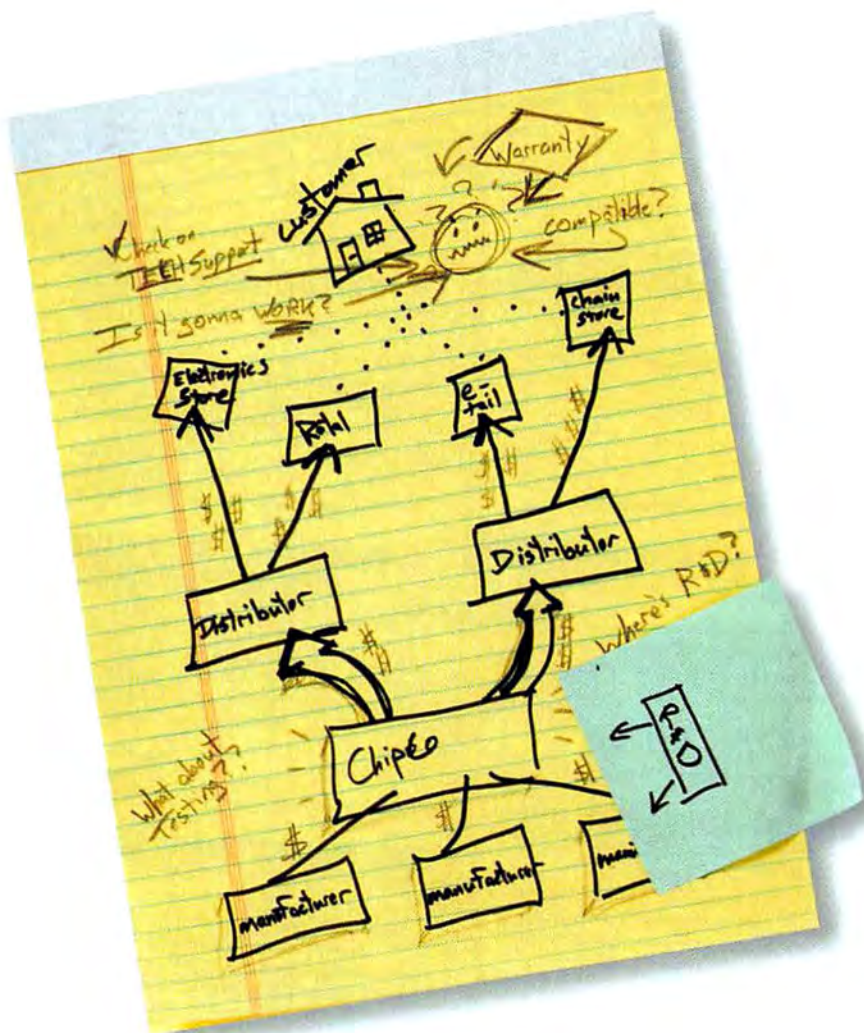
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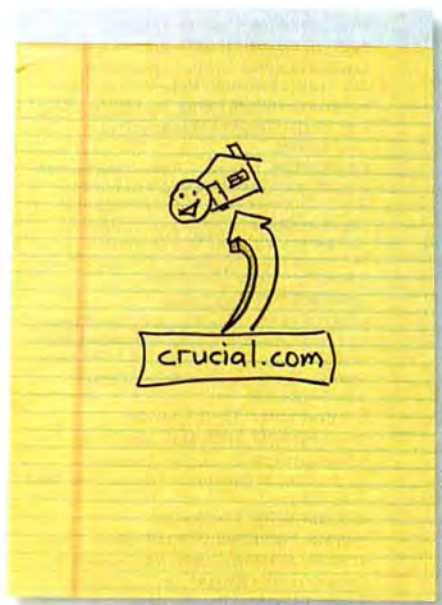


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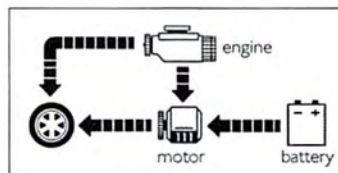
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No Guardian Angels on the Net

IT CAME AS A RUDE AWAKENING—literally. As I dozed in bed one recent Sunday morning, the phone rang. A rep from my bank was on the line, wondering whether I'd used my credit card to pay for any phone calls lately. In Moscow.

Well, no. As I soon learned, I was one of a throng of shoppers whose card numbers had evidently been swiped from an e-commerce site and then billed for bogus telecom charges by a Russian company. At last report, the FBI was on the case.

My bank quickly reversed the spurious charges, canceled the card, and issued a replacement. I lost only sleep and time. And maybe a little innocence. Sure, I've reported on the underbelly of the Web for years. But until that call, my biggest personal cyber-headache had been managing my spam-infested in-box.

THE DANGERS ARE REAL

AT LEAST I COULD consider my brush with online crime a bit of unexpected research for *PC World's* first-ever special issue on Internet dangers. Peruse the articles we've assembled, and you'll meet an array of Web users whose lives have been touched—even damaged—by Net threats, including an investor who lost \$41,000 to an alleged stock scam. We also check in with law enforcement officials, independent watchdogs, and even a few hackers to find out just who is on the prowl on the Internet these days.

Most important, we rounded up dozens of tools, resources, and strategies you can use to safeguard your privacy and keep your data secure. Among the highlights: "The Ten Commandments of Internet Privacy" (page 97, in "Privacy Matters"), our picks of the best security utilities ("Fortress PC," page 120), and a parent's guide to Web dangers ("Safe Kids," page 143).

It all adds up to a crash course in online self-defense, an essential skill given Internet companies' spotty record of protecting their customers. Take a look at the evidence in this issue. Though privacy policies are posted everywhere, sites don't always stick to them. Online auctions tout antifraud policies, but many burned bidders say that the protection isn't nearly as comprehensive or generous as it sounds.

Then there are the *unintentional* ways that sites leave customers in the lurch. For instance, so many companies have bun-



Don't be rattled by Web hazards. Just call on the right tools, common sense, and a dash of skepticism.

gled server security recently that you'd think the Three Stooges had consulting contracts with some of them. (As we were wrapping up this issue, Amazon.com's Bibliofind site alerted me and other patrons to "a security violation on its site that compromised the security of some customers' credit card information." Oops.)

Of course, businesses are most likely to shield customers from harm when doing so also defends their corporate bottom line. My bank's speedy action on the Russian charges, for instance, protected its own pocketbook: Federal law mandates that I would have been responsible for only the first \$50 of any unauthorized billing. So it's no wonder that the bank got the card canceled pronto.

LAWMAKERS VS. LAWBREAKERS

SPEAKING OF LAWS, don't expect the government to rid the Web of bad guys. Agencies such as the FBI and the Federal Trade Commission continue to ramp up their online efforts, but it's all too easy for wily crooks to hide behind anonymous e-mail accounts or fly-by-night Web sites and then abandon them at a moment's notice. Nor does Web crime observe any international boundaries, which makes government action even tougher. The National Consumer League's Internet Fraud Watch program reports that complaints concerning companies outside the United States and Canada have risen by 230 percent over the past year.

Ultimately, the Internet remains so useful and entertaining that it's hard to remember life without it. Don't let the Net's occasional hazards rattle you. Just take care to protect yourself with the right tools and techniques, common sense, and a healthy dash of good old-fashioned skepticism. We hope you'll agree that this issue offers plenty of just those essential ingredients.

Harry McCracken is an executive editor for *PC World*. ■

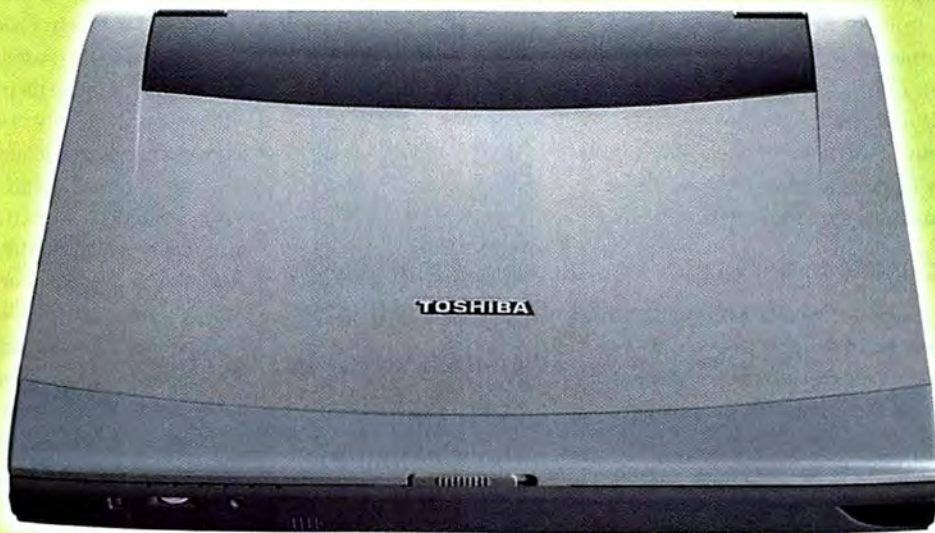
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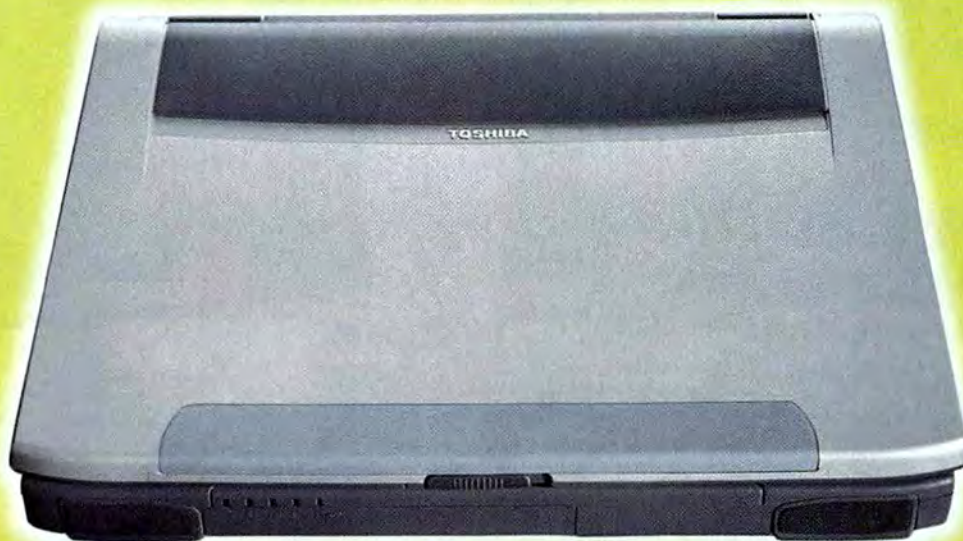
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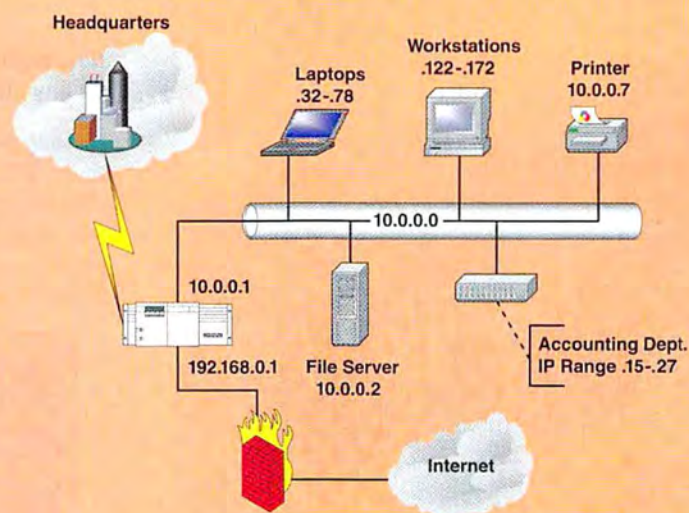
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WIRELESS WONDERS

YOUR ARTICLE on wireless services for PDAs ["Take a Walk on the Wireless Side," March] makes good points about what to expect from devices like the Compaq iPaq Pocket PC and Palm-based units.

Inconveniences like slow speed, spotty service, and Web pages that don't translate well to the small screens of these tiny marvels are all discomfiting, but at least on Pocket PCs, being able to visit any Web page and see it in bright colors—supplementing all the information and e-mail capabilities in our pockets, anytime, anywhere—is simply wonderful.

A lot depends on the service provider and the software you can use, though. The OmniSky service and portal I use with my iPaq are outstanding, and the Transcriber handwriting-recognition software I use is excellent, so writing long e-mail messages and documents is never a problem; I remain infocentric at all times!

(Note: I wrote this e-mail message in bed and sent it wirelessly immediately after reading your article.)

Ed Garay, Chicago

THE ETHICS OF VIDEO DOWNLOADS

I AM SURPRISED that *PC World*, which people look to for advice on using and understanding technology, does not take an ethical stance on intellectual property protection. In "Capture Video Streams Into Files, Then Onto CDs" [*Internet Tips*, February], Scott Spanbauer said:

1. Here is something you may want to do—but content publishers don't want you to, and the software won't let you.
2. Here is a program to get around that.
3. Is it stealing? We don't know, but here are some Web sites to look at.

Next you'll publish articles on how to



pirate software, send fake e-mail, or launch denial-of-service attacks on major Web sites. Your editors need to take a stance on ethical issues rather than just publishing articles describing tools and then saying "but let your conscience be your guide."

Ajay Jindal, Seattle

I AM AN INDEPENDENT artist with a Web site that

has been ransacked by pirates. While researching solutions, I ran across articles in your magazine that actually give people instructions on how to steal video clips. This is the problem that has plagued my site—and as a result I have not posted any new content. Because of piracy, I am not making enough money to keep my site going and will have to shut it down. Perhaps you should consider the small-business user before giving your readers tools to put us all out of business.

Liz Galtney, Blue Jay, California

Author's response: Streaming-media Web sites are free to employ rules, terms of service, and technical roadblocks to constrain how visitors view their content. But well-established fair-use laws allow us to make copies of our CDs, videotapes, books, and magazines under a variety of circumstances. In the long run, such copies benefit media creators and publishers by making the titles better known. That's different from piracy, which I do not condone. To be sure that people don't download and copy your intellectual property, keep it off the Web.

—Scott Spanbauer

TAX SOFTWARE TRAVAILS

YOUR REVIEW of tax software [*Top of the News*, February] declares that these programs cut paperwork. Perhaps, but they may increase work overall.

TaxAct Online is slow (a new screen for each W-2 block) and linear (changing any block on a W-2 requires starting from block 1). When I got a solution to ▶

HOT BUTTON

Our Power PC Ratings: What's Up?

I READ YOUR *Top 10 Power PCs* chart [March] and got terribly confused. The computers seem to have been listed in random order. [We showed in first place the Dell OptiPlex GX300 (Pentium III-866 CPU, PC World-Bench 2000 score of 179, rated Good); in second place, the Dell Dimension 8100 (Pentium 4-1500, WorldBench score of 194, rated Very good); and in third place, the Polywell Poly 830K7-1100 (Athlon-1100, WorldBench score 240, rated Outstanding). —Ed.]

Surely the number three Polywell should have been number one? You're losing all credibility in my office—I've been ordered not to make buying decisions based on your reviews as a result of these anomalies.

Dexter Fletcher, Houston

YOU GUYS MUST have made a typo—the third-place machine should be at the top! It has two 30GB drives in a RAID configuration, and it is faster and cheaper [than the first place PC]. How could it be third? Does Dell

win because it has great phone support? Just how far does that take you?

Bruce MacKenzie, via the Internet

Editors' response: Our chart's footnote 1 states: "A system's performance word score is relative to the scores earned by other PCs running the same operating system." The two Dell machines ran on Windows 2000, the Polywell on Windows NT 4.0. Most PC performance benchmarks tend to run much faster under Windows NT (see www.pcworld.com/benchmark). And Dell has consistently earned Outstanding scores for support policies and system reliability in surveys of *PC World* readers. Across the bottom of our charts are weightings for the various categories in a PC's ranking. Those weightings mean that what makes a PC the best isn't speed and components alone, but rather the best combination of performance, design, price, and vendor support and reliability.

—Tracey Capen and Kalpana Narayanamurthi

another problem from e-mail tech support, the site wouldn't let me back into my return. I had to abandon 3 hours of work.

TurboTax would not allow me to file electronically because of minor "errors." Online help was useless, and repeated calls to tech support yielded only a busy signal. I finally resolved the problems, but only after spending 6 hours on a job that takes half an hour by hand.

Joseph Tainter, Corrales, New Mexico

WHEN PRICES DROP

HAVING JUST ordered a \$1250 flat-screen monitor from Dell, I found the article "PC Price Drops: Don't Lose Out" [On Your Side, March] quite timely. I went to Dell's online store and found the monitor selling for \$50 less only two weeks after I'd placed my order. I asked Dell's customer service department for a \$50 credit on my charge card. Its response: I'd have to return the monitor and reorder it at the lower price. I then insisted on

speaking with a supervisor. After putting me on hold, the rep told me Dell would, this one time, issue a credit for \$50.

If you don't ask, you don't receive.

Gary Teller, Atlanta

THE SOFTWARE USER'S RULES

I JUST FINISHED reading your article on software bugs ["PC Pest Control," March]. I can't begin to count the number of late-night hours I've spent staring at a computer screen, the hundreds (thousands?) of reboots, and the dozens of reinstalls of Windows. What have I learned? 1) Never install new software in the evening (East-coast time), as not everyone offers 24-hour tech support. 2) Get a program that allows you to restore an earlier configuration. 3) Hold off on upgrading. If it ain't broke, don't fix it. 4) Install a good search program. Then you can type in an error message verbatim and find numerous references to it, including fixes.

Using these rules, I have become a

much happier camper; I get more sleep, and I spend more time with my family.

J. Reed Gidez, Oradell, New Jersey

PC World welcomes your letters to the editor. Send e-mail to letters@pcworld.com. ■

CORRECTIONS AND CLARIFICATIONS

IN MARCH'S "Best Free Stuff Online," though we tried to avoid including shareware, three such products slipped in: AprCalc, Cash Express 2000, and Alexsys Team 98. Each has a registration fee as well as a free trial version, as follows: AprCalc 3.0 (unlimited free trial; \$25 ends nag screens that urge you to buy); Cash Express 2000 (\$20 after 30-day free trial); Alexsys Team 98 (free for the first 100 tasks; then \$155 for one user, \$655 for five). In addition, Freemercant.com added a fee shortly after we went to press. For online merchants, the storefront is still free, but the shopping-cart feature costs \$25 a month.

PC World regrets the errors.

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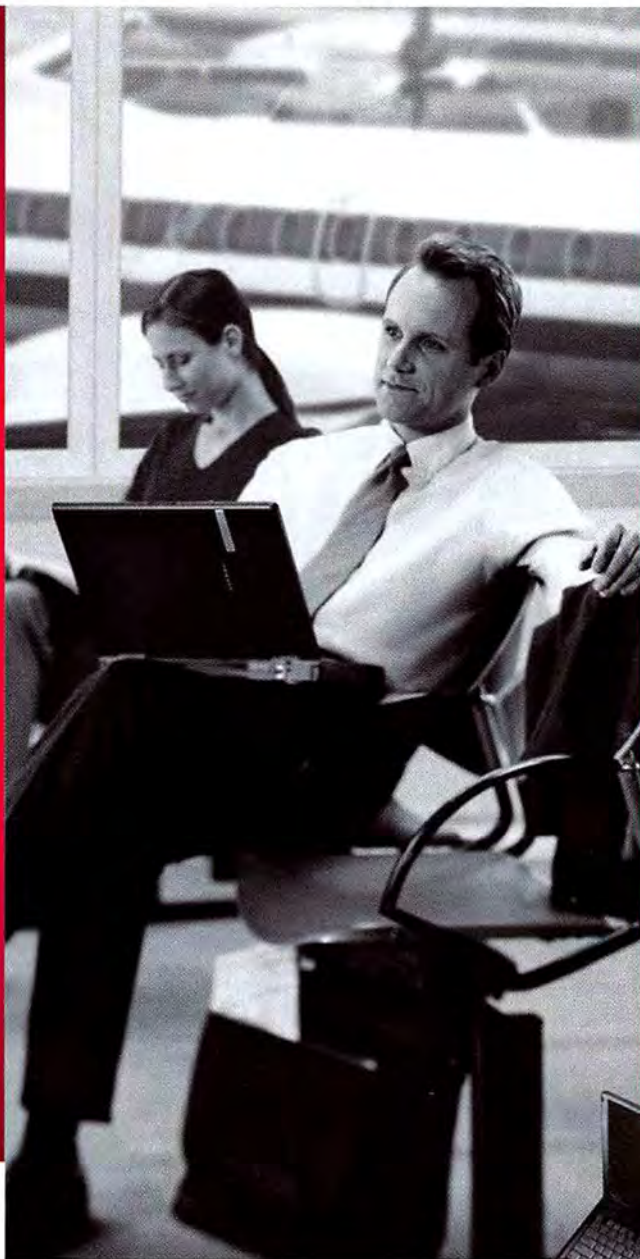
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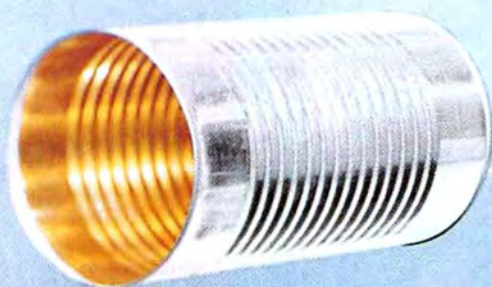
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Hold the Spam—Maybe

ISPs have declared war on junk mail, but some of their users are getting caught in the crossfire.



IT'S OUT THERE 24/7, desperately trying to get your attention. It wastes your time, tests your patience, and tries to steal your money. It lies. It has atrocious grammar. Sometimes you don't even recognize it—it's known to travel in disguise.

I'm not talking about your deadbeat brother-in-law, I'm talking about spam, those unsolicited e-mail offers for Viagra, credit cards, sleuth services, get-rich-quick schemes, and porn sites that slither into your in-box like unsavory, uninvited houseguests.

If you're like most e-mail users, it's a given that you hate spam

and want to reduce the amount you receive (for tips on cutting your spam intake, see "Spam: It Happens," page 104). And you're not alone. ISPs—stung by user complaints—are also trying to block spam from your mailbox. But is it possible that ISPs have taken the war on spam too far? Yes, say some users who have been unfairly caught in a spam blockade. Lately, I've heard from people who say they've missed important messages, or even been cut off from their mail service entirely because of overly aggressive spam screening.

Your ISP's e-mail filters are your first—and often most effective—defense against spam. They confront the problem early, identifying spammers by domain name and deflecting their messages at the front door. AOL, for example, prides itself on its vigorous spam control features—a policy that sounds like great news for its customers. But for James Warner, an electrical engineer from Elmhurst, Illinois, the company's efforts were too proactive.

Warner, an AOL subscriber for years, used the service for e-mail, Web access, and keeping up-to-date on his church's tech support needs. "The church's Webmaster had set up an e-mail distribution list that included me and about five others," says Warner, who often helps with church projects. "It worked well, until one day when I stopped getting my updates."

Warner started investigating and learned that he wasn't alone—all the AOL and CompuServe subscribers on the church's numerous mailing lists had also suddenly and mysteriously stopped getting their mail from the church. After a series of phone calls to AOL's tech and customer support, Warner learned that the church's domain had been blocked for spamming. Warner's response: "Poppycock! [The church] never sends anything to anyone without their consent."

Nevertheless, AOL refused to remove the block and, according to Warner, declined to work with either Warner or the church's Webmaster to resolve the impasse. Says Warner, "Not only was the church never notified that its mail was being blocked, but I, a long-term paying subscriber to AOL, was never told that [some] mail wasn't being delivered. I find it highly unacceptable to pay for a service that won't deliver what I legitimately have coming to me." Warner has switched to a new ISP and reports no further problems getting his e-mail.

AOL declined to comment on Warner's ►

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CONSUMER WATCH

case, citing privacy issues and difficulty in obtaining full details of the situation since Warner is no longer a member. However, spokesperson Nicholas Graham says that the company will work case by case with any member or organization with a legitimate need to send or receive bulk e-mail.

AOL isn't the only service provider that's been accused of overzealous spam control. Similar cases involving EarthLink, MSN's Hotmail, and other providers have also been reported recently. Hotmail user Robert Kadish, a physician living in Metairie, Louisiana, learned first-hand just how easy it is to be labeled a spammer—and how tough the penalty can be.

Kadish, who used his Hotmail account for auction bidding and visiting newsgroups as well as for professional correspondence, found himself with an extra notebook PC. He decided to post a message on the newsgroup comp.sys.laptops to sell it. A week later, he found himself inexplicably locked out of his Hotmail account. Kadish eventually learned that he'd been shut off after another newsgroup participant reported him to Hotmail's abuse department for spamming.

His appeals to Hotmail received canned responses. "I'm not running a commercial business or sending [pyramid] schemes to anyone, and I don't believe I

violated the terms of service... who has since obtained an e-mail address with another provider. "It seems that one anonymous complainant can cancel someone's account completely."

But Hotmail stands by its right to terminate Kadish's account. According to MSN group product manager Bob Visse, using Hotmail to sell anything violates its Use of Services agreement. "MSN is very committed to protecting its members

from being the victims of unsolicited e-mail. It is equally important that Hotmail not serve as a mechanism for its members to send junk e-mail to other e-mail users," says Visse. "The Hotmail staff individually reviews all abuse complaints and makes individual deter-

minations on what action to take."

Even online auction giant EBay recently ran into problems with a spam-fighting plan of its own. The auction house stopped displaying the e-mail addresses of many users as a way, the company claimed, of reducing the amount of spam users receive. Instead, bidders and sellers had to contact each other through EBay. But when EBay processed the mail, it left the send-to field blank—something that causes many spam filters to discard a message as junk. As a result, some users missed important e-mail messages. Others, ironically, had to drop their spam defenses so they could receive EBay ▶

"I was never told that [some] mail wasn't being delivered," says former AOL user James Warner.

ON YOUR SIDE



I ORDERED A computer from Axis Systems last October. When it didn't arrive in time for the holidays, I canceled my order and received an e-mail from the company acknowledging my cancellation. As of late January, Axis still had not issued my credit of \$2191. I've contacted the company numerous times, but it has been unresponsive to my inquiries. It was very quick to charge my card but has not been as quick to refund the money—especially now that the order has been canceled. Please help.

Howard A. Parsons
Powder Springs, Georgia

On Your Side responds: In late February, Axis Systems closed its doors, and it is no longer shipping PCs, issuing refunds, or providing service and support to its customers. Luckily for Parsons, we were able to help him get his money back just before the company ceased operations. For more information on the situation, go to www.pcworld.com/news/axis.

—Grace Aquino

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messages. At press time, eBay officials said they had solved the problems.

Clearly, ISPs want to convince you that they're serious about spam. With as many as 250,000 spam-related complaints reported every day at AOL alone, they can't afford not to be. AOL's Graham says spam is the number one complaint of its users. "It's a tremendous scourge. We're obligated to bring spammers to justice, and we'll continue to use faster, more complex, and more sophisticated technology to eliminate it for our members."

Most ISPs are reluctant to discuss the details of their antispam technology for proprietary reasons. But EarthLink's director of systems vendor management Steve Dougherty says his staff looks for traffic spikes as well as specific phrases and headers, often culled from abandoned mail accounts that receive large amounts of spam. "It's as much an art as a science," he explains. "We keep the human element involved by having someone write and review every rule before it's applied. In addition, we have between 6 and 12 individuals watching for spam at any given time."

So should you take comfort in the fact that your ISP is looking out for you, or worry that its antispam policy might be too heavy-handed? It comes down to what creates the most good for the largest number of people, according to Jason Catlett, president of the antijunk mail organization Junkbusters. "Cases in which real messages are lost due to filtering are extremely rare, and eliminating spam controls at the ISP level would result in intolerably large amounts of spam."

It's highly unlikely you'll miss a crucial e-mail due to a spam-filtering glitch, EarthLink's Dougherty argues. "Sure, it can happen," he admits, "but 99.9 percent of the time, the filters are accurate." AOL's Graham concurs: "For every 5000 e-mails we eliminate, there's maybe one that shouldn't be. That's a pretty good ratio."

But if your next e-mail is the one that's squashed, will you agree?

Anne Kandra is a contributing editor and Grace Aquino an associate editor for PC World.



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Smarter Ways to Search

I THOUGHT THAT I HAD finally settled down with the right search engine. In fact, for the past few months I'd found life with Google (www.google.com) so agreeable that the other search sites I used to dally with in my younger days had become no more than fuzzy memories.

Foolish me. I'd forgotten one of the Web's eternal verities: There's no such thing as a perfect search site. True, Google is the one engine to have if you're having only one. But even though it's eerily accurate most of the time, it doesn't sleuth out everything. And cool tools keep popping up elsewhere—frequently at sites that lack the brand-name cachet of the big engines. Here-with, a handful of recent developments:

Facts in a Flash: As its name suggests, **IWon** (www.iwon.com) is a portal where prize giveaways are the main attraction. Even so, it's got one feature that a serious info-junkie can love: Fact Finder, available at the ungainly URL of www.iwon.com/home/search/factcity_tutorial.

Powered by a service called Fact City, Fact Finder melds a natural-language interface with its own vast repository of data on sports, movies, TV, history, and more, licensed from reputable sources like *Billboard* magazine and the CIA's *World Factbook*. Fact Finder usually knew the answers when I posed burning questions such as "Who did Ingrid Bergman play in *Spellbound*?" and "What is the capital of Micronesia?" (Dr. Constance Peterson and Palikir, in case you were wondering).

The laudable goal here is to let you snag such arcana without wading out into the Web at large, where information is often

buried, garbled, or just plain wrong. But when my questions got too complex, they stumped Fact Finder. What baseball player had the highest single-season batting average in history? Beats me—Fact Finder struck out on that one.

The More Sources the

Merrier: Meta-searchers can search multiple engines

with one query. They remain the best option when your favorite engine comes up clueless. I tried the newly revamped **Pro-**

Fusion (beta.profusion.com), for example, when Google couldn't

help me find a long-lost friend. ProFusion found a link to his home page from MSN, an engine I'd never have tried on my own.

Unlike most metasearchers, ProFusion offers a topic directory that lets you limit your quest to specialized engines and

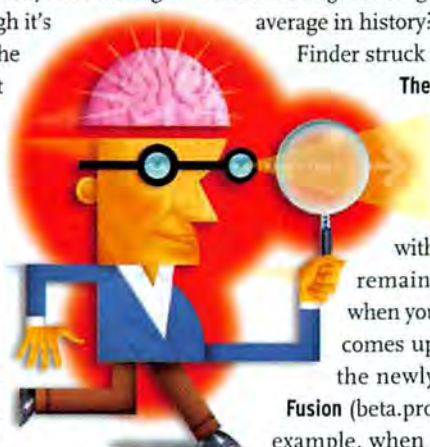
databases. Planning a vacation in Portugal? Try ProFusion's travel search, which ignores irrelevancies such as the site of a school of meteorology in Lisbon (which was among the first links that Google offered when I searched for "Portugal").

Whereas ProFusion claims to scour 1000 information sources, **Vivisimo** (www.vivisimo.com) collates links from a mere eight. But its user interface sorts links into folders for easy browsing. If you search for "scanners," for instance, you get separate folders for flatbed scanners, virus scanners, and police scanners.

Picture This: One of the few sites that focus on finding images, **Diggit** (www.diggit.com) is new and innovative. Most strikingly, it analyzes images for similarities in color, shapes, and textures—so it can find photos that all show red pickup trucks or the Eiffel Tower. While the technology is ingenious, the results are erratic: When I searched for pictures of Abraham Lincoln, Diggit retrieved a bunch of Honest Abe images—plus shots of Tony Bennett and Dr. Laura Schlessinger.

Ditto.com, an older image searcher, is less prone to drag images out of left field. On the other hand, it lacks Diggit's cornucopia of features, such as the ability to restrict searches to images of a certain size. So when I'm trolling for pictures, I'll hop between both sites. And I'll keep my eye out for other options. Hey, if you're not going to stick with one search engine, you might as well play the field.

Contact PC World Executive Editor Harry McCracken at websavvy@pcworld.com. ■



GIMME FIVE

Sites for Office Suite Help



ARE YOU A WORD wrangler? A spreadsheet jockey? Make the most of Microsoft Office and its rivals with the help of these sites:

1. Woody's Office Portal: Home of busy message boards and an opinionated Microsoft Office newsletter. www.wopr.com

2. About.com Desktop Publishing: The name *doesn't* say it all—this site also covers word processing and more. desktoppub.about.com

3. Office Update: Microsoft's official Office site backs the suite with plentiful help and downloads (and relatively little promotional hype). www.officeupdate.com

4. WordPerfect Universe: An online community of WordPerfect aficionados, plus links to other resources. www.wpun.com

5. David McRitchie's Excel Pages: Number crunchers rejoice! Meaty articles and tutorials galore. www.geocities.com/davemcrichtie



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LP to CD: Music Soothes Savage Bass

ITS SCRATCHES are deep enough to fall into, it's got one small gouge, and, like me, it's slightly warped. Still guessing? It's Dave Brubeck's *Elementals* 33-rpm long-playing record I found in a bargain bin nearly 40 years ago. And it's the perfect excuse for a kick-back, springtime experiment: Turn a dingy old vinyl album into a pristine-sounding audio CD. (What, you think *every* column's got to be about gnarly Windows problems?)

I know what you're thinking: Transferring LPs to CD-R discs is another of Bass's harebrained schemes. But think of it as another use for that CD-RW drive you bought as a backup device. And you're sure to smile when you listen to the immaculate sound of one of your favorite old LPs (or audiotapes) on CD.

Once you're done, you can retire your turntable and vinyl albums. CDs are easier to handle than LPs, and you can listen to them almost anywhere, even on a PC.

Recording an entire album onto my PC and burning it to CD took maybe an hour, but I spent two days digging through the garage looking for the right equipment, hooking it up to the PC, and finally futzing with the software. First, the futz.

THE TRANSFER SOFTWARE

THE \$99 EASY CD Creator 5 Platinum from Roxio (a recent Adaptec spin-off) and EnhancedAudio's \$99 Diamond Cut Audio Restoration Tools 32 both record music from an LP onto your hard drive and run filters to remove unwanted noise.

Easy CD Creator 5 Platinum

\$99 list, upgrade \$50

Roxio, 866/280-7694, www.roxio.com

Diamond Cut Audio Restoration Tools 32

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www.enhancedaudio.com



Recording an **entire album onto my PC** and burning it to CD took **maybe an hour.**

Easy CD Creator is a terrific tool for many disc-burning tasks—backing up your data, creating music CDs, or printing CD labels and notes. It also includes Spin Doctor, a feature to help remove pops, clicks, and hisses from old records and tapes as you convert them to digital format. Spin Doctor is a snap to use, but it's too dumbed-down for me. It has just two useful filters—noise and pop removal—and few other tools for adjusting the sound or removing distortions.

While Easy CD Creator is more the general practitioner, Diamond Cut 32 is a specialist. It's jammed with audio-tweaking features: 17 noise filters; a graphic equalizer; and tons of presets for recordings from live performances, shellac records, 78s, and 45s. The product's downside? It takes time to learn, and it lacks built-in CD-burning capabilities. My workaround for this is MusicMatch, a free program for playing music and burning CDs. You can download MusicMatch as well as a fully

operational trial version of Diamond Cut 32 (good for 30 days or 10 hours of use) from [PCWorld.com's Downloads](http://PCWorld.com'sDownloads).

AUDIO HARDWARE CHECKLIST

IT TAKES SOME equipment to put LPs on CD, but don't go hog-wild until you know you'll be converting several recordings.

A record turntable: You may remember these, and may still have one. If not, prices start at about \$100—check www.audioreview.com for advice.

An amplifier: Your stereo can boost the sound from the turntable to the PC. Connect the turntable to the amplifier's input port and the amp's output port to your sound card. Don't want to disconnect the wires on your amp? I found a preamp at a yard sale for \$20. It boosts the sound from the turntable and connects to your sound card just as an amp would. Not all shelf systems have a line-in jack for a turntable, however.

PC sound card, speakers, and cables: If your PC's sound card has a line-in or microphone port, it'll do fine. You'll need a Y-cable with a stereo miniplug at one end for the line-in or microphone jack on the sound card, and two RCA plugs at the other end for the preamp's left and right audio channels. A Y-cable costs about \$5.

TAKE FIVE (MEGABYTES)

PREPARE YOUR PC: Defrag your hard drive and make sure there's plenty of free space. At 10MB or more per minute of recording, you need at least 2GB to store five average-length LPs. Here's your chance for a cagey rationalization: Buy a new drive and dedicate it specifically to audio recordings. You can easily find 10GB drives for less than \$100. That'll give you breathing room for the music.

Time to go. Only another 120 albums to transfer before I can stash my turntable in the garage, right next to my eight-track.



Find files from this article at www.pcworld.com/downloads.

Contributing Editor Steve Bass runs the Pasadena IBM Users Group. Sign up for his Home Office newsletter at www.pcworld.com/bass_letter. He can be reached at steve_bass@pcworld.com. ■

sweet

16

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Windows Me worries ♦ Netscape 6.01 released ♦ Late tax updates

Windows Me: Problems for You?

IS WINDOWS Millennium Edition driving you crazy? You're not alone. We've received a ton of complaints recently about all kinds of Me woes—even though the new operating system has been around since last fall. Readers grumble about installation nightmares, subsequent software and hardware incompatibilities, and good old system crashes. On top of all that, some users can't get Me to shut down properly. If you upgraded to Me from an older version of Windows, you might feel that the term *Millennium* refers to the length of time it will take to fix the glitches.

Microsoft has posted some information on its site to help you surmount the most common Me problems you're likely to encounter. The company organized its online troubleshooting section into two parts: installation and its aftermath. The setup section takes you through several scenarios. It tells you what to do when your PC mysteriously crashes and how to deal with a stubborn installation wizard that refuses to accept your valid Me ID. It also explains how to get rid of pesky error messages that pop up when you reboot after installing the OS. Find the solutions at support.microsoft.com/support/kb/articles/Q268/8/91.asp.

Me may also stumble when it detects any one of a slew of incompatible third-party programs, hardware device drivers, and utilities. When Me encounters these conflicts, it generally stops



I N B R I E F

Avoid Last-Minute Tax Problems

IF YOU HAVEN'T filed your tax return yet, now is a good time to go online and collect any recent updates to your tax preparation software. If you use Intuit's TurboTax and you are filing from Alabama, Iowa, Minnesota, Missouri, or Oklahoma, certain errors may crop up in your state tax return. For example, Oklahoma forms have some errors involving seniors' tax relief credits. Get the lowdown by surfing over to www.intuit.com/support/turbotax/updates/ty2000/ttax_updates_alerts00.html and clicking the *State Update Alerts* link.

A small group of tax filers using Block Financial's Kiplinger TaxCut are affected by a clash between the federal and state versions of the program. For details on fixing the conflict, go to www.taxcut.com/updates/00fedwinprob.html#state_prob.

the installation process and spits out an error message stating that you can't proceed. To deal with the problem, you must either upgrade to a newer version of the app, utility, or driver (if one is available) or uninstall the current one. Either way, it's a drag.

Specific problems include Me's clashes with early editions of Dr. Solomon's Anti-Virus (versions earlier than 7.71) and BlackICE Personal Defender packages (versions 1.8.6.8 and 2.0.23). Go to support.microsoft.com/support/kb/articles/Q262/4/02.asp for a list of conflicting programs, utilities, and drivers. To find updated device drivers for popular products, visit www.microsoft.com/windowsme/support/bulletins/findingdrivers.asp.

Even if your computer survived the upgrade (or your machine shipped with Me), you may run into a bunch of other problems. For example, you may have trouble using Windows' disk defragmenter or simply restarting your computer. Or your browser may have difficulties displaying Web pages. Microsoft lumps the workarounds for these problems together in one spot. Find descriptions of the snags and step-by-step solutions at www.microsoft.com/windowsme/support.

According to Tom Laemmle, a product manager in the Windows group, Microsoft has no plans to release any service packs for Me. Instead, users should regularly visit the Windows Update site (windowsupdate.com) to get all current and future updates.

Netscape 6.01 Rolls Out

LAST MONTH we reported on various problems with Netscape 6, ranging from installation snafus to browser crashes. Netscape recently (and quietly) released an update, Netscape 6.01. The company says the update makes the browser more stable and fixes a couple of glitches. One of them, first discovered by the Denver-based Privacy Foundation, would have allowed a malicious hacker to send you an e-mail message containing hidden JavaScript code instructing Netscape 6 to send copies of all your e-mail messages back to the hacker. The other flaw was exposed during e-commerce transactions. When going through a secure transaction on the Web, some users noticed with alarm that the little padlock icon at the bottom of the screen was open instead of closed. Their transactions were actually secure, says Netscape spokesperson Catherine Corre, but the update fixes the padlock icon. To get Netscape 6.01, visit home.netscape.com/download.



You'll find files from this article at www.pcworld.com/downloads. Stuart J. Johnston is a contributing editor for PC World.

B U G G E D ?

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TOP OF THE NEWS

Gigahertz to Go

◆ By Anush Yeghazarian

FOR YEARS, notebook users have suffered from desktop envy: Despite high marks for versatility and style, mobile systems couldn't quite match the performance and features of their desk-bound cousins.

Intel's latest mobile CPU, the 1-GHz Pentium III SpeedStep—with help from new,

larger hard disks and better graphics—is changing all that.

We tested five of the first laptops to use the new chip, ranging from a thin-and-light WinBook model to full-featured Hewlett-Packard and To-

shiba units to desktop replacements from Dell and Gateway. All of them had at least 128MB of SDRAM, 20GB or larger hard disks, 8X DVD-ROM

drives, and either Windows 2000 Professional or Windows Millennium Edition. And all performed very well.

THE SCORE

AS WE expected, these 1-GHz systems reached highs on our PC WorldBench 2000 tests. A shipping WinBook X1 earned a score of 178, the top mark for this group; it also had the lowest resolution of the systems here, at 1024 by 768 (lower resolution tends to yield higher scores). The unit came with 320MB of main memory, with 312MB allocated to general tasks and 8MB set for graphics. A preproduction Toshiba Tecra 8200, with 256MB of



1-GHZ PORTABLE POWER (from left to right): Toshiba's Tecra 8200, Dell's Inspiron 8000, Gateway's Solo 9500, and Hewlett-Packard's OmniBook 6000.

SDRAM, posted the next-highest score, 172.

A preproduction Dell Inspiron 8000 and a shipping HP OmniBook 6000, both with 128MB of SDRAM, weren't far behind, with PC World-Bench 2000 scores of 169 and 168, respectively. These units offered a boost of about 4 percent over the average of eight similar notebooks with Pentium III-850/700 chips, previously the fastest available for laptops. The new units are still approximately 8 percent slower than the average of three 1-GHz Pentium III desktops, but many users wouldn't see any performance difference when running typical business applications.

Great as these systems are, top honors still go to a Pentium III-850/700-based IBM ThinkPad A21p system that we tested. Equipped with 256MB of RAM, this superfast system is at the upper limit of its processor class. (All the above systems ran Windows 2000.)

RUNWAY MODELS

THE SHIPPING Gateway Solo 9500, the only one of the five running Windows Me, garnered a top-notch 158 on PC WorldBench 2000, the highest yet for a Windows Me laptop and a match for the average of four Win Me-based 1-GHz PIII desktops we've tested. The unit was also about 9 percent faster than the average of three PIII-850 laptops. All had 128MB of SDRAM. (Windows Me systems typically score lower on our tests than Windows 2000 PCs.)

Battery life was also good for these units: The HP lasted an

impressive 3 hours, 19 minutes; the Toshiba and Gateway each managed nearly 3 hours. The Dell was still good at 2 hours, 41 minutes. The WinBook trailed at 2 hours, 15 minutes; unlike the others, it did not have Intel's battery-saving SpeedStep technology enabled (units will ship with SpeedStep enabled, however).

Although these systems don't have the stop-in-your-tracks appeal of Apple's wide-screen PowerBook G4 (see *New Products*, page 80), each of them has plenty to offer.

Dell's Inspiron 8000 and Gateway's Solo 9500 are true

control your DVD-ROM drive. Gateway provides the quick-launch application buttons but no external drive controls. At \$3319, the Dell offers a slightly better deal than Gateway's \$3549 Solo. However, the Solo gives you a bigger screen, an LS-120 floppy drive, and a fiber-optic digital audio channel; it also weighs a bit less (8.9 pounds versus 9.3 pounds).

BYE-BYE, DESKTOP

MAINSTREAM small-business and corporate buyers who are in the market for lighter, full-featured notebooks have first-rate options in both HP's

OmniBook 6000 unit and Toshiba's Tecra 8200 (www.hp.com/omnibook/notebooks, www.csd.toshiba.com). Each offers a stable platform, which corporate buyers prefer, without sacrificing

features or performance. The HP's 15-inch screen is larger (the Toshiba's is 14.1 inches), as is its hard disk—30GB versus the Toshiba's 20GB. HP gives you a pointing stick and a touchpad, plus the option of an internal floppy drive; the Toshiba's floppy is external only, and it lacks a touchpad.

You pay a bit more for the Tecra—\$4463 versus \$4199 for the HP—but you also get twice the main memory and graphics memory. And a wireless 802.11b antenna and circuitry are built in, so you can use the Tecra on a wireless network from the get-go. It weighs less, too:

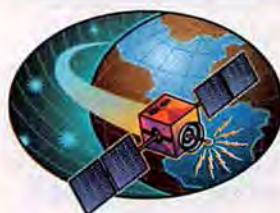
7.5 pounds versus 8.1 pounds for the HP. Both offer a 56-kbps modem, ethernet, and a ▶

Intel's latest mobile processor ends desktop envy, offering a more powerful platform for notebook users.

desktop replacements (www.dell.com, www.gateway.com). Both pack top-notch components, including roomy 32GB hard disks, DVD-ROM drives, at least one media bay each, 56-kbps modems, touchpads, and fast IEEE 1394 ports. The Dell also has great graphics, thanks to NVIDIA's new GeForce2 Go chip set with 32MB of DDR SDRAM and a sharp 15-inch LCD with 1600 by 1200 resolution. The Solo's screen is larger—15.7 inches—but its ATI Mobility M4 graphics chip set offers less memory (16MB of SGRAM) and supports a maximum resolution of just 1280 by 1024.

The Dell we tested offers built-in ethernet and a pointing stick, as well as extra buttons to launch Internet and user-programmed apps or

DISPATCH



Product Pipeline

▶ **Stinger Gets Closer:** Microsoft's smart-phone operating system, code-named Stinger, puts Pocket PC-like features on a mobile



phone. Microsoft has demonstrated a beta version of the OS on a prototype phone by Sanyo; that company, along with Samsung and Mitsubishi, is expect-

ed to ship Stinger phones later this year. Individual carriers will determine pricing.

▶ **Visor Gets Thinner:** Handspring's latest salvo in the battle of the Palm OS-based PDAs is a Visor about the size of a Palm V that accommodates Springboard expansion modules via a slide-on sled. The \$399 Visor Edge will compete with the new Palm M500 (see page 58).

▶ **Tiny Camera, Big Picture:** Kyocera's Finecam S3 challenges Canon's Digital Elph for the title of smallest and lightest—yet powerful—digital still camera. Due in April, the \$699 Finecam S3 is just slightly larger than the credit card-size Elph, and both have 2X optical zoom lenses. But the Finecam is 20 percent lighter and packs a 3.3-megapixel CCD, versus the Elph's 2-megapixel unit. ▶



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media bay (taken by a DVD-ROM drive in our models).

WinBook's sleek X1 (www.winbook.com) crams plenty into its 1-inch-thick case: a 13.3-inch screen, 320MB of SDRAM, a 20GB hard disk, a fixed DVD-ROM drive, a 56-kbps modem, and ethernet. It's also the lightest notebook here, weighing in at just 6.8 pounds (including a USB floppy drive). DVD playback was not quite as sharp and smooth as on the others, though, perhaps because of the X1's unusual graphics subsystem, which borrows up to 64MB of graphics memory from the main memory. All in all, those power-hungry travelers who count each and every pound they must carry should be satisfied with the X1, an excellent value at \$2999. (Unlike our blue test unit, shipping units will be pewter.)

Other major vendors such as Compaq and IBM will also offer 1-GHz notebooks.

ROAD MAP

MEANWHILE, Intel is preparing to launch its next mobile CPU, code-named Tualatin, in



WINBOOK'S eye-catching, lightweight X1 system.

the second half of 2001. Although it uses some of the same technology as current mobile PIIIs, Tualatin will have a new CPU core with new features and should debut at

speeds above 1 GHz. It will also be Intel's first CPU to use a .13-micron manufacturing process, upping performance and lowering power consumption (most chips today are made using a .18-micron process).

Intel competitors AMD and Transmeta have new mobile products in the wings, too. Transmeta, maker of super-low-voltage Crusoe CPUs, has continued to improve its code-morphing software and plans new Crusoe TM5800 chips for the second half of 2001. Made using the .13-micron process, the new chips should reach 800 MHz speeds by year's end. Also look for more Crusoe-based notebooks in the United States later this year, according to the company (only Sony has released laptops using Crusoe chips in the United States thus far).

AMD's next Athlon proces-

sor, code-named Palomino, is designed to meet both mobile and desktop needs. The new chips will arrive on the mobile market first and should appear in notebooks in the second quarter of this year. These chips will have AMD's PowerNow technology, and chip sets should support Athlon's 200-MHz front-side bus, as well as both SDRAM and DDR memory. HP has said that it will use the new chip in some consumer notebooks.

Typically, you can save upward of \$300 and not lose much in performance with a notebook that uses a CPU one or two levels down from the top. You may miss other improvements, such as faster graphics or built-in ethernet, that add appeal to the overall platform for the highest-end systems, however. In either case, you certainly won't lack for choices. And the new 1-GHz systems offer plenty of power to back up their style.

PC WORLD BENCH 2000

TEST REPORT

Notebooks Close the Gap on Desktop Performance, Specs

NOTEBOOK	Processor	System memory	Operating system	Graphics chip set	Graphics memory	PC WorldBench 2000 score	Battery life (hours: minutes)
Dell Inspiron 8000	Pentium III-1000/700	128MB SDRAM	Windows 2000	NVIDIA GeForce2 Go	32MB DDR SDRAM	169	2:41
Gateway Solo 9500	Pentium III-1000/700	128MB SDRAM	Windows Me	ATI Mobility M4	16MB SGRAM	158	2:52
HP OmniBook 6000	Pentium III-1000/700	128MB SDRAM	Windows 2000	ATI Rage P/M Mobility	8MB SDRAM	168	3:19
Toshiba Tecra 8200	Pentium III-1000/700	256MB SDRAM	Windows 2000	Trident Cyberblade	16MB SDRAM	172	2:50
WinBook X1	Pentium III-1000/700	312MB SDRAM	Windows 2000	SIS 630	8MB UMA	178	2:15
Average of eight laptops	Pentium III-850/700	128MB SDRAM	Windows 2000	n/a	n/a	162	n/a
Average of three laptops	Pentium III-850/700	128MB SDRAM	Windows Me	n/a	n/a	145	n/a
Average of three desktops	Pentium III-1000	128MB RAM	Windows 2000	n/a	n/a	182	n/a
Average of four desktops	Pentium III-1000	128MB RAM	Windows Me	n/a	n/a	158	n/a
n/a = not applicable						Better	

TEST CENTER **HOW WE TEST** All systems are tested with PC WorldBench 2000, PC World's application-based benchmark. For more details on our benchmark and how we run it, see www.pcworld.com/benchmark. For the battery test, we drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Microsoft Office workers use Windows 9x applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off. Higher scores on both tests are better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. Number highlighted in red represents best score.

Breakthrough Combo Drive Burns DVDs More Affordably



FIRST LOOK

EVERY SO OFTEN, a product like Pioneer's DVR-A03 DVD-R/CD-RW burner comes along and makes a host of high-cost computing tasks suddenly affordable. DVD-R writers and their capacious 4.7GB DVD-R media used to be extremely expensive—\$5000 or more for a writer and \$40 for each disc. Now, thanks to the \$995 DVR-A03 and its \$10 media, many more users can afford to create their own DVD home movies—which will play on their living-room DVD players—and burn DVD-R data discs that mimic DVD-ROMs, a blessing for those of us who work with space-hogging digital video or audio.

But archiving home movies and massive amounts of data and transferring video from your old VHS tapes aren't the only activities likely to drive the DVR-A03's popularity. The dirty little not-so-secret about DVD-R is that it can be used to violate copyright law and illegally record commercial DVD movies. The copy

PIONEER'S DVR-A03, the first DVD-R, CD-RW, and CD-R drive.

protection scheme that's used for DVD movies (CSS, or Content Scrambling System) was broken a long time ago. And despite legal action, programs

DVD Glossary

- ◆ **DVD-RAM:** Format developed by Panasonic, Toshiba, and Hitachi. Randomly rewritable, 4.7GB per side, incompatible with current DVD players and most DVD-ROM drives. Recorders and drives are available.
- ◆ **DVD-RW:** Rewritable format, 4.7GB per side, compatible with some current DVD players. Consumer recorders due out this summer in the United States.
- ◆ **DVD+RW:** A long-promised, 4.7GB-per-side rewritable format, said to be compatible with virtually all current DVD players and drives. HP, Philips, and others promise drives and recorders by fall.

for copying the contents of a DVD to a hard drive sans protection remain plentiful.

MULTITASKING

THE DVR-A03 I tested looks like a typical IDE DVD-ROM drive. It's a combo unit, capable of handling both DVD and CD media. Pioneer rates the drive to write CD-R at 8X, CD-

RW at 4X, and DVD-R at 2X. One caveat: Like many 4X CD-RW drives, the DVR-A03 will not write to 10X-rated CD-RW discs. The drive is rated to read CD-ROMs at 16X and to read DVD-ROMs at 4X.

In my informal tests, CD reads came in at 11.6X and DVD reads at 1.9X, acceptable for a drive with this rated speed. Write speeds were just about at 8X for CD-R and nearly 4X for CD-RW. The DVR-A03 may not be lightning-fast with older optical media, but its backward compatibility is a major benefit; I would want one even if it were a one-trick pony.

That's because writing DVD-R is such a compelling trick. The DVR-A03 takes just

28 minutes to burn a full DVD-R disc—the equivalent of writing seven CD-Rs in 4 minutes apiece, but without the hassle of disc swapping. Another upside to the DVR-A03: It can both read and write rewritable DVD-RW media, although according to the company DVD-RW

discs will cost about twice as much as DVD-R discs.

Whether you want to store high-quality digital video or archive data, the DVR-A03 (or SuperDrive to Apple users) could change the face of computing—and possibly the entertainment industry. The DVR-A03 will be available in May; these drives also ship in some Compaq Presarios.

—Jon L. Jacobi

For more, see www.pcworld.com/news/may2001.

Tidbytes

► Video Rentals Over Broadband:

Blockbuster wants to rent you videos without making you drive to the store. A service currently in trials in Portland, Oregon, and Seattle lets customers watch movies streamed to their TVs via a special Motorola set-top box. Blockbuster's video-on-demand service not only eliminates the wait for a pay-per-view film to start, it also offers full playback control—pause, fast-forward, rewind, and stop—for the 24-hour rental period. Final pricing for the service has not been determined, but Blockbuster gave trial participants two free movies a week and charged \$5 per movie thereafter—about \$1 more than renting a movie from the store.

► Wireless Access for Your PDA:

PDA users on the move can now access Web information such as stock quotes or download e-mail using Get2Net's new Infrared NetStations. Get2Net, the provider of airport NetStation Internet PC terminals, has already launched several wireless PDA NetStations in New York airports. Within six months, Get2Net hopes to have 100 Infrared NetStations running in such cities as Chicago; Denver; Hartford, Connecticut; New Orleans; and San Jose, California.

► Swap CDs Instead of MP3s:

With Napster's future up in the air, sharing MP3s over the Internet will likely become more difficult. Here's another option: Trade CDs via CD Swapper, a new service from Swapit and MP3.com. Once you register and print out a mailing label, you can send in CDs or games you don't want, in exchange for credits toward the purchase of other titles. More details are available at www.swapit.mp3.com.

Pioneer DVR-A03 DVD-R recorder

List price: \$995; 800/444-6784; www.pioneerelectronics.com

Great XPections: Next Windows Rocks, But Copy Controls Could Hamper Reinstalls

Future View

WINDOWS XP, Microsoft's next operating system, is shaping up as one of the most exciting—and controversial—products ever put out by the Redmond, Washington, technology behemoth.

The controversy over the OS formerly code-named Whistler, and now in Beta version 2,

real hassle for people who don't have state-of-the-art PCs. You'll also need a gigabyte of free disk space.

However, Windows XP inherits Windows 2000's stability and security, and it will be even more appealing than Windows Millennium Edition to digital photo, video, and audio enthusiasts. XP also includes Me's highly popular software for re-

XP Home Edition replaces Windows Me and its Windows 9x antecedents, marking the end of the line for that MS-DOS-based family. Home Edition is essentially a subset of Professional, omitting several nifty tools that Microsoft has deemed appropriate only for business users. But even the lowliest Windows XP Home Edition system will benefit from the Windows NT/2000 family's software stability and user and file security.

Nevertheless, Windows XP is almost sure to be less compatible with legacy hardware and applications than Windows Me and its predecessors. While Microsoft has labored to improve XP's compatibility with games,

many DOS and Windows applications will be nonstarters; and Microsoft says people with computers and peripherals released before 2000 may run into problems. A Microsoft product manager predicts that 90 percent of upgraders will experience 100 percent success. The remaining 10 percent will encounter difficulties that range from minor to catastrophic. Older PCs are also likely to run afoul of XP's system requirements: In addition to the minimum 1GB of free hard disk space (needed partly for XP's nonoptional uninstall backups), your machine must have at least a Pentium III-233 CPU and 64MB of RAM—more for better ►

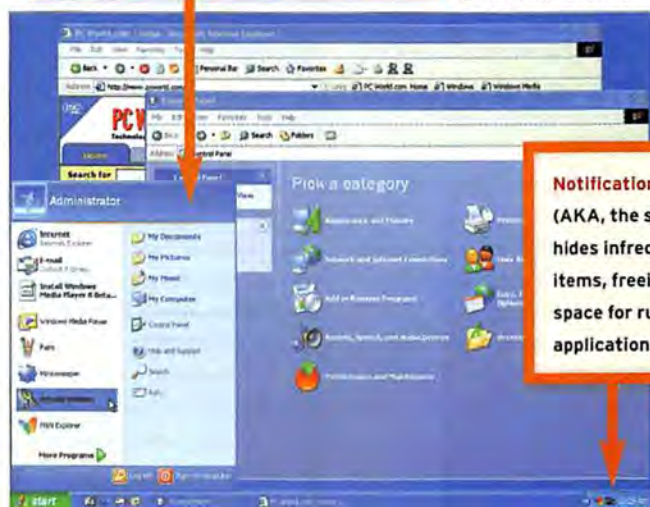
► **Web Surfing in a Limo:** Luxury car-maker BMW has a limousine equipped with a mobile multimedia office. The prototype, a BMW L7, includes a computer with an Intel Celeron processor, an infrared keyboard, a wireless Internet connection, and a retractable 15-inch flat screen on which you can watch DVDs, TV shows, and video conferences. Not slated for regular production, the prototype car is valued by BMW at about \$220,000.

► **E-Reading Like Paper:** Although e-books may sound like a good idea, screens on the first devices just aren't as readable as paper. But researchers may change that. Philips Electronics and E Ink are developing a display technology for handhelds to make text and images look like ink on paper. If successful, the technology could boost acceptance of electronic books. Philips would build screens that use E Ink's "electronic ink sheets."

► **Connecting with Bluetooth BLIPs:** Ericsson envisions people relying on Bluetooth Local Infotainment Points (BLIPs) to exchange information when using low-power wireless technology. BLIPs are connection hubs for Bluetooth-enabled devices such as mobile phones and PDAs. Device owners who pass by a BLIP—at a mall, for example—could receive information on stores or download discount coupons. BLIPs run on the Linux operating system and support Bluetooth transfer speeds up to 720 kbps. Ericsson plans to launch BLIP this year in shopping centers and train stations. Accessing BLIP content will be free to end users. ►



Expanded Start Menu displays links to frequently used applications and folders.



Notification Area (AKA, the system tray) hides infrequently used items, freeing Taskbar space for running applications.

WINDOWS XP LOOKS friendlier, with more color and less clutter.

systems from Windows Product Activation, a new and stringent copy protection scheme that requires upgrade customers to contact Microsoft for an ID number (a procedure separate from the usual registration process). This feature, which could hinder some installations, isn't the only potential upgrade hurdle. Microsoft already anticipates that XP may conflict with some system BIOSs, hardware, and applications. As a result, installing the new OS could be a

turning a system to the way it was before installation of a buggy driver or application.

ALL IN THE FAMILY

WINDOWS XP will appear later this year in two versions: the business-oriented Professional, and the consumer-focused Home Edition. We looked at a near-Beta 2 build of Windows XP Professional and found it to be essentially the next version of Windows 2000 Professional, Microsoft's current OS for businesses. Windows



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¹MHz/GHz only measures microprocessor internal clock speed; many factors affect application performance. ²GB equals one billion bytes when referring to storage capacity; accessible capacity may be less. ³CD-RW, DVD-ROM and CD-ROM drives list a variable read rate. CD-RW write and re-write speeds vary and list only the maximum possible. Actual CD-RW, DVD-ROM and CD-ROM speeds will vary and are often less than the maximum possible. The read and write results of the CD-RW drive depend on the quality and characteristics of the CD-R and CD-RW media used. Poor results may be obtained with some media suppliers. ⁴Designed to be capable of receiving at up to 56Kbps with compatible phone line and server equipment, and transmitting at up to 31.2Kbps. Public networks currently limit maximum download speeds to about 53Kbps. Actual speeds depend on many factors and are often less than the maximum possible. ⁵Some software may differ from its retail version (if available), and may not include user manuals or all program functionality. For non-IBM software, applicable third-party licenses may apply. ⁶Warranty, service and support for non-IBM products, if any, are provided by third parties, not IBM. IBM makes no representations or warranties regarding non-IBM products. ⁷Includes battery and optional travel bezel instead of optical drive in Ultrabay 2000, if applicable; weight may vary due to vendor components, manufacturing process and options. ⁸Pricing shown is price available from IBM directly; reseller prices may vary. IBM price does not include tax or shipping and is subject to change without notice. ⁹SuccessLease is offered and administered in the US, Canada and other countries by third-party providers of business financing approved by IBM Global Financing. SuccessLease terms and conditions provided by the third party. Featured monthly lease payments are based on a 36-month term with prespecified purchase option at the end of lease, to qualified business customers only, installing in the US. A documentation fee and first month's payment due at lease signing. Any taxes are additional. Other lease terms and structures are available. Offer may be withdrawn or changed without notice. Options cannot be leased separately from system unit. ¹⁰This product is distributed and sold by Tripp Lite. IBM, the IBM logo and IBM trade dress are owned by International Business Machines Corporation and are used under a license from IBM. IBM does not manufacture this product and provides no warranty or support for this product. Please contact Tripp Lite for all questions/comments and service or support related to this product. ¹¹System includes chipset that uses some main memory for the video subsystem. The amount used will vary depending on video mode and may be as much as 8MB. Thus, actual accessible system memory is less than the amount stated. ¹²This product is distributed and sold by Tripp Lite. IBM, the IBM logo and IBM trade dress are owned by International Business Machines Corporation and are used under a license from IBM. IBM does not manufacture this product and provides no warranty or support for this product. Please contact Tripp Lite for all questions/comments and service or support related to this product. IBM reserves the right to alter product offerings and specifications at any time, without notice. SuccessLease and all IBM product names are registered trademarks or trademarks of International Business Machines Corporation. Lotus and SmartSuite are registered trademarks of Lotus Development Corporation, an IBM company. Intel, the Intel Inside logo and Pentium are registered trademarks and Celeron is a trademark of Intel Corporation. Microsoft and Windows are registered trademarks of Microsoft Corporation. Other company, product and service names may be trademarks or service marks of others. ©2001 IBM Corp. All rights reserved.

sion of Windows Terminal Services, which lets you log out, yet leave your apps running while another user logs on. When you want to return, XP can switch back to your session almost instantly.

The Terminal Services-based Remote Desktop lets you connect to and take control of your system remotely, either over the Internet or by modem—but only in Windows XP Professional. A relat-

ed feature included in Home Edition, however, lets any Windows XP system connect to, troubleshoot, and reboot another remote XP computer—with permission from that PC's owner. This could be invaluable to anyone who donates a PC to a far-away, technically challenged relative—as well as to companies that want to support off-site users and install software remotely.

To maintain security amid

all this Internet activity, both versions of XP will come with a personal firewall. A network bridge simplifies setup of a wired or wireless network, which could benefit home and office users joining the wireless networking boom.

Overall, XP promises to be the best preinstalled version of Windows yet. Businesses that have been contemplating a move to Windows 2000 may find XP friendlier, while home

users will find it more reliable and suited to family needs. But upgraders should keep their expectations low. You cannot upgrade a Windows 95 PC at all. And at least some Windows 98, 98 SE, and Me users should expect hassles similar to those encountered in Windows 2000 upgrades.

—Scott Spanbauer

For more, visit www.pcworld.com/news/may2001.

A Lovelier Linux Boosts Its Hardware Support

FIRST LOOK

LOTS OF US would love to love Linux. The operating system is stable, secure, and—best of all—free. But for many years, tales of installation and configuration hassles have discouraged most desktop users from giving Linux a whirl.

At long last, it may be time to take another look.

The newest version of the Linux operating system core, kernel 2.4, supports a broader range of computer hardware than did its predecessors—most notably USB devices, software modems, and 3D video boards. This increases the odds that your machine will be fully functional after you install the alternative OS.

Meanwhile, several new Linux distributions—packages from commercial vendors that bundle the kernel with graphical installers, user interface software, applications, and utilities—have been thoroughly updated to make the OS more accessible than ever. For instance, new versions of the OS's base XFree86 window-

ing system and the popular GNOME and KDE desktop environments give Linux a gorgeous look that should appeal to longtime Mac OS and Windows users. An upcoming enhancement to GNOME, Ea-

zel). Though it includes the GNOME interface as an option, it defaults to the Windows-like KDE 2.0.1 interface. However, distributions due later this year from Red Hat, Mandrake, and other competi-

7.1, but a beta version on the company's Web site contained kernel 2.4.1, the latest XFree86, and default firewall installation. More exciting is the possibility Red Hat Linux will ship with GNOME 1.4, which will incorporate Eazel's new

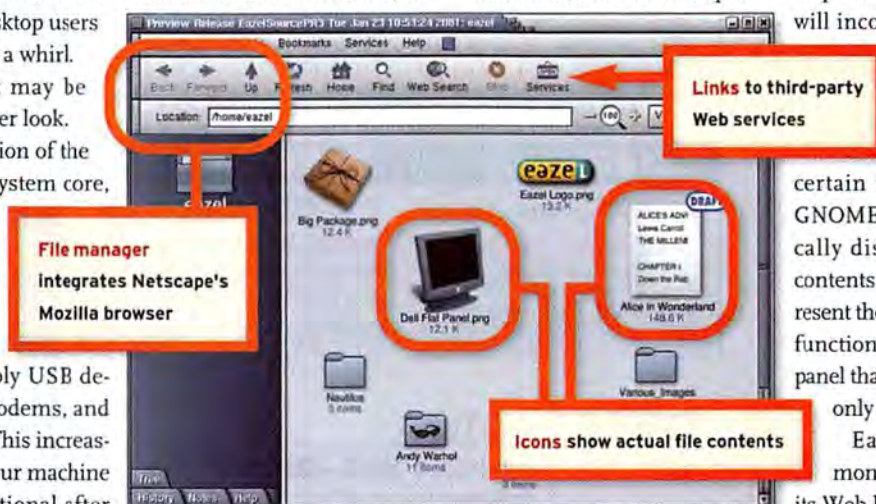
Nautilus graphical shell—a browser and file manager.

Nautilus seems certain to add depth to the GNOME interface, automatically displaying document contents in the icons that represent them and increasing the functionality of the left-hand panel that in GNOME displays only a file directory.

Eazel hopes to make money by driving users to its Web-based services. A preview release had links to free online storage, and a Linux software catalog that installs programs you click on.

Innovations such as Nautilus may not prompt mass defections from Windows, but they could make Linux more attractive to organizations that have grown weary of mounting Windows licensing fees.

—Scott Spanbauer ►



LINUX GETS A friendlier face from the Nautilus browser/file manager, an enhancement to the forthcoming GNOME 1.4 desktop environment.

zel's Nautilus, promises to be the most powerful and intuitive Linux user interface yet.

OOH LA LA LINUX

GERMAN distributor SuSE recently released the first kernel 2.4-based distribution, SuSE Linux 7.1 (\$30 for the personal

tors will incorporate later, more stable kernel versions, GUIs, and applications. Wary would-be Windows deserters may prefer to wait for one of these later distributions.

Linux market leader Red Hat refused to comment on its forthcoming Red Hat Linux



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Palms Gain Expansion Options, Keep Popular, Sleek Design

FIRST LOOK

THE SIMPLICITY and elegance of Palm-connected organizers have made them the most popular personal digital assistants ever. But a growing number of PDA buyers are turning to feature-rich competitors—to Pocket PCs with glitzy multimedia, productivity software, and multiple connectivity options; or to Handspring Visors with their easy expandability via Springboard modules. Now Palm is fighting back with new models that add some of these features—in a package the size of the sleek, popular Palm V.

The new Palm M500, which should be available by the time you read this, and the M505, a color version due in May, include an expansion slot for postage-stamp-size Secure Digital (SD) cards or MultiMediaCards (MMCs) for adding memory, content, and eventually peripherals. But the expandability, though welcome, seems half-baked in some ways. You'll have to wait at least until the fall before SD cards that permit you to add hardware (such as Bluetooth cards or GPS devices) become available. And while the M505 is the first Palm with 16-bit color support, the screen is disappointingly dull.

WHAT'S INSIDE

THE BIGGEST innovation in these new Palms is the small SD/MMC slot on top. Users are likely to prefer MMC for memory, but SD cards will

add content such as Lonely Planet travel guides and games (including an amusing version of Sim City). The input/output standard for SD cards has not been set, however, so you won't be seeing any SD hardware peripherals—similar to modules for the Handspring Springboard—right away.

Both M500-series Palms come with 8MB of RAM, a 33-MHz processor, and Palm OS 4. They also have a new universal base connector that allows hot syncing via a USB or serial hookup. But you can't use today's Palm modems, keyboards, or cradles with the new devices. New keyboards and modems for the M500-

The new Palms offer room to grow in a slim, attractive package, but you'll have to wait for hardware add-ons.

series Palms are due in April.

The new Palms hold the line on weight (a plastic backing helps on the M505). At just 4 ounces, the M500 weighs less than the Palm V, while the color M505 weighs about the same as the V and is a mere 1 millimeter thicker. Other color PDAs are chunky in comparison. But to match the Palm V's estimated two-week battery life and skinny form fac-



THE TINY SD slot allows expansion without bulking up Palm's M500 series.

tor, the M505 uses a reflective color screen. It's easier to view in sunlight than the screen on the Palm IIIc. But indoors it looked too dark, even with the backlight switched on—and it paled in comparison to the brilliant screen on the IIIc and on Compaq's IPaq Pocket PC.

NEW SOFTWARE INCLUDED

BESIDES OFFERING SD and 16-bit color support, Palm OS 4 builds in wireless connectivity software that lets you use a mobile phone as a modem via the infrared port or a cable. You can click on a phone number in your address book to place a call on your mobile phone. And you can now beam appointments made using datebooks that support the VCal format.

Palm bundles several programs that mimic Pocket PC

productivity applications: MGI PhotoSuite, DataViz's Documents To Go (for reading and editing Word and Excel documents), AOL for Palm OS, AvantGo, Infinity Software's PowerOne personal calendar, and Palm Reader (for e-books).

Estimated street prices are \$399 for the M500 and \$449 for the M505. They'll compete head to head with PDAs such as HP's \$499 Jornada 548 Pocket PC and Handspring's \$449 color Visor Prism.

The new-generation Palms offer room to grow in a slim, attractive package, but you'll have to wait for hardware add-ons, and the color display on the M505 is disappointing. If you want to view images, read books, and edit Word documents, you'll probably be happier with a Pocket PC. But if a small profile and battery life matter to you, and you prefer the Palm OS, the M500-series Palms' SD slot and new applications make these devices more than mere organizers.

—Cameron Crouch ▶



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Memory Malaise: Rambus Lawsuits Could Raise RAM Prices

FIRST LOOK

YOUR NEXT PC or memory upgrade could cost more if Rambus wins pending court cases against memory makers.

Best known for designing high-speed RDRAM, Rambus also holds patents crucial to popular SDRAM and DDR SDRAM (an RDRAM competitor). The company wants royalties from all SDRAM and DDR makers. Some of them have agreed to pay, but others have refused, asserting that Rambus's allegedly deceptive practices should invalidate the patents.

As a result, Rambus is engaged in lawsuits in several countries, including the United States, with Infineon Technologies, Hyundai Elec-

tronics, and Micron Technologies. The first trial (Rambus versus Infineon) was due to begin in Virginia in March.

If the memory makers lose these cases and must pay royalties, they "will pass the price increase along to consumers if they can," according to Sherry Garber, vice president of the

memory research firm Semico.

Rambus disputes this scenario. "We don't anticipate that consumers will be affected by this," says Avo Kanadjian, vice president of Rambus worldwide marketing. In the volatile memory market, he notes, the small additional cost of royalty fees will matter little; supply and demand determine prices.

BAD CONDUCT?

RAMBUS'S patent claims are very strong, according to independent patent expert Rich Belgard. In his opinion, the company's only potential weakness in court relates to its conduct as a member of the standards organization JEDEC.

Opponents argue that Ram-

bus failed to disclose its pending patent ownership during JEDEC meetings establishing the SDRAM industry guidelines. Rambus officials argue the company left JEDEC before acquiring the patents and therefore did nothing wrong.

The litigants whose position on that issue prevails in court may win the overall case, Belgard believes. "The JEDEC [issue] could render the patents unenforceable," he says.

If Rambus wins, its revenues could skyrocket, since SDRAM makes up the bulk of a RAM market with total revenues of \$29 billion in 2000.

—Tom Mainelli

For more, visit www.pcworld.com/news/may2001.



Open QuickBooks: Big Web Tools Brew for Small Businesses

FIRST LOOK

IT'S A small-business owner's tech dream: affordable software that delivers capabilities only large enterprises now enjoy. And this dream may be coming true, thanks to a new initiative from Intuit, whose QuickBooks accounting software is used by nearly 3 million small businesses.

Upcoming QuickBooks add-ons will handle chores that are highly specific to a particular type of business. For example, a dental office might need an online reservation system that ties into its accounting system; or a contractor might want a project cost estimator that works with QuickBooks.

Normally, such industry-

specific programs cost thousands of dollars. But independent developers may soon offer QuickBooks-integrated software for as little as a few hundred dollars. Why? Intuit has published the application programming interfaces for its QuickBooks Site Solutions Web site builder and its Quick-

Base Web database service, as well as a draft API specification for the next version of QuickBooks (final APIs are due when it's released). APIs provide the technical information software developers need to create apps that link seam-

lessly with Intuit's products.

We looked at the first QuickBooks Site Solutions developed under this program (they are available at site.quickbooks.com). The free Tell a Friend form lets visitors to your Web site recommend it to friends via e-mail—much like Recommend-It (www.recommendit.com).

The more functional Request for Information/Quotations captures sales leads (from customers who fill it out) and stores these in a database for follow-up, but it's relatively pricey at \$40 per month.

The add-ons will appeal to small businesses that want to track more data than QuickBooks by itself can handle. More than 1000 developers have signed up for the Intuit program, so new apps should appear over the next few months. If you use QuickBooks, check them out.

—Richard

Morochove ■

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NOMADS

WITH KNOW-HOW

No matter how much you spend on desktop computer equipment, that investment is all but worthless the moment you step away from your desk. Wireless devices keep you connected to your technology investment.

Gone are the days of choosing between being mobile and being productive. New devices and improved wireless services enable you to be as productive, accessible and connected when you're flying at 35,000 feet as you are when you are sitting at your desk.

From the computers in your home office to those at corporate headquarters, information fuels today's economy. While effective communication between buyers and sellers has always been paramount, how that exchange takes place has evolved tremendously. The advent of convenient and reliable wireless technology has made it easier to get information to customers and to colleagues wherever they are, whenever they want it. Whether measured in social or in business terms, the value of this newfound freedom to leave your desk and still stay connected cannot be overstated.

WIRELESS WIZARDRY

The keys that unlock this wizardry are the wireless devices and services that make anywhere, anytime communication possible. The kinds of devices you use to stay connected depend on the number of people you need to communicate with simultaneously.

For Norm Jacknis, Chief Information Officer of Westchester County, N.Y., that means using a selection of equipment including laptops, pagers, cell phones, PDAs and even Internet cafés.

"Distance or time differences are no longer an impediment. When I need to exchange data, I use a laptop to dial into the county's servers from remote locations anywhere in the country or the world. Other times I use



PETER SERLING

Norm Jacknis, Chief Information Officer of Westchester County, N.Y., uses a selection of equipment including laptops, pagers, cell phones, PDAs and even Internet cafés.

a cell phone for one-to-one conversations," he says, talking from a cell phone on the return leg of a recent business trip to Washington, D.C.

While Jacknis is well-wired with a variety of devices, some of his colleagues travel lighter. So what do they do when they need to exchange data and lack a laptop? During a business trip to Holland and England, Norm's boss, County Executive Andy Spano, dialed in from an Internet café. "We created a virtual private network to establish a secure link and work goes on regardless of location," says Jacknis.

Continued on page 5



lunch with client.

ordered the chicken special.

spent afternoon schmoozing.

lunch with client.

ordered the filet mignon.

received e-mail with
at&t digital pocketnetSM service.

got the \$15 million sale and
a bottle of champagne.



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POWER TO THE

Have you noticed how notebook PCs—once a luxury reserved for top executives—have suddenly become a necessity for everyone from students to telecommuters? American workers are especially hitting the road more than ever, and they're looking for reliable devices to boost their productivity away from the office. Today's notebooks must now stand up to jarring commuter-rail rides, curious kids and brutish airport security personnel. Fortunately, one computer manufacturer is partnering with mobile and remote users to help them get even more out of their notebook PCs than they might get from a desktop at the office. And the prices, sizes and gorgeous looks of these machines make them excellent traveling companions, as well as powerful tools for the home office.

Newark, Calif.-based ASUS Computer International has engineered technology for both businesses and individuals for over a decade. Now the company aims to replace

many expensive desktop systems and notebooks with an unprecedented line of Microsoft Windows-certified notebooks. The company is bringing small, superbly crafted and blazingly fast Intel Pentium and Celeron-driven computers within the reach of every SOHO user, mobile presenter, student and IT executive.

THE A1: LOOKING GOOD, INSIDE AND OUT

Students and city dwellers will appreciate ASUS' A1 series notebook, which packs all the strengths of a full-featured, multimedia desktop into a durable, lightweight (6.6-pound) package. The A1 sports a full-size keyboard (with three one-touch programmable keys), 24x CD-ROM drive (or an optional 8x DVD-ROM), a video conferencing-ready V.90 56Kbps modem, a PS/2 port and two PCMCIA-compliant PC card slots. And users can choose between 13.3-inch or 12.1-inch active matrix displays with resolutions up to 1024x768 and 800x600

pixels, respectively.

The A1's indigo blue and magnesium alloy finish make it a head-turner in cafés and classrooms alike. But this notebook offers users more than good looks. Inside, they will find support for Intel Mobile Pentium III and Intel Mobile Celeron processors, and room for up to 192MB SDRAM. The A1's smart architecture also permits PIII upgrades up to 850MHz, and Celeron upgrades up to 700MHz. Thanks to ASUS' own ADTD Dynamic Thermal Dissipation technology, even Intel's fastest chips will run coolly and efficiently with heavy use.

Gamers will also thrill to the notebook's built-in support for 16MB VRAM and 128-bit 2D/3D graphics acceleration, enabling 16.7 million color performance in CRT displays. And music lovers will be hooked on the A1's robust audio features, including high-fidelity stereo speakers, stereo input and output jacks, and side-panel buttons that allow them to play CDs while the A1 is turned off.

The A1 Series: Indigo blue and magnesium alloy finish make it a head-turner.



The S8 Series: For users who want it all: desktop performance, great looks and ultra-light portability



PEOPLE

THE S8: SPRY FEATHER-WEIGHT KO'S DESKTOP PERFORMANCE

Users who want it all—desktop performance, great looks and ultra-light portability—should check out the eye-popping features in ASUS' S8 series notebook. This ultra-featherweight model owes much of its beauty, from its smooth curves to its hi-tech magnesium alloy chassis, to the A1. S8 buyers can also choose between two trim colors, scholar blue and London yellow. Inside, users will find a full-size keyboard with four programmable hot keys, two USB ports and a video-out jack that make the S8 especially helpful to highly mobile presenters.

The S8 also supports ASUS' new USB Port Replicator, which provides users with the functionality of four USB ports, two PS/2 ports, as well as serial and printer ports, without requiring them to constantly plug and unplug a multitude of peripheral connectors.

The L8 Series: Perfect for users hitting the road with challenging applications or major multimedia presentations



And there's more: just like the A1, the S8 is a high-speed Pentium III machine (available with Celeron, too) that ships with 8MB of embedded video RAM and supports up to 192MB SDRAM. Yet ASUS' engineers have created a highly integrated PC infrastructure and space architecture that makes the S8 super-svelte at 3.9 pounds and 1.1 inches thick.

THE L8: MOBILE USERS GET THE BIG PICTURE

For users hitting the road with challenging applications or major multimedia presentations, ASUS recommends the L8, which is as portable as it is reliable. The L8 is only 1.37 inches thick, and weighs just 6.4 pounds, yet it boasts a full-size keyboard with two one-touch programmable keys, and a 14.1-inch LCD display that delivers resolutions up to 1024x768 pixels. The L8 also adds two USB ports to the list of connectors that are a part of the A1. ASUS ships L8 notebooks with 32x CD-ROM (or optional 8x DVD-ROM),

and the manufacturer's engineers have made upgrading the system's 64MB standard memory to 256MB a snap.

THE M1: SPACIOUS, POWERFUL, LIGHTWEIGHT

ASUS has just combined some of the best features from all of its notebooks into the M1, which is razor thin (at 1.16 inches), lightweight (4.15 pounds) and smart (supporting Pentium III and Celeron processors and SDRAM up to 320MB). Its ultraslim module drive bay, USB port, infrared port and full-size keyboard make the M1 a worthy companion on any mobile mission.

Each of ASUS' notebooks combines the fastest CPUs available with high memory capacities, built-in V.90 56Kbps modems and 10/100Mbps LAN connectivity. For more details about ASUS' notebooks, visit <http://notebooks.asus.com>.

Road warriors and SOHO users alike are finding that they must be self-sufficient if they hope to stay out of the office. That's why they can count on ASUS' engineers to answer their technical support questions, 24x7. Indeed, with the combination of ASUS hardware and tech support, many users may wish they had left the office sooner.



The M1 Series is razor-thin, lightweight and smart.

mobilemanager

Continued from page 1

Asked to select one device in his arsenal as his favorite, Jacknis unhesitatingly picks his RIM BlackBerry palm-sized two-way communicator that can send and receive e-mail messages. "It's indispensable; it is the most important device I use." The BlackBerry proved its value last year when the Indian Point Nuclear Generating Plant developed a leak. The level of urgent e-mail messages surged to epic proportions as the crisis mounted.

"In times of a crisis, I prefer to see information in writing so there's less of a chance of a misunderstanding," Jacknis notes. While Jacknis routinely uses his cellular phone for one-to-one conversations, the Black-



Sony's VPL-CX10 SuperLite LCD projector offers dazzling brightness in a compact, 7.7-pound package. With a USB port, the VPL-CX10 is designed for multipurpose use, with tabletop and rear projection capabilities.

berry is more efficient for sharing written information quickly. "However, when a communication gets to the 'let's talk about it' stage, or when messages volley back and forth more than three times, it's time to stop typing and get on the cell phone," he adds.

However, new technology may begin to change this perception. For example, AT&T's Digital PocketNet multi-network cellular phones combine voice service with access to corporate e-mail, personal schedules, Web content and the address books found in popular groupware applications including Lotus' Domino, Microsoft's Exchange, and Novell's Groupwise. Digital PocketNet service uses Cellular Digital Packet Data, an IP-based communication architecture that supports secure data transmission at a raw data rate of 19.2Kbps.

Measured in terms of market penetration and matu-



Texas Instruments' Digital Light Processing (DLP) technology.

rity of technology, wireless is still in its infancy. To maximize your investment in wireless equipment, you must recognize what the current equipment is best suited for. "Set realistic expectations and initially expect a period of low or negative productivity as you learn how to use this equipment," says Kneko Burney, Director of eBusiness Services at

Cahners In-Stat Group in Scottsdale, Ariz. "Recognize that near-term it is best used for transmitting smaller pieces of written and verbal information," she adds.

The best features of this new technology may still be on the horizon. "We are still in the Model-T-Ford days of wireless," says Gerry Purdy, CEO of Mountain View, Calif.-based Mobile Insights. According to the experts, the best is yet to come as wireless technology matures.

GREATER FREEDOM

Over the past three years, the quality and volume of wireless communications, as well as the number of methods for sending and receiving messages available to consumers, have expanded. Vendors have responded with ever-faster and more intelligent products.

For example, Bluetooth, an intelligent, short-range home and small business wireless networking technology, promises to eliminate the need to hardwire your computers together. Aside from the time and cost savings, Bluetooth takes convenience to a new height. Picture this: You're in a meeting with a customer who has just requested that you revise your proposal. You

want to close the deal now, while the negotiations are going your way. You enter the changes into your laptop, wait while Bluetooth synchronizes your machine to the customer's wireless network, and print your revised proposal on the customer's printer, all within seconds. No cables or converters needed.

In fact, if the experts' predictions hold true, your next car could become part of your network. Advances in computer technology will make the car of tomorrow another peripheral device in your wireless stable. In a classic role reversal, your four-wheeled, 2,000-pound portable laptop will let you sit in its lap. The adoption of the proposed 3G (third generation) standard for mobile

Continued on page 7



AT&T's Digital PocketNet multi-network cellular phones combine voice service with Web access.



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Continued from page 5

phones and network infrastructure will offer transmission speeds up to 384Kbps, 50 times faster than current data transfer rates, enabling new services barely dreamt of a year ago. Imagine entering your car with notes from a customer meeting on your laptop. Using a security code to access the embedded wireless network in the car, you send the customer you just left a thank-you note and confirmation of your agreement. Of course, the information is also automatically transmitted to your server.

At Microsoft, the pursuit of pervasive computing drives the development of next-generation wireless Internet products. The "Stinger," due for release next year, is a combination of PDA and Internet-enabled smart phone. It will offer an easy-to-read color screen, a Web browser and applications such as a mobile version of Microsoft Outlook, a calendar and a contacts list.

All-in-one devices like the Stinger would mean that people such as Chris Dunn wouldn't have to carry multiple devices. Dunn, president of True Synergies, a Scottsdale, Ariz.-based infrastructures services provider, routinely totes a Nextel phone, Palm VII and a

laptop when he's out of the office, which is about 50 percent of the time.

"Without that stuff, I'd go through withdrawal," he says candidly. "I need regular information transfusions." One of Dunn's time-saving strategies involves uploading PowerPoint presentations, contracts and documents to mydocsonline.com, a Web-based file storage service. He then uses his wireless Palm to e-mail the documents directly to clients and to colleagues.

"My equipment is never a burden; it's always a benefit. The more I use them, the more comfortable and dependent on them I become," he admits, adding "they help to make my life a little easier."

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WATCHING YOUR WEIGHT

Business travelers are weight-conscious. Not only of their own body weight, but of their luggage's weight as well. When you are already toting cell phones, laptops, and PDAs, less is definitely more when the need arises to bring along a projector for a sales presentation.

Pioneering advances in mobile projection technology by Wilsonville, Ore.-based InFocus Corporation have resulted in a microprojector that's 40 percent smaller than last year's trimmest model. Yet the new model still delivers a dazzling 1100 lumens of illumination, full multimedia functionality and XGA resolution. Measuring a compact 6.7 inches by 8.6 inches and a trim 2 inches thick, which is smaller than some laptop computers, the InFocus LP130 pro-

vides remarkable performance in a three-pound package.

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InFocus LP130 projector

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DLP's refractive systems offer

greater 3D image depth and less visual noise, which allows viewers to see more detail in the image. What's more, the increased brightness of DLP's high-contrast images, as much as 400:1, makes images easier for participants to view from the sides of the room. Combined with the LP130's zoom lens and digital keystone correction, DLP technology projects a crisp, distortion-free image even in ambient light.

The LP130's other advanced features include a 2000-hour lamp life, HDTV compatibility and the standard M1-DA connector that incorporates Digital Visual Interface (DVI) digital, analog and USB connectivity. InFocus packages all this in a rugged, lightweight magnesium case to help ensure that you, your equipment and your presentation arrive ready to work.



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Mobile professionals would like to use their compact, sleek handheld devices as often as they can in place of the bulkier laptops they have traditionally lugged around. Handhelds like the Palm V, Sony Clie, and Handspring Visor are much more than just contact-management tools with function buttons. Properly synchronized with PCs and other platforms at the office, these devices offer mobile professionals significant productivity boosts and possibly a leg-up on the competition.

Fortunately for the growing legions of mobile professionals—there are some 25 million in the United States today—there is one company that has been enabling and simplifying the exchange of information among different programs and different platforms for 16 years. As the world's leading compatibility software provider, DataViz (www.dataviz.com) offers solutions that are custom-fit to the needs of people requiring fast, reliable and highly functional information exchange. More recently, DataViz has focused its attention on serving the needs of Palm users, providing enhanced compatibility between their handheld devices and their desktops.

SOLUTIONS TO GO

Consider DataViz's Documents To Go, which allows users to take their Microsoft Word, Excel and other files, such as contracts, sales numbers and proposals with them on their Palm OS handhelds. The versatility of Documents To Go is shown by the wide range of customers it has attracted, including the Los Angeles Police Department, University of Nebraska Medical Center, and Michigan Aerospace Corp., to name a few. In an independent review, *PC World* said Documents To Go is "a must-have for Palm users who need to edit or revise their work on the go" and "has the added flexibility of supporting a variety of file formats."

Documents To Go allows users to create, view and

edit their important files anywhere, anytime, allowing them to get more done on the road. With a click of the HotSync button, users will get the most recent revisions of the documents on both the handheld and on the desktop...automatically. David Trotsky, a Documents To

Go customer, raves that "You can keep all your proposals with you all the time and answer important questions on the spot while your competitor needs to go back to the office to answer them."

As a bonus, users who buy Documents To Go get DataViz Mail as well. This



enhanced e-mail application for handhelds enables users to synchronize their mobile devices with desktop e-mail clients, including Microsoft Outlook and Lotus Notes, while simultaneously retaining all the user's attachments.

So if you are trying to synchronize e-mail down to your handheld without using DataViz Mail, you may well only be getting half the message. But with DataViz Mail, a simple click on the paper-clip icon allows you to view and edit your attachments immediately.

Loaded with functions, features and ease-of-use, Documents To Go sells for \$49.95 at leading retailers and office supply outlets, including CompUSA, Staples and Best Buy. It is also available online from sites like Amazon.com, Palmgear.com and Handango.com.

Information exchange between different programs and different platforms made easy: It is what you'd expect from a company whose sole mission is to increase the productivity of today's mobile professional.



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tools and
technologies
to care for
remote
workers

LONG DISTANCE OPERATORS



W

hether they're telecommuting or working at a branch office, you can safely say three things about remote users. First, there are more of them than there used to be (and that trend will accelerate for the foreseeable future). Second, many are high-value-add users who contribute greatly to the organization's bottom line. And third—they're no longer content to be second-class network citizens.



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While the cost of bandwidth is dropping, remote demand is rising even faster. So a buying spree is not the answer. The key to getting remote users the bandwidth they need without breaking the bank is to undertake a balanced program of optimized network performance, wise use of policy- or network-

based quality of service (QoS), and prudent use of the growing number of bandwidth options, including cable modems, Digital Subscriber Line (DSL), and emerging wireless and satellite technology.

THE ABCs ...

A recent report from Cambridge, Mass.-based Giga Information Group says that when it comes to Internet and intranet access, too many organizations take the attitude, "If we just throw bandwidth at the problem, maybe it will go away." That's false, Giga reports, because remote users' increased hunger is outstripping the

falling price of bandwidth.

To truly address the remote access problem, you must start much closer to home, paying attention to the fundamentals of network architecture, infrastructure, and performance. Such basic measures as decentralizing Internet access to improve response time, measuring traffic flow to eliminate bottlenecks, and deploying QoS all deserve attention.

Like many universities, Waltham, Mass.-based Bentley College's network has recently seen a rise in traffic as many of its approximately 5,700 students download and swap music files. According to Traci Logan, vice-president of IT, the size of the pipe is not the problem: Bentley has a T3 line. Nevertheless, the Napster craze has prompted Logan to use Packeteer, a packet-shaping tool from Cupertino, Calif.-based Packeteer Inc., to assign bandwidth where it's needed most. "If we have a number of students transferring huge files, consuming huge amounts of bandwidth," Logan says, "we can give higher priority to news feeds and other more important activities—automatically."



... AND THE VPNs

Outsourced virtual private networks, or VPNs, have grown in popularity as IT departments seek to offload the complexities and staffing needs of the network. Maribel Dolinov, a senior telecom analyst at Cambridge, Mass.-based Forrester Research Inc., says, "The big thing about buying [a VPN] is that if you were to try and manage it yourself, it'd be hard no matter how much money you had. It's nice to call AT&T or UUNET and say, 'Come slap some boxes on the edge of my site.'"

Moreover, today's IP VPNs are cheaper than dedicated, leased-line WANs, and improved security measures have assuaged many businesses' fears of data loss.

Steven Harris, an analyst at Framingham, Mass.-based International Data Corp. (IDC), says IP VPNs are making inroads on their traditional frame-relay counterparts, though he foresees no "wholesale shift." Harris says the market for IP VPNs will grow about 50% a year for the next five years, and that the growth "comes from WAN managers interested in remote access."

The trouble with VPNs for remote offices is availability. Dolinov says this is a perpetual problem for businesses. "It always seems they

offices. Traditional business-quality options such as T1 and frame-relay networks cost as much as \$1,500 a month—prohibitively expensive for many smaller remote offices.

In addition to cable and DSL, newer broadband technologies such as wireless networking and satellite IP access are waiting in the wings.

▶ ▶ ▶ **DSL.** According to Current Analysis Inc. in Sterling, Va., businesses will spend \$5 billion on DSL in 2003, by which time about a third of the 7.7 million DSL lines in service will be for business use. DSL costs significantly less than T1 lines and skirts some security problems inherent in cable modems.

However, in the near future, DSL access will remain clustered in developed areas, which promise a better payoff for providers. So if your remote offices are in remote areas, they're likely to be out of luck. Also, reports of inconsistent service, combined with recent high-profile business setbacks at ambitious DSL providers, indicate that network managers must shop carefully.

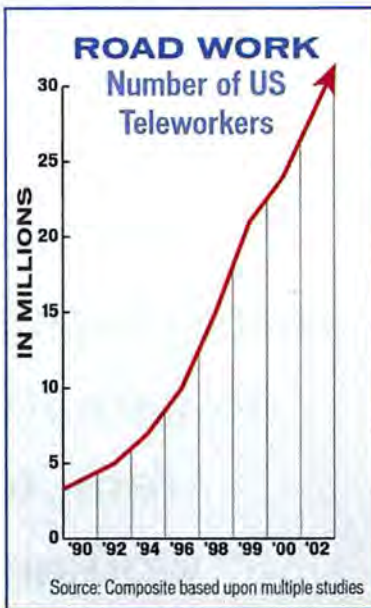
▶ ▶ ▶ **Cable modems.** Offering real-world speeds in the 1M bit/sec range and above, cable modems are also crossing over from the residential to the remote-office market. The price is one major draw: in some cases, small branch offices can be served for less than \$100 a month.

Data security, a perennial concern where cable modems are concerned, is likely to remain a sticking point for organizations that move lots of sensitive data. And businesses may balk at standing in line behind residential customers for service calls.

▶ ▶ ▶ **Wireless and Satellite.** Put off by the high cost of wired solutions, especially in urban areas, some organizations are turning to wireless technology.

Getting an enterprise network to interoperate with a satellite network used to be a prohibitive headache, but a multitude of improvements—including an updated digital broadcasting standard, new-generation satellites, and better last-mile connectivity—are making IP satellites a viable option for remote offices. Some business users report they can configure asynchronous outbound satellite traffic up to 45M bit/sec, with inbound traffic at 2M bit/sec. The cost per location for such a setup runs about \$1,000.

When it comes to remote-office bandwidth, there's no single answer. But as IDC analyst Brad Baldwin says, "The bottom line is, if you're part of a corporate infrastructure, you have a lot of choices for high-speed remote access."



"A study by Cambridge, MA-based consultants Arthur D. Little and Associates found that if **10 to 20 percent** of traditional commuters switched to telecommuting, savings would total **\$23 billion** annually. It would eliminate **1.8 million** tons of regulated pollutants, saving **3.5 billion** gallons of gas, freeing up **3.1 billion** hours of personal time and reducing maintenance costs for the transportation infrastructure by **\$500 million.**"



[VPN providers] can handle 50 out of your 60 sites," she says. And providers almost never agree to service-level agreements across anybody else's network. So what do you do about the sites that are left out in the cold? "Suffer," Dolionov says. "Grin and bear it."

HELP FROM 3COM

Many companies have built their remote access foundations around technology supplied by 3Com, whose award-winning technology and products enable users to stay connected by communicating and sharing information anytime, anywhere. 3Com provides complete end-to-end remote access solutions, including its remote access concentrators. Their modular design is based upon interface and application cards that can be hot-swapped while the chassis remains online, so users experience no downtime and the network stays up.

3Com is also a leader in the fast-emerging wireless solutions arena, where 3Com's advocacy of the business-critical Bluetooth technology mirrors its leadership in pushing for the wireless LAN and networking standards so important to remote office architecture.

BROADBAND OPTIONS

Though often thought of as consumer technologies, cable modems and DSL are growing in popularity for business users in remote



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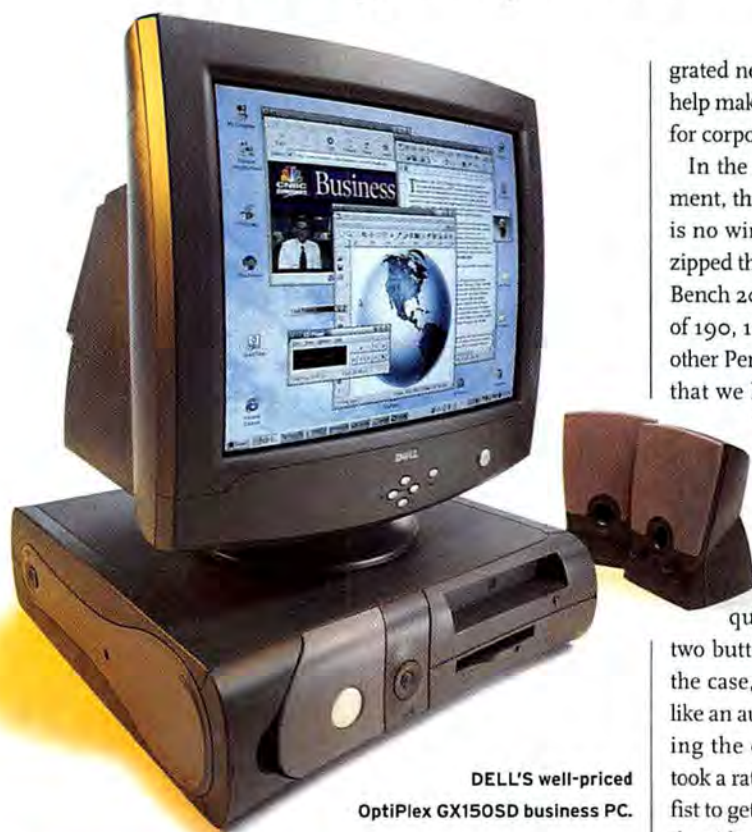
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NEW PRODUCTS

Power, Easy Access Make for a Winning Corporate Dell



DELL'S well-priced
OptiPlex GX150SD business PC.

DESKTOP WITH ITS FUTURISTIC, easy-to-open, black-and-gray case, Dell's new \$1353 OptiPlex GX150SD looks like a power toolbox. But this is no ordinary box. With its network administration features, muscular performance, tool-free manageability, and stylish new design, Dell's latest corporate desktop system should satisfy most IT buyers.

For instance, the 20GB hard drive, the 8X/4X/32X CD-RW drive, and the floppy drive can all be removed without tools. The motherboard pops out easily with the removal of one screw. A handy chassis-intrusion feature alerts IT managers when employees tinker with their systems. Dell's bundled OpenManage Client administration software and Wake-on-LAN (via an inte-

grated network interface) also help make this an ideal system for corporate environments.

In the performance department, the OptiPlex GX150SD is no wimp. A shipping unit zipped through our PC World-Bench 2000 tests with a score of 190, 12 points ahead of the other Pentium III-933 systems that we have tested running Windows 2000.

EASY ENTRY

GETTING TO the components is easy—no tools required. Simply press two buttons on either side of the case, and the top flips up like an automobile hood. Closing the case was harder—it took a rather heavy slam of my fist to get the plastic latches on the sides to catch.

Though the OptiPlex's case is small, Dell makes good use of its space. For instance, PCI cards install on a riser card within a cage that also comes out sans tools. However, the cage felt flimsy and probably could be made more secure with a screw. And the small case means expansion is not this OptiPlex's game. Only two open PCI slots are available, and no drive bays.

On the outside, the case sports a standard case-lock loop; twin USB ports on the front allow easy attachment of USB peripherals.

To accommodate users with different space constraints, the OptiPlex can lie flat as a desktop system or sit upright on the floor, thanks to an included stand. A bit of company vanity: You can orient the Dell logo on the cover that protects the USB ports either horizontally or vertically, so it's readable no matter how you decide to position the case.

The 17-inch Dell E771p monitor that came bundled with our test system delivered bright images. Other, more-expensive Dell monitors, such as a 15-inch LCD, are available.

With its reasonable price and its slew of administration tools, Dell's OptiPlex GX150SD provides a versatile, manageable choice for IT pros looking for fast systems to deploy at the office.

—Kalpana Narayanamurthi

OptiPlex GX150SD

PRO: Powerful performance, network administration features, and tool-free manageability for a reasonable price.

CON: Limited expansion options, difficult to close the case.

VALUE: Best suited for corporate IT buyers seeking performance and easy manageability.

Street price: \$1353

Dell Computer
800/388-8542
www.dell.com

Easy CD Creator 5: A Software Smorgasbord

CD-RW SOFTWARE

ROXIO'S NEW **Easy CD Creator 5 Platinum** software suite is a fine first product from this Adaptec spin-off. Improvements over version 4 include a slicker, more intuitive interface; the ability to encode MP3s (with playlist creation); and support for Windows Media Audio.

Easy CD Creator 5 Platinum

PRO: Handles virtually all CD-related chores, including MP3 encoding and video CD editing.

CON: Holdover bugs and annoyances; different interfaces for programs can be irksome.

VALUE: Worth upgrading to if you want the extras.

List price: \$100, competitive upgrade \$50

Roxio

408/934-7283

www.roxio.com

At the heart of version 5 are the Project Selector, which helps you move between programs in the suite, and the new SoundStream app that makes creating audio CDs easy and intuitive. SoundStream incorporates version 4's Spin Doctor audio restoration program (record from vinyl, remove hiss and scratches, then save to digital format), and its equalizer and normalizer (to process songs to uniform volume). It also adds a realizer (for boomer bass and brighter highs) and an MP3 encoder. You get just about everything you need to process and record audio material.

A few gripes: You can see only the first 30 or so characters of song names, and you can't drag and drop files from Explorer windows to the playlist—instead, you have to work from a folder.

Welcome additions on my \$100 shipping copy included a disc-recovery and disc-repair utility; a simple video editor; MPEG-1 video encoding; and DirectCD packet writing support for Hitachi and Toshiba DVD-RAM drives.

A few annoyances from earlier versions persist. The user interface isn't the same for all programs in the suite. Overwriting with DirectCD can take three or more times longer than the original write. You cannot test a hard drive for transfer speed—critical to proper writing of a CD—if it doesn't hold the right number of files. There's no batch function for testing multiple hard drives or partitions.

Easy CD Creator 5 Platinum is still the most comprehensive CD authoring package available. But it's a must-have upgrade only if you're unhap-

Portable Personal CD Burner for Music, Data

CD-RW PLAYER/DRIVE

WHEN YOU'RE ON the road, an audio CD player helps kill time during flight delays. But you may also need a CD-RW drive for emergency backups and for passing data to colleagues.

Sony's \$399 **Digital Relay CRX10U-A2** combines both devices. It records CD-R and CD-RW at 4X, reads CD-ROMs at 6X, and plays CDs of MP3 files.

The 15.5-ounce Digital Relay's sturdy 5.25-by-1-by-7.5-inch case is longer and a bit bulkier than typical stand-

alone CD players due to its rechargeable lithium ion battery, which powered 2 hours of MP3 CD playback in my



SONY'S Digital Relay CRX10U-A2 plays CDs and writes CD-RWs.

tests. Sony says the unit will last 2 hours while recording CDs (at 4X, that's six CDs). Also included are two user-friendly recording packages and a data backup program.

I used a shipping unit to burn CDs with data or MP3 files. Results were great, but not as speedy as with the latest internal 16X/10X/40X CD-RW drives.

The Digital Relay's shockproof mechanism kept skips at bay as I listened while bouncing around a gym. The sound quality was excellent via

- 72 Dell OptiPlex GX150SD
- 73 Roxio Easy CD Creator 5; Sony Digital Relay CRX10U-A2
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- 79 Adobe Photoshop Elements; Kodak MC3 digital camera
- 80 Apple PowerBook G4; V Communications DriveWorks
- 82 Sanyo Fisher IDC-1000z IDshot digital camera; Novatel Wireless Merlin for Ricochet
- 86 WebLink Wireless, Motorola Talkabout T900; EBeam Presenter, Mimio BoardCast
- 88 Agate Q, Microtech ZiO; Intel Pocket Concert Audio Player



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py with version 4, or another package—in which case, a \$50 competitive upgrade offer sweetens the deal.

—Jon L. Jacobi

the supplied earphones, which are equipped with a narrow remote that controls most playback operations.

If you want a portable USB CD-RW drive, there is little reason not to choose the Digital Relay.

—Melissa J. Perenson

Digital Relay CRX10U-A2

PRO: Portable, battery-operated CD-RW drive and MP3 CD player.

CON: Battery life could be longer; CD-R write speed is only 4X.

VALUE: Cheaper than a separate CD-RW drive and MP3/CD player.

List price: \$399

Sony Electronics

800/352-7669

www.sony.com/digitalrelay

Peek Into Your PC From Anywhere

REMOTE ACCESS

ON THE ROAD—and missing an important file left behind on your office system? With remote PC-access software, you can quickly save the day. New entrants in this category include Expertcity's Web-based GoToMyPC and an updated version of Symantec's long-standing PCAnywhere. GoToMyPC's simplicity makes a better fit for newbies who need to access less-sensitive data, while PCAnywhere 10's complex user interface and features speak to tech buffs and IT managers.

In my tests, remote file and application transfers worked well with both programs but didn't execute as quickly as if I were working on the remote PCs themselves. Both are supposed to be compatible with Windows 9x, NT, 2000, and Millennium.

Using a beta of GoToMyPC, I quickly established an account at Expertcity's Web site,

filled a blank window with a nickname for the computer I wanted to access, and clicked the Add Computer button. After a few more clicks, that nickname appeared in my account window. To gain remote access to the first PC, I went to another system with Web access, logged in to my

clicked the icon to indicate the type of connection I used. Multiple tabs then appeared, through which I could set connection information, security options, item protection, and more. I also made additional choices, including the Internet protocol address of the host and automatic shutdown after my session. I then repeated

DESKTOP VS. BROWSER: PC-Anywhere (top) and GoToMyPC take different approaches to remote-access computing.



the same process on the host computer, creating a successful connection.

This version of PCAnywhere boasts a number of new features. Among

them are security enhancements, such as a remote-access perimeter scanner that scans network and telephone lines for unprotected systems; a Packager tool that enables more-flexible installs; and file-transfer enhancements, including a list of directories accessed previously.

The simple GoToMyPC Web interface will charm new users, but its security may make IT managers uneasy. The GoToMyPC desktop app handles firewalls by periodically checking with GoToMyPC's servers to see if a user is trying to log in. But while providing 128-bit encryption of data streams and SSL (secure sockets layer) encryption, GoToMyPC lacks PCAny-

Tote a Tiny Mouse

IF YOU HATE that touchpad mouse on your notebook but don't want to pack a regular mouse for the road, read on. Atek Electronics' \$50 Super Mini Optical Mouse is just 1 inch wide and 2.5 inches long, comes in its own travel bag, plugs into a USB port, and requires no additional software. This two-button optical mouse requires little movement to navigate the cursor and works on any surface. The shipping version I tested performed well for short computing sessions.



Its Lilliputian size, although travel-friendly, became ergonomically unfriendly with continued usage, but I still prefer it to some touchpads. Atek Electronics, 888/889-9990, www.atekelec.com

—Michael S. Lasky

where's extra security features, such as the ability to limit login attempts and restart the remote system. Of course, both programs require that the remote PC be left on, and both help protect against intruders—GoToMyPC by locking the host's keyboard, PCAnywhere with passwords.

Individuals should find GoToMyPC a handy way to retrieve forgotten files; the beta version is free until May 1. Enterprises may feel more comfortable using hyper-security-sensitive PCAnywhere 10, which costs \$180 (discounts for multiple units).

—Stephanie Bruzzese

GoToMyPC

PRO: Web interface allows remote access from any system with an Internet connection.

CON: Application's ability to get past firewalls will make the security-sensitive queasy.

VALUE: Best for forgetful individuals who leave needed files at work. List price: Beta free until May 1

Expertcity

877/397-2489

www.gotomypc.com

PCAnywhere 10

PRO: Strong security features give businesses extra peace of mind.

CON: Complicated configuration process.

VALUE: Best for corporate customers with knowledgeable tech staff, or for advanced consumers. List price: \$180 (discounts for multiple units)

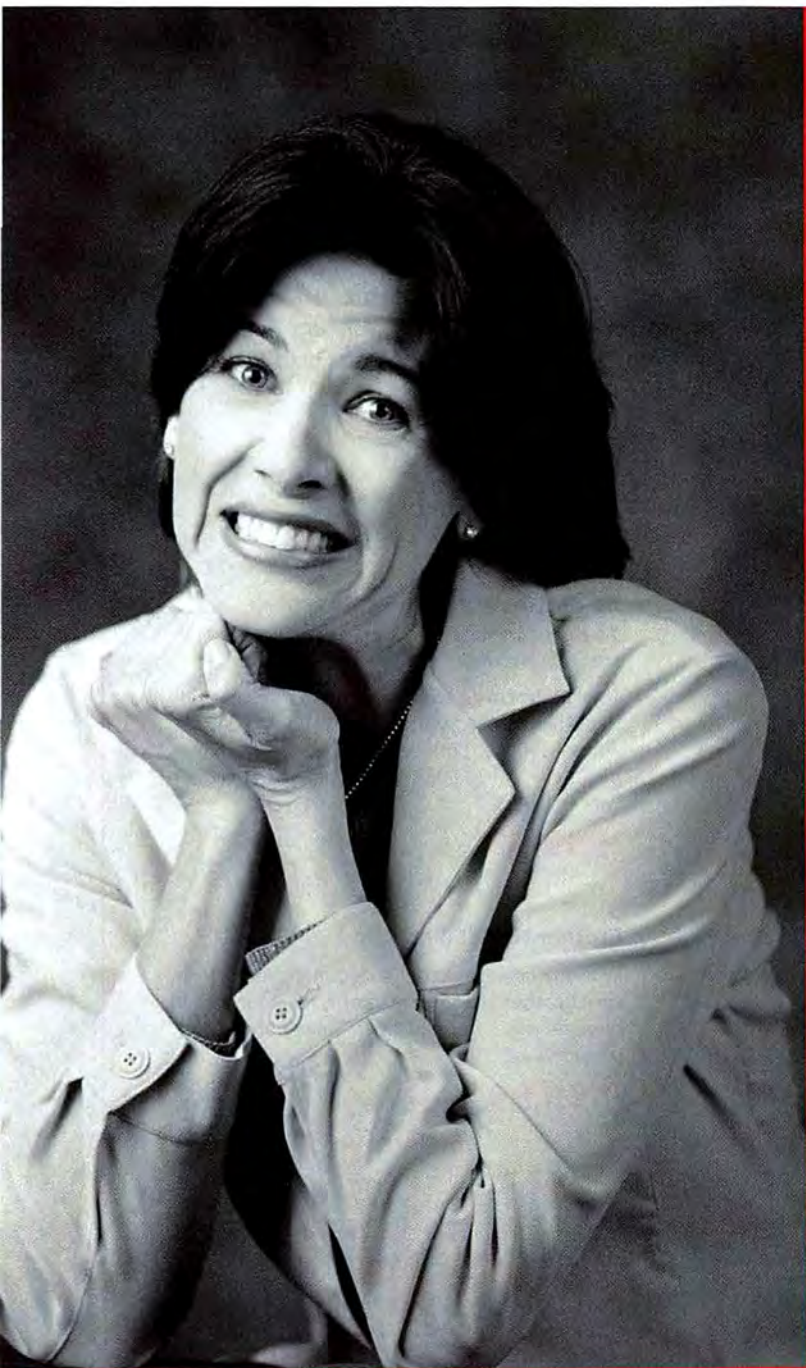
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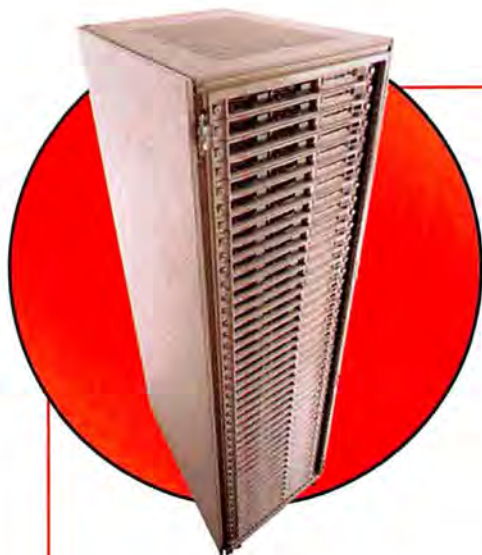
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"When you get a minute, we need IT's buying history."

Translation: The CFO needs IT's buying history by tomorrow.



How to get the
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Adobe Photoshop Elements Buries Its LE Past

IMAGE EDITING

DO YOU WANT to fix up photos from a digital camera or scanner without having to master a high-end graphics program? Adobe Systems' new **Photoshop Elements** image editor provides a robust mix of features and enough hand-holding to help novice and intermediate users. I looked at a beta version.

It replaces Photoshop LE, which lacked full versions of Photoshop's best features and made only a feeble attempt to help users learn the program.

By contrast, the \$99 Elements boasts tools not found in Photoshop that help you learn standard graphics procedures. Recipes, which are text-based instructional procedures housed in a palette, help with tasks such as color correction. The application shows you how to do something, but it won't apply the fixes for you—you have to do most of the work yourself, which lets you learn to use the tools.

A new red-eye-reduction brush works similarly to MGI PhotoSuite's. Wipe the brush over the demonized pupil; the first point you click sets the color to be corrected. Photo-



ELEMENTS' RECIPES guide you through graphics tasks such as adding a drop shadow to text, but they don't do all the driving.

Suite's tool requires less precision, but that's the only advantage that program has.

Vector-based shapes and text are rare in low-priced graphics applications; Elements includes both. Type text onto the canvas or add shadows and bevels, and the text

remains sharp at any resolution. Elements' Fill Flash tool does an easy and competent job of brightening a photo.

One included feature sorely missing from Photoshop LE was multilevel undo. Elements allows you to map multiple undo/redo steps to the

new History palette (cataloging every action you implement), so you can step forward and backward.

Elements cannot work in CMYK (four-color) mode, necessary for professional printing. However, instead of refusing to open such files, Elements offers the option of converting them to RGB format. It can also handle Encapsulated PostScript files.

Elements lacks such Photoshop features as curves, color channels, and perhaps most important, masking, which lets you protect areas of an image from change. (The new app can create adjustment layers, to tweak an image without affecting the underlying base.)

For most users, Elements has it all over every other image-editing application except for Photoshop, the leading application in the field.

—Alan Stafford

A Digicam That Plays MP3s

DIGICAM/MP3 PLAYER

WITH A purple-and-black case and a vertical design, the **Kodak MC3** digital camera grabs your attention. And this capable, if low-resolution, still and video camera doubles as an MP3 player. The \$299 unit has a CompactFlash card slot for

storage; my preproduction unit had a 64MB card.

To use the MC3, simply flip a switch to select still, video, playback, or MP3 mode (one task at a time); its menu is intuitive. Uploading images is also easy via the USB cable (a more convenient USB cradle is \$25) and bundled software.

The camera's 640 by 480 resolution is sufficient only for on-screen viewing or small prints. Image colors can be slightly off without bright light (there is no flash), and the still camera often blurred objects in motion. The 320 by 420, 20-frames-per-second video looks fuzzy on a big screen.



STILLS, VIDEOS, and MP3s: Kodak's versatile MC3.

The audio sounded full, and the mono speaker and microphone are both adequate.

Despite some limitations, this pocket-size camera is good enough for casual audio and visual fun.

—Melissa J. Perenson ▶

Photoshop Elements

PRO: Helps you learn without getting in your way.

CON: Lacks high-end Photoshop features.

VALUE: An excellent mix of features for the money; ideal for intermediate-level users.

List price: \$99

Adobe Systems

800/833-6687

www.adobe.com

Kodak MC3

PRO: Digital still and video camera and MP3 player, at a low price.

CON: Low image quality; no flash.

VALUE: Good casual-use camera and MP3 player in one.

List price: \$299

Kodak

800/235-6325

kodak.com/go/mc3

Light Is Right: Apple's Ultrathin PowerBook G4

NOTEBOOK

APPLE'S **PowerBook G4** might be the right portable studio for churning out your next video opus. This well-designed notebook features an extra-wide screen, high-speed ports, and video-editing

software—all in a sturdy, lightweight titanium case.

I looked at a \$3499 shipping unit equipped with a 500-MHz PowerPC G4 processor, 256MB of SDRAM, a 20GB hard drive, a 15.2-inch screen, a fixed 6X DVD-ROM drive, a built-in 56-kbps modem, and a network adapter.

GREAT VISUALS: Apple's PowerBook G4 features an extra-wide screen.



The G4's screen, with an unusual native resolution of 1152 by 768 pixels and a 3:2 aspect ratio, accommodates large application windows side-by-side. To manage this feat, the 5.3-pound notebook's 1-inch-thick, titanium-and-carbon-fiber case extends an inch wider than standard. It's the lightest laptop we've seen that carries a 15-inch screen.

Apple is touting this model, equipped with a PowerPC G4 chip, as the first laptop that is capable of supercomputer-class gigaflop speed. Only a handful of high-end graphics and video-editing applications currently are opti-

mized for the chip, however.

On the front of the G4, the self-loading DVD-ROM slot noiselessly accepts discs; Unfortunately, you can't swap out this drive for any other type of internal drive, and you can't connect drives externally unless you buy relatively cumbersome USB or IEEE 1394 (FireWire) versions. To reach the outside world, the notebook has an IEEE-1394 port, two USB connections, an ethernet port, and built-in wireless networking circuitry. (The last requires a \$99 AirPort card.) The G4 packs an industry-standard ATI Rage Mobility graphics card with only 8MB of dedicated graphics RAM.

I had trouble getting a DVD-ROM movie to play without interruption while I tried to work on another application at the same time. And when the G4 works hard, its battery life falls far short of the 5 hours Apple claims: My G4 pooped out 2 hours into *Gladiator*.

The PowerBook G4 could be right for a graphics or video pro. But most office applications will run fine on a less delightful, less costly notebook.

—Carla Thornton ►

Making the Most of Humongous Hard Drives

UTILITIES

MASSIVE HARD DRIVES offer lots of storage space, but dividing that space into sections can make using it a lot easier. V Communications' **DriveWorks** is an integrated suite of software utilities that handles partitioning a hard drive, imaging it, and more, for \$70.

DriveWorks runs in DOS, but you can install and launch it through any version of Windows except 2000 and NT; for those or for Linux, you must boot from the included floppy disk. You can use DriveWorks with almost any PC—386 on up—that has 8MB of RAM.

The software has a straightforward Windows-style interface and wizards that walk you through various tasks. Partition Commander, the solid, easy-to-use core utility, lets

you create, delete, resize, and move partitions, and convert them between disk formats such as FAT32 and NTFS.

Image Commander can capture images of whole drives or individual partitions and then save those images—including every file—in a single compressed file. Restoring a partition or drive from an image is quick and easy, but you can't

restore individual files from an image (you must restore all files). The program also has weak support for using CDs to save and restore images, making this approach cumbersome and inefficient.

My shipping copy of DriveWorks also included apps for copying an entire hard drive to another hard drive; for erasing a drive or partition so it can't be restored; and for automatically backing up files as you create and change them. But switching between operating systems—handy if you choose to run a different OS in some partitions—is more awkward with DriveWorks than with other partitioning software. Still, DriveWorks is powerful enough for most people, and you can't argue with the price.

—Lincoln Spector

DriveWorks

PRO: Does most tasks well.

CON: Restoring from images on CDs is unduly complicated.

VALUE: Price, power right for most. List price: \$70; downloadable version \$50; Partition Commander, Partition Commander upgrade, or System Commander 2000 upgrade \$40

V Communications

408/965-4000

www.v-com.com

PowerBook G4

PRO: Striking looks; mega-wide screen; powerful processor boosts speed in some applications.

CON: Limited graphics RAM, poor DVD-ROM performance.

VALUE: Big screen, strong processing, and understated chic—at a very steep price.

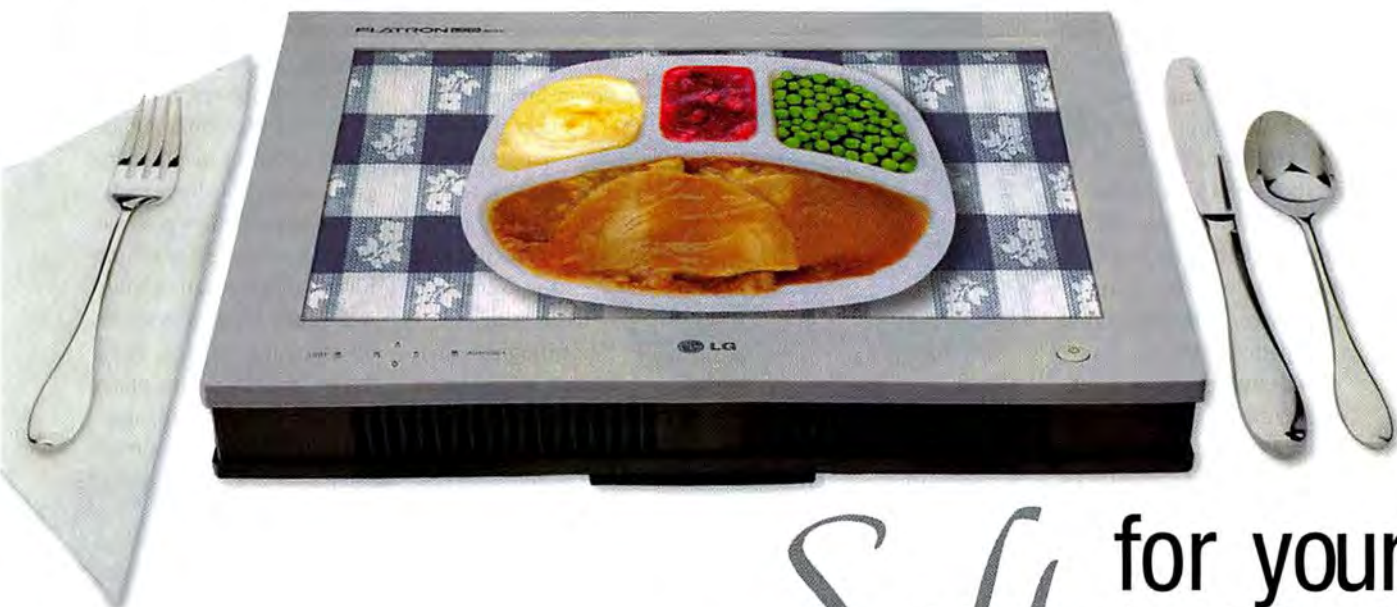
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Still and Motion Pictures in One Digital Camera

DIGITAL CAMERA

TIRE OF LUGGING both a digital camera and a camcorder when you want to take stills and videos of vacations or a kid's soccer games? Sanyo Fisher's **IDC-1000z IDshot** gives you full image and video capture in one device—convenient, but not a perfect solution.

While impressive for a camcorder, the \$1499 IDshot's 1.5 megapixels are meager for a still camera. The camera does capture VGA resolution (640 by 480) video at 30 frames per second—better than broadcast quality. And its price is steep for less-than-top-quality still images. For the same money, you could buy a 2-megapixel digital camera and a digital camcorder separately.

The Sanyo ID Photo digital disk in my shipping camera



SANYO FISHER'S all-in-one camera.

provided impressively high-capacity storage—730MB—for only \$35; flash memory used in other cameras costs around \$360 for 256MB. But the storage news isn't all good: This disk is bulky and incompatible with other devices.

Using the IDshot was fairly easy. The camera provides the usual LCD menu navigation for setting resolution, focus,

and exposure. A handy knob surrounding the power button let me smoothly switch from video to image to the "camera-PC" mode the unit uses to communicate with a PC. I shot roughly equal amounts of photos (in

middle to high resolution) and video (at one-quarter VGA), and found the rechargeable battery's life poor; it lasted only about 1 hour. The disk stores only about 8 minutes of video shot in VGA resolution.

The camera captures JPEG images and video in QuickTime—a compressed video format that keeps file size manageable—and supports USB and IEEE 1394 hookups.

When you connect via IEEE

1394, you can view and edit images and QuickTime videos stored on the ID Photo disk without transferring them to your desktop. The software bundle includes capture software, MGI PhotoSuite, QuickTime, a Sanyo panorama program, and Adobe Premiere LE.

This camera offers good video and average-quality still pictures—a combination that's well suited for Web multimedia and image sharing. But at \$1499, the IDC-1000z places a high price on convenience.

—Cameron Crouch

IDC-1000z IDshot

PRO: Good video camera; high-capacity, inexpensive storage; direct video transfer to the Web.

CON: Pricey overall, too ambitious.

VALUE: May be better to stick with still and video cameras instead.

List price: \$1499

Sanyo Fisher

818/998-7322

www.sanyousa.com

Mini-Modem for Wireless Internet Service

PC CARD MODEM

METRICOM's Ricochet service lets mobile users in major metropolitan areas access the Internet at speeds up to 128 kbps—wirelessly. But until re-

Merlin for Ricochet

PRO: First PC Card modem for 128-kbps Ricochet service.

CON: Stick-up antenna means card must be removed when notebook/palmtop is packed; pricey.

VALUE: Worthwhile if you prize small size and cable-free installation. Street price: \$299

Novatel Wireless

888/888-9231

www.novatelwireless.com

cently, you had to hook up an external modem the size of a large handheld to use the service. Now there's a less clunky (but pricier) alternative: the **Merlin for Ricochet** PC Card modem from Novatel Wireless.

My shipping copy of this Type II PC Card modem was a snap to install, and it came with drivers and software for Windows 2000, 98 SE, NT, and even Windows CE. I was up and running in a couple of minutes, using an account from Ricochet reseller Wireless Web Connect (at \$75 per month, currently available in 13 major urban areas). As with

the original USB/serial modem, the bandwidth you get depends on how near you are to one of the Ricochet access points; in general, the closer you are to a window, the better. In my tests in downtown San Francisco, the Merlin's speeds were sometimes painfully poky—as slow as 10 kbps. That is ade-

AN ANTENNA that won't fold flat.



quate for e-mail, but I certainly wouldn't try to use it for streaming media.

My one design gripe: The Merlin's antenna sticks out at an angle and won't telescope or fold flat against your notebook. As a result, you have to remove the PC Card from its slot to pack your notebook into a carrying case. And at \$299, the Merlin costs three times as much as the original USB/serial modem from Ricochet. That's a hefty premium, but for many mobile users the extra \$200 may be well worth spending to shed the cables and bulk of the external modem.

—Yardena Arar ►



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performance—to run either version of Windows XP.

Microsoft's stepped-up copy protection may prompt even more howls from users, however. During installation, Windows Product Activation will scan your system's hardware and create a "fingerprint" that you'll be required to transmit to Microsoft, along with the unique product key, within 30 days of installation. If you alter enough of the system's characteristics recorded in this fingerprint—by upgrading video, storage, and other components, for example—you may have to call Microsoft and convince a representative that you're not a software pirate before you can use the system again. The feature's main purpose, of course, is to prevent people from installing a single copy of XP on multiple computers, something determined crackers will surely view as a challenge.

NEW FACE, NEW FUN

WINDOWS XP'S most obvious innovations are strictly skin deep. A revamped interface offers richer colors and textures in icons, buttons, toolbars, and menus. A larger Start menu automatically displays icons of frequently used applications. Control Panel, My Computer, and other system folders link to common file-management tasks and organize icons into novice-friendly categories. Prefer the status quo? You can disable most of these features, after which XP will look a lot like Windows Me and 2000.

XP includes all of Windows Me's consumer-oriented add-

ons, and it even improves on some. A Camera and Scanner Wizard and the related My Pictures folder are bursting with ways to preview, copy, and print images, either from your PC or from your attached digital camera. Windows XP also supports the new Picture Transfer Protocol (PTP) for camera connections. The new Windows Media Player 8 is more streamlined and customizable than its predecessor, and it plays DVDs. Like Media Player 7, version 8 lets you manage the contents of an

mates DVD quality. Regrettably, the Windows Movie Maker application is just as limited in Windows XP as it was in Windows Me. Importing clips from your digital or analog source is easy enough, but the program's video editing tools are limited, and its output options even more so.

Windows XP inherits Windows Me's popular System Restore feature, which lets you roll back the system's state to an earlier configuration. There's also a new safety net: The Automated System Recovery wizard, tucked away in the Back-up program, guides you in creating an emergency boot floppy/CD-R combo that you can use to recover from a hard disk crash or other disaster in minutes. Unfortunately, this feature is not included in the Home Edition.

Despite Microsoft's ongoing legal battle over its browser marketing tactics, Internet Explorer 6 is one of Windows XP's least interesting updates. The main innovations since version 5.5 are a Personal Bar, which incorporates a miniature media player, and new privacy settings.

SHARE THE MACHINE

AT HOME, Windows Me and its predecessors do very little to make life easier for multiple users. When everyone in the family needs a private e-mail account, a place to run Quick-En, and room to play Tony Hawk's Pro Skater, chaos ensues. XP tackles the problem with a slimmed-down ver-



WINDOWS XP'S built-in firewall will appeal to people with always-on DSL and cable hookups.

attached digital audio player, but it adds the welcome ability to burn CDs. Even so, it's less full-featured than a product like Roxio's Easy CD Creator (see *New Products*, page 73).

Windows Media Audio and Video files will sound and look better, while using less disk space. Microsoft says it has improved the encoding algorithm for both formats, adding a new 750-kbps video stream rate (geared to cable and DSL connections) that approxi-



Site to See

POLICE AUCTIONS are great places to find deals on seized or unclaimed goods, but you have to show up at odd times, and selection is spotty. Now, at Property Bureau's PropertyRoom.com (www.propertyroom.com), local authorities can sell recovered merchandise—such as jewelry, stereos, TVs, cameras, computers, and collectibles—at a single virtual location. Property Bureau inspects and cleans all items before auctioning them. And if you've had something stolen, register your missing property at the StealItBack section so that the item can be returned if it is recovered. Already, several law enforcement agencies in California have begun using the auctions.

Top PC World Downloads

1 3DMark2000

19,532KB. Evaluate your system's 3D graphics performance.

2 PhotoPhilia

4563KB. View, edit, and organize images saved in almost any format.

3 PC Accelerator 5500 SE

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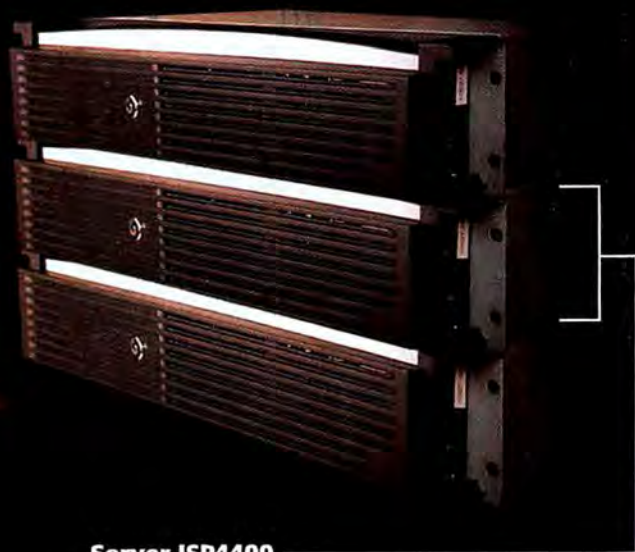
4 George Lucas in Love

9000KB. View the video parody in which the creator of *Star Wars* goes hunting for a muse.

5 Anonymity 4 Proxy

1010KB. Surf the Web in privacy, using an anonymous proxy server.

Find files on www.pcworld.com/downloads/top5/may2001.



Server ISP4400

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Power Server SC400

Success Story

Taking an idea for an online company from the back room to the forefront of category is no easy feat. But that's exactly what Band9 did. Time to market, scalability, and cost-efficiency were key considerations when Band9, an E-tailer based in Vancouver, Washington went to work spending over \$16 million in venture capital. Caliber Voyager servers with Intel Architecture played a central role in meeting the company's goals. By investing in six Intel® Pentium® III Xeon™ quad processor-based servers from Caliber, the company instantly acquired the power and scalability it needed in anticipation of its explosive growth. And because these powerful servers cost less than Unix-based boxes, Band9 could afford to launch a marketing campaign to build brand awareness for the new company.

Voyager Power Server SC400

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- Integrated Intel® Pro/100+ Fast Ethernet Controller
- Integrated graphics with 2MB SGRAM
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- Supports most popular OS

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Pass Notes the Wireless Way

E-MAIL PAGER

IF YOU CRAVE constant communication but can't always use a cell phone or PC, why not combine a **WebLink Wireless 2-Way Messaging** account with Motorola's petite **Talkabout T900**? This pairing allows you to send and receive brief text missives via e-mail, pager, other wireless messaging device, or even PCS cell phone.

WebLink Wireless's 2-Way Messaging stands out from similar services because of its versatility, its affordable pricing options, and the sporty T900 (the service also supports a few older devices). The soap bar-size, 3.9-ounce T900 has a thin lid that opens to reveal a minuscule keyboard. I found my \$180 shipping model fine for tapping out quick notes. (WebLink limits you to 100 characters per message.) The monochrome LCD inside the lid displays four lines of very readable text. A single AA battery powers the T900 for a couple of weeks. The device's address book

holds up to 250 entries. You get a numeric e-mail address with your account, and at WebLink Wireless's Web site you can configure the service to forward e-mail from up to six existing POP3 accounts from select ISPs, including AOL (MSN and Juno are not supported, however).

You can set up blocks and filters to fend off nonurgent

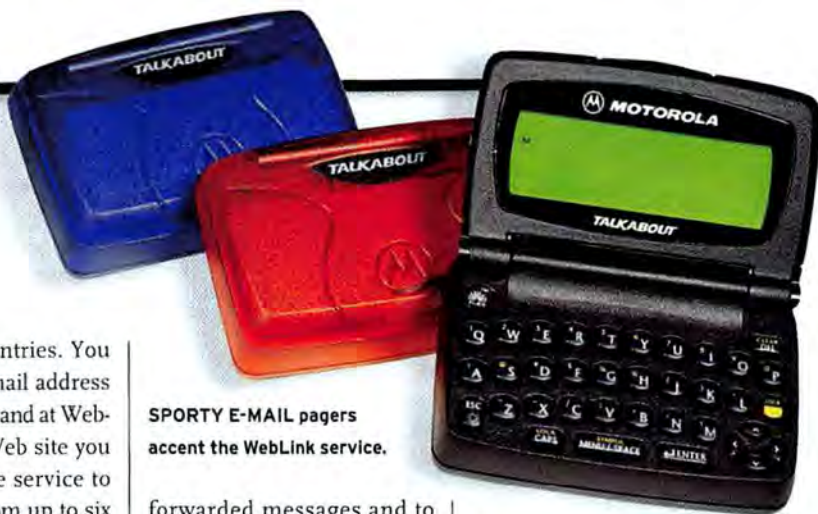
SPORTY E-MAIL pagers
accent the WebLink service.

forwarded messages and to make your reply look as if it came from the account that received the original message.

Pricing plans range from \$15 a month for 250 messages (and 6 cents for each addition-

al message) to \$30 a month for 1000 messages (5 cents for each additional message). As far as wireless services go, these are fair prices.

—Yardena Arar



Plug Audio Into Your Whiteboard Meetings

ELECTRONIC NOTETAKING

WHITEBOARD capture kits that let you record scribbles done on conventional whiteboards have proved to be a cost-effective alternative to electronic whiteboards. Now they're getting even more useful: New plug-ins for Electronics for Imaging's EBeam and Virtual Ink's Mimio let you record the comments that you make during a whiteboarding session for later playback as a streaming media file.

By means of special pens and hardware, the whiteboard kits record your scribbles and then transfer the information to your PC.

The \$99 **EBeam Presenter** and \$249 **Mimio BoardCast** both record sound in RealAudio format and create a file that syncs the sound with your whiteboard strokes during playback. Simply connect a microphone to your PC, select a connection speed to determine the file size and quality (the 56-kbps modem setting

worked fine for me), hit the record button, and start writing and talking away.

If you operate a RealMedia streaming media server, remote users can observe in real time. Otherwise, such users can download and play back the file for a full audiovisual record of the meeting.

Both products performed well in my tests, but the Presenter has a little more polish. One minus for the BoardCast: It always records the warning beep when you stop the capture. The Presenter's recorded strokes were a little clearer than the BoardCast's, too.

These plug-ins work with the new versions of their whiteboard capture programs. EFI's EBeam Moderator adds several options for sharing meetings—Microsoft's NetMeeting or EFI's own collaboration software.

Mimio, meanwhile, lets you share whiteboard sessions through free downloads of the capture software, or with Net-

Mimio BoardCast

PRO: Captures audio.

CON: Expensive.

VALUE: Good for Mimio owners looking to capture audio.

List price: \$249

Virtual Ink

877/696-4646

www.mimio.com

EBeam Presenter

PRO: Less-expensive than the competition, better-quality streaming.

CON: None.

VALUE: A useful audio add-on for current EBeam owners.

List price: \$99

Electronics for Imaging

877/463-2326

www.e-beam.com

Meeting (also adding full support for its whiteboard feature), or via Mimio.com's on-line meeting center.

Though EBeam's Presenter is the better value, it's no reason to dump your Virtual Ink hardware, which still is better-designed than EFI's.

—Eric Dahl ▶

WebLink Wireless 2-Way Messaging; Motorola Talkabout T900

PRO: Affordable, versatile text-based service that fields pages and e-mail messages.

CON: Some users may find the 100-character message limit too small.

VALUE: Useful for exchanging messages when phones aren't feasible.

Street price: Talkabout T900 \$180; service plans \$15 to \$30 monthly

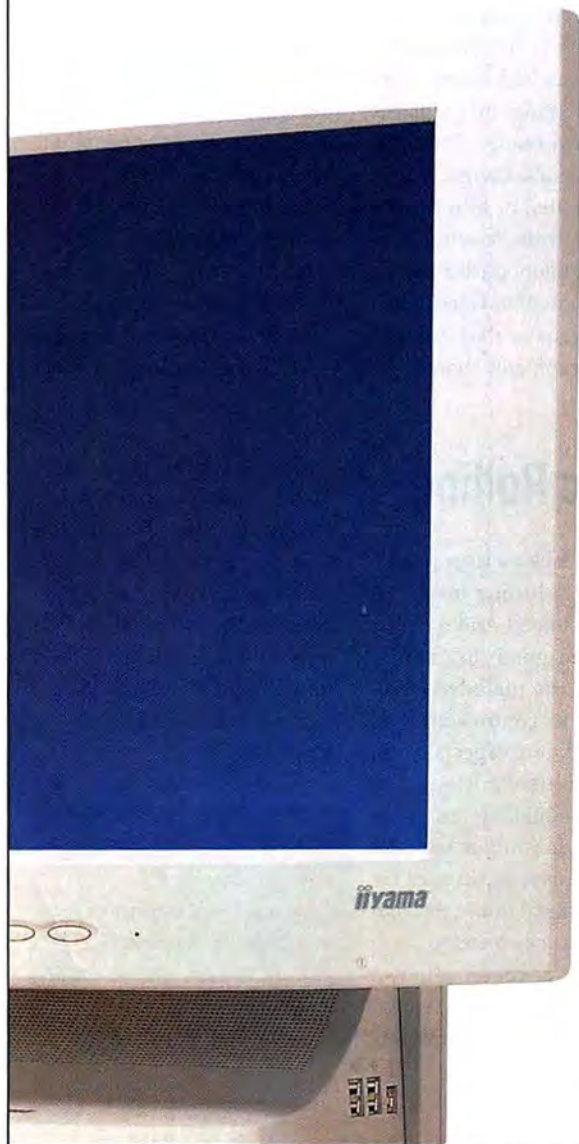
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Big Storage, Small Drives

STORAGE

BUY A NOTEBOOK computer today, and chances are pretty good that it will come without an integrated floppy drive. In fact, even some new desktop PCs have shed their legacy 3.5-inch drive. So what do you do if you want to move data from one PC to another, but neither has a drive that handles removable media?

The simple answer: You get on the bus—the Universal Serial Bus, that is. Two differ-

ent approaches employ USB. Agate Technologies' key-size **Q** drive plugs into a USB port and uses nonvolatile flash memory (which retains content when power is turned off) to safely store and transport your valuable data. The \$70 16MB **Q** stores up to ten times more information than a standard 3.5-inch floppy disk (also available: 32MB and 64MB versions for \$130 and \$200, respectively). After a first-time installation that involved add-

Q

PRO: Quick, easy, removable storage contained in a key-size USB flash memory device.

CON: Could be easily lost, expensive.

VALUE: Very convenient.

List price: 16MB \$70; 32MB \$130; 64MB \$200

Agate Technologies
562/483-1095
www.agatetech.com

Zio

PRO: Inexpensive; models accommodate various flash memory cards.

CON: Installation hassles you don't expect with USB.

VALUE: Good for reading data from flash memory devices in a pinch.

List price: \$40
Microtech International
800/626-4276
www.microtechint.com



THIS small device reads memory cards.

ing drivers for Windows—Windows 98, Millennium, and 2000 are supported—I found that the **Q** drive worked flawlessly. The shipping model I used read and wrote data as quickly as a hard drive, and it let me play video smoothly.

Microtech International's \$40 **Zio** is a USB-based memory card reader that replaces a PC Card reader. Different models handle CompactFlash, SmartMedia, or Multimedia memory cards. As with the **Q** drive, memory cards inserted in the matchbook-size **Zio**'s drives transfer data quickly, and their contents show up on

your PC as the next logical drive letter. But unlike with the **Q** drive, you can insert memory cards of different sizes—from 4MB to 1GB—in the **Zio**, much like inserting a floppy. One quirk: Initial installation of the drivers on the shipping unit I tested entailed rebooting the computer—something you aren't supposed to have to do with USB devices. But after I completed that step, my PC instantly recognized the **Zio**, making subsequent data moves a snap.

—Michael S. Lasky

Roomy Memory Keeps Intel's Music Rolling

MP3 PLAYER

THE SKIMPY capacity of most MP3 players is a major drawback of these devices: Just as you get into a nice groove, it's time to stop and transfer some bits. That's because the 32MB of memory that many MP3 players offer is too little to store an entire CD recorded at 128 kbps, a rate approaching CD quality. Players can, of course, become more expansive by accommodating small memory cards, but if they do, it increases their cost.

Intel's **Pocket Concert Audio Player** addresses this issue

with 128MB of onboard memory—enough to hold about 2 hours of MP3 music compressed at a near-CD-quality 128 kbps. And with a list price of \$300, it's not much more expensive than players with skimpier storage.

A reproduction model that I looked at was attractive, but maybe a little too slick—literally. With its rounded corners and egg-smooth surface, the device almost slipped through my fingers more than once, like a bar of soap. Encased in brushed aluminum with translucent blue accents, the

unit resembles a large pager.

In my informal tests, the Pocket Concert Audio Player produced good, big sound through the included headphones. Its controls are well designed, too, especially the raised volume buttons that simplify adjusting the player while it's in your pocket. Intel also promises accessories for playing digital music through your home or car stereo.

The player comes with two pieces of software: its own audio manager—a simple way to transfer music from your PC to your player over a fast

USB connection—and a copy of MusicMatch Jukebox to help you rip music from audio CDs. Unfortunately, while Intel says that you'll be able to program the player to handle new music formats in the future, it can't play one of the current dominant formats—RealAudio files.

—Edward N. Albrow ■

Pocket Concert Audio Player

PRO: Abundant storage.

CON: Won't play some music formats, including RealAudio.

VALUE: This player holds lots of tunes for the money.

List price: \$300

Intel

www.intel.com/home/audio



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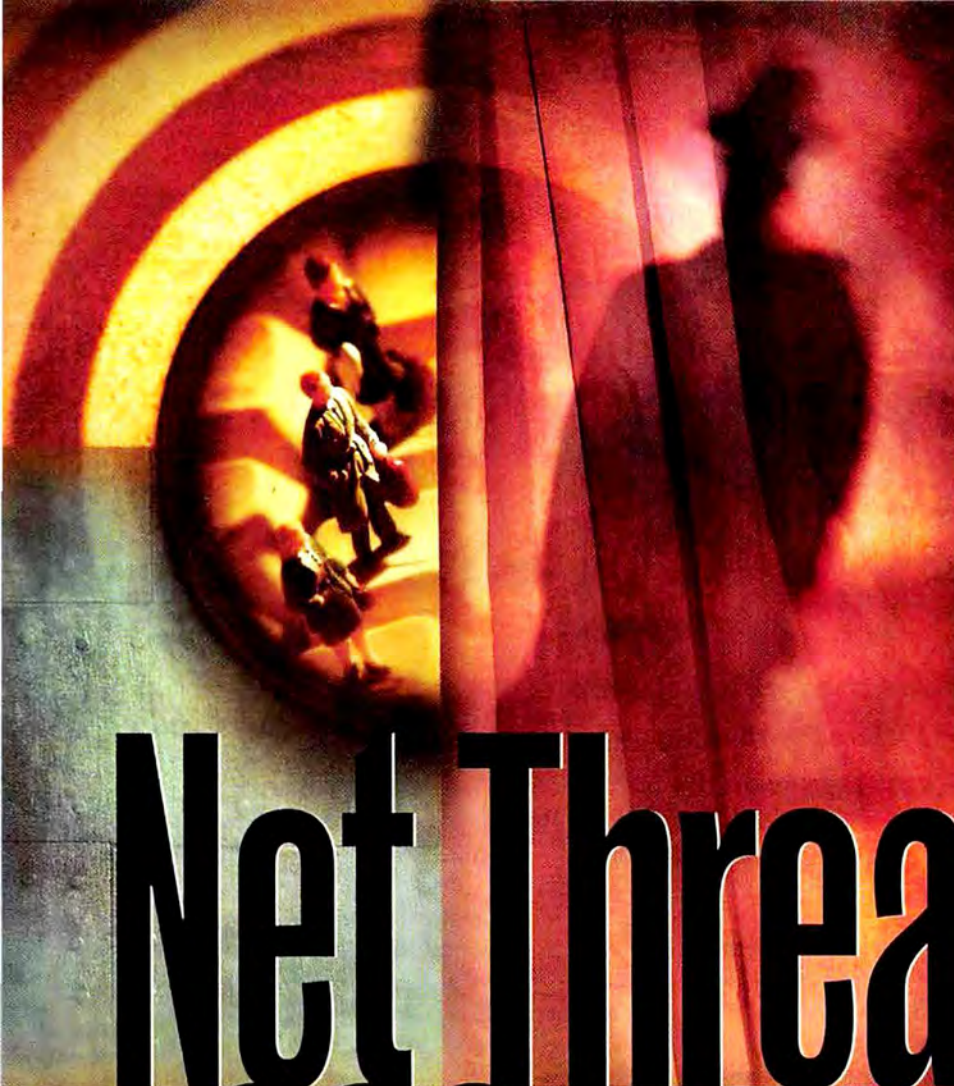
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Net Threats 2001

How to Spot Them,
How to Stop Them.

SECTION EDITOR: HARRY McCracken

A PC WORLD SPECIAL REPORT

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Privacy Matters

Your personal data has never been more vulnerable to prying eyes than it is today. Even with independent watchdogs on the case and tougher laws on the horizon, self-protection remains the best defense.

BY BRAD GRIMES

It's 10 a.m. and Richard M. Smith is ordering breakfast at a restaurant near his home in Brookline, Massachusetts. In the past several years, Smith, chief technology officer for the Denver-based Privacy Foundation and noted privacy expert, has shed light on controversial data-gathering practices at Amazon.com, Microsoft, and RealNetworks, among others. He wouldn't normally order eggs and sausage this late in the day, he says, but he's been on the road for more than two weeks on behalf of the Privacy Foundation and this was the first morning in a long time that he could sleep in.

"Our goal at the Privacy Foundation is to educate people about possible threats to their personal privacy and what tools they can use to protect themselves," he says. For advocates like Smith and others, privacy education is a full-time job.

Though most Internet users remain concerned about online privacy, many don't fully appreciate what's at stake. A research report published last August by the Pew Internet & American Life Project showed that 64 percent of Internet users have shared, or are willing to share, personal information in order to use a Web site. Moreover, 68 percent of users said they weren't worried that someone might

know what Web sites they had visited.

Meanwhile, the mad scramble for online information continues. Even as users, industry groups, and policy makers come to grips with the sometimes surreptitious methods Web sites use to collect data, they are confronted with a changing landscape. New ways of gathering information come to light; major Web sites alter their privacy policies; and dot coms go out of business, leaving unprotected the data they've gathered. And new technologies such as wireless tracking and interactive television are poised to enter the picture.

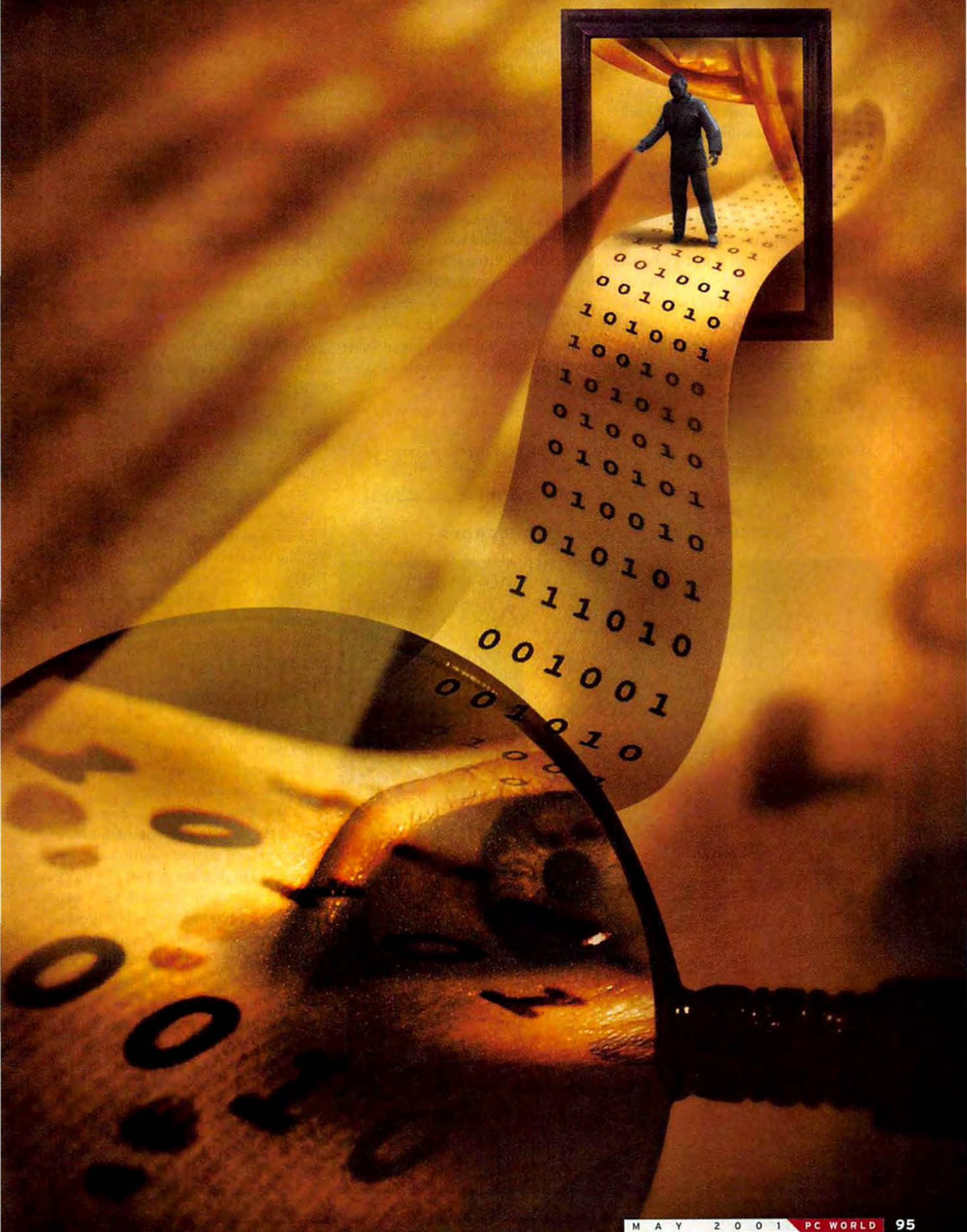
Smith believes life would be better if companies treated personal information the way the American Library Association does. "Librarians have been dealing with issues of privacy for a hundred years. They decided they wouldn't give out lists of the books people took out, and once the book was returned, they'd throw away the check-out records," he says.

If only it were that easy.

THE SIEGE CONTINUES

What some people don't understand is that the Internet is more privacy-invasive than anything we've had to deal with before," explains Smith. "Anybody can get a name and address and put it in a little context. But the Internet lets [marketers] put it in a lot more context, with everything you've bought, everything you've read about, and everything you've looked for in a search engine.

"What's also important is what happens to the information later. After ►



companies have collected all this data, even if it's for benign reasons, not only will third-party marketers want access to it, but the police will want it, the FBI will want it, and lawyers will want it."

"He's right," says attorney Ira Rothken when told of Smith's prediction. Rothken brought the first lawsuit against DoubleClick in January 2000 after the online advertising company said that it intended to marry information it had gathered online to personal information it had acquired by buying Abacus Direct. The ensuing uproar forced DoubleClick to reverse its decision and prompted the Federal Trade Commission to start an

investigation. In January 2001, after concluding that DoubleClick hadn't violated its privacy policy, the FTC dropped its inquiry but the lawsuits continue.

"As a lawyer in workplace litigation or another matter between companies, the first thing I do is subpoena all e-mail," says Rothken. "Now I'll find out your cookie IDs and I'll subpoena all of DoubleClick's data files to find out your surfing habits." (See "The No-Privacy Workplace," page 102, for more on workplace surveillance.)

Smith wonders whether serious online privacy laws will pass only following some high-profile case, as when Judge Robert Bork's Supreme Court nomination was

"The Internet is more privacy-invasive than anything we've had to deal with before. It [puts your] name in context with everything you've bought or read about."

—RICHARD SMITH, PRIVACY CRUSADER



derailed, in part, because investigators unearthed his video rental habits. That ruckus led to a law preventing video stores from revealing what titles people rent.

TAKING BACK YOUR DATA

Even as Net users continue to give away personal information, companies track them zealously, and lawyers lick their chops, the good news is that people aren't sitting idly by.

Marius Cybulski, a programming student from Oshawa, Ontario, Canada, is one of a growing number of Net users who employ software to protect privacy online. Cybulski uses Norton Internet Security 2001 and Zone Labs' ZoneAlarm Pro firewall software to protect his system from prying eyes and rogue applications. He also strictly controls which cookies land on his hard drive.

"Unless a site specifically needs [cookies] to function, like Windows Update, I don't permit them," Cybulski explains. "Why should I? For statistical purposes? So a site can remember me and customize itself to my preferences? I hardly consider that essential in exchange for knowledge of where I've been, what I did, and where I'll be going."

NEW TRACKING TOOLS

Cookies aren't the only devices that Net users have to worry about, however. Today, many companies use Web bugs to track your movements online.

A Web bug is a tiny GIF image file—just 1 pixel in size—embedded in a Web page and used to report information to the company that sends it. You can block cookies, but you can't currently block Web bugs, though companies are building filtering software. If your browser isn't set to block cookies, the bug may tell your browser to accept a cookie from the server that delivers the image, or to send a previously stored cookie back to that server. Even if you block cookies, the bug offers another way—beyond server log files—of tracking your movements through a site.

"All of these technologies have been around for years," says Craig Nathan, chief technology officer for MEconomy, a start-up that helps Web sites develop server setups and site architecture to pre-

The Ten Commandments of Internet Privacy

Concerned about your privacy? A few changes in the way you use the Net can make all the difference. Follow these commandments.

1 Thou shalt not create easy passwords. Don't get lazy and use only one or two passwords at multiple sites just because that's easier to remember. Stay away from real words, use a combination of letters and numbers, and keep passwords at least six characters long. Don't use birth dates, names of children or pets, or simple sequences like XYZ123. Keep a record of your IDs and passwords, but not on your PC. Don't store your password to avoid entering it the next time you log on. And periodically change your passwords.

2 Thou shalt not maintain a browser cache. Browsers speed up online navigation by storing graphical and other elements of pages you visit in a cache on your hard drive. Of course, anyone with access to your PC can check where you've been and what you've seen. Regular purging is wise.

To clean out your cache in Internet Explorer 5, select *Tools•Internet Options*. With the *General* tab selected, click *Delete Files* in the 'Temporary Internet files' section. In Netscape 4 or higher, select *Edit•Preferences*. In the Category tree, double-click *Advanced* and then select *Cache*. In the *Cache* section, click *Clear Memory Cache* and *OK*. Then click the *Clear Disk Cache* button and, finally, click *OK*.

3 Thou shalt not enable file sharing. Your PC need not be on a network to be set to allow file and printer sharing. And if it is, you've left an open door for any knowledgeable hacker to enter through in order to snoop around and perhaps do some mischief. Lock up your PC as follows:

In Windows 9x, select *Start•Control Panel*, double-click the *Network* icon, and choose the *Configuration* tab. Click the *File and Print Sharing* button, and uncheck both boxes in the dialog box, if they aren't already unchecked.

4 Thou shalt not preserve a history. The browser keeps a history log that identifies each Web address you visit. If you're on a public machine, you might want to purge your history periodically. To clean out your history log in IE 5, select *Tools•Internet Options*. In the *General* tab, click the *Clear History* button and follow the prompt. In Netscape 4 or higher, select *Edit•Preferences*, choose *Navigator* in the Category window, and click *Clear History*.

5 Thou shalt not accept cookies from strangers. Useful cookies let Web sites recognize you on a return visit. Less-wholesome cookies follow your surfing habits and report on what you view. IE 4 and higher store cookies in the *\Windows\Cookies* folder. You can delete its contents by highlighting one file, then pressing <Ctrl>-A followed by <Delete>. Netscape Navigator versions 4 and higher

store cookies in a file called *cookies.txt*. To find it, select *Start•Find* (or *Search* in Windows 2000/Me)•<For> *Files or Folders*, and search for *cookies.txt*; then delete this file and its subfolders, if any.

You'll probably want to allow some cookies, so consider a cookie-management shareware program such as *CookiePal* or *Cookie-Crusher*. Check out PCWorld.com's online coverage at www.pcworld.com/may2001/threats for a roundup of the best downloads.

6 Thou shalt not talk to strangers without protection. You may think you're safe when you communicate with people you know, but spammers and Web sites use harvesting software to grab e-mail addresses even when you think you haven't supplied yours.

The best way to talk safely: Don't run instant-messaging software in the background. Turn it off when you aren't using it, and configure your software to hide your presence. In AOL Instant Messenger, for example, select *My Aim•Edit Options•Edit Preferences*, and select the *Privacy* tab.

7 Surf anonymously, lest thy information be laid bare. If you wish to mask your ID when you surf, use one of the many anonymizing services available on the Web. Most of these Web-based services

work the same: You log on to their site and go wherever you want on the Web from there. The services hide your actual IP address and substitute their own. For more on anonymous surfing, see "Private E-Mail and Browsing" on page 126.

8 Thou shalt not surf without a firewall. If you have a broadband connection such as DSL or cable, you're connected to the Internet whenever your computer's turned on. And that makes you a target for hackers in search of computers to play around in. You can stop their intrusion with a *firewall*—an anti-intrusion program that acts as your PC's Internet gatekeeper. For reviews of the best software firewalls, see "Home Firewalls" on page 124.

9 Thou shalt not reveal information needlessly. The more personal information you supply, the less privacy you keep. Accordingly, give out the least amount of information necessary to complete any registration. Don't fill in any optional lines on profiles. Don't elect to store credit card numbers for future convenience. If a site offers to save your password for future visits, just say no.

10 Encrypt thy e-mail. Think your e-mail is private? Think again. Administrators, hackers, or anyone intent on gaining access to it can read your e-mail. For confidential correspondence, your best line of defense is encryption. Spies use it for a reason: No one but you and the intended recipient can decipher it. There are plenty of easy-to-use encryption programs available. To learn more, check out "Private E-Mail and Browsing" on page 124.

—Michael S. Lasky



serve customer privacy. "But now companies are experimenting with how they can use them. And practices that companies used to get away with are coming into the mainstream and gaining attention."

Most large sites employ Web bugs, Richard Smith says. PC World.com, for example, uses a bug delivered by Double-Click, which handles our online ads. The bug was introduced in an effort to get a better count of traffic to the site after other information sources, such as server logs and syndicated research, proved contradictory or unreliable. PC World discloses the existence of the bug in its Privacy Statement; not all sites do likewise.

In many cases, moreover, the tools employed to track individuals on the Web aren't behind-the-scenes agents like cookies and Web bugs; they're programs that people use every day. Last fall, for example, Smith demonstrated how Web sites could use the "persistence" feature of

Internet Explorer versions 5.0 and higher to obtain surfing information from a visitor—even one whose browser is set to block cookies. Persistence lets Web pages remember things like search queries so users don't have to reenter them.

More recently, Smith learned of a loophole in e-mail clients that allows someone to add JavaScript code to HTML-formatted messages so that person can find out where the message gets forwarded and what the forwarding comments are.

"Say I'm a marketer and I send you an e-mail about a product or service, and you send it along to someone with a comment like 'This looks interesting.' I'll know whom you sent it to and that you thought it looked interesting. Now I know to target you and your colleague," explains Smith.

Vulnerable e-mail readers include Netscape 6 Mail, Outlook, and Outlook Express. Eudora and AOL 6 e-mail readers, as well as earlier versions of Netscape and

many Web-based e-mail systems, are unaffected because they don't support JavaScript fully, they turn it off by default, or they strip it out of incoming messages.

So far, no reports have surfaced of anyone exploiting this glitch. One way to fend off prying eyes is to disable JavaScript in HTML e-mail messages. You can find instructions for doing so, as well as other possible fixes, at the Privacy Foundation's Web site (www.privacyfoundation.org).

CHANGING THE RULES

Even users who try to keep up with all the latest tracking technologies may be helpless when companies change the rules. Many dot-com companies are scrambling for profits or going out of business, and databases of personal information are a valuable commodity.

When Toysmart.com filed for Chapter 11 bankruptcy protection last June, it attempted to sell its customer database—something the site's privacy policy swore it would never do. The FTC and attorneys general from roughly 40 states filed suit against the company for violating its customers' privacy. Eventually, after receiving \$50,000 from a division of Disney, a financial backer of the now-defunct retailer, Toysmart.com agreed to destroy its list.

In January, EBay users learned that they're not always in control of their own privacy preferences. At that time, the online auction site decided to fix a glitch in its registration form. Between April and October 2000, the part of the form that asked new users if they'd like to receive marketing messages, users surveys, telemarketing calls, and so forth had defaulted the answers to 'no,' whereas EBay had intended that the default answers be 'yes.'

The company finally decided to switch all the preferences to 'yes' and notified affected users by e-mail. EBay gave people two weeks to restore their old preferences before the changes went into effect.

"I don't understand why they can't just assume that right-thinking users would choose 'no' to these options, whether it was the default or not," says John Lee, an EBay user who works for a Boston insurance firm. "If the default was supposed to be 'no' and it was accidentally switched to 'yes', would EBay go through the ►

TO TELL OR NOT TO TELL?

IF YOU WANT TO FIND OUT about tomorrow's weather, you'll get a more specific forecast if you provide your zip code to the weather service. But an online vitamin vendor doesn't need to know your entire medical history to sell you some echinacea.

Here's our rundown of personal information you should share only when it's absolutely necessary (Stop), the information you can share discriminately (Caution), and the information you can feel comfortable about sharing with anyone (Go). The rule of thumb: When in doubt, leave it out.

—Dennis O'Reilly



STOP Social Security number, bank-account personal identification number (PIN), mother's maiden name, medical information, legal history, specific financial information (tax history, savings, mortgage, and so on), travel plans, employment history, and information about friends and relatives, including their home and e-mail addresses and telephone numbers.



CAUTION Telephone number, street address, date of birth, marital status, employer, education, e-mail address, shopping preferences (music, books, favorite brand names, and the like), credit card number, hobbies and interests, affiliations (club memberships, political associations), and Web sites you've visited.



GO Zip code, age, salary range, opinion surveys, and occupation. (Note: This information is safe to provide only when not transmitted along with other, more specific personal information.)



FOR MORE INFORMATION ON INTERNET PRIVACY, check out PC World.com's continuing coverage at www.pcworld.com/may2001/threats and visit the following sites: Privacy Foundation (www.privacyfoundation.org), Electronic Privacy Information Center (www.epic.org), and Privacy.Org (www.privacy.org).

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same process or would they just assume people read the form correctly and made the selections they really wanted?"

In its defense, EBay said the same problem that flip-flopped registrants' default answers could have prevented users from getting updates about the site's privacy policy or e-mail notices that they'd been outbid in an auction. This assumes people were not reading the registration form closely and simply accepted the defaults.

The company says it ran its plan by several privacy watchdog groups before implementing it. One of the groups, Truste, later voiced concerns. "In this case [EBay] probably could have made a better call," says David Steer, a Truste spokesperson.

FUMBLING THE DATA

Even online businesses that don't change their policies or track your whereabouts can threaten your privacy: Companies that collect information on their servers can't seem to keep a lid on the data.

Last year, hacking incidents and other security gaffes revealed customer information for the world to see at sites such as CreditCards.com, Eve.com (which later went out of business), and Amazon.com.

In January, the names, e-mail and home addresses, and phone numbers of 50,000 or so Travelocity customers were exposed to possible theft; investigators determined that the information may have been out in the open for more than a month.

Be prepared for more of the same, because Web sites clearly have not done enough to secure the information on their servers. Last year, *PC World* sat down with security experts from Sanctum (then called Perfecto Technologies). The company audits the security of client Web sites by trying to break in. When successful, Sanctum suggests remedies. At the time, the company had audited 50 big-name sites and found security breaches in all of them. In eight cases, they were able to access any file they wanted—including customer data. Today, the overall situation remains unchanged.

"We wish we could say there's been progress over the past year," says Izhar Bar-Gad, Sanctum's chief technical officer. "Sites have not taken the necessary measures to protect themselves and their



"I don't want the government writing [privacy] laws they can't or won't enforce. The best way would be for all of us to just boycott sites that don't offer opt-in."

-DEB HOOPER, INTERNET PRIVACY HARD-LINER

customers' data. We haven't found a single site that wasn't vulnerable."

During a recent audit of an airline Web site, Sanctum downloaded the entire source code and built a replica site. "It's not a matter of the bigger the bank, the better the security," says Bar-Gad. "The bigger the site, the more holes it has."

21ST-CENTURY PRIVACY

Soon, Web sites won't be the only entities that can gather information on their users. Wireless devices and interactive television sets will be able to communicate with company servers.

In 1996, the Federal Communications Commission launched Enhanced 911. Among other things, the E911 initiative requires cell phone companies to add fea-

tures to new and existing phones that allow them to locate, within 100 feet, a wireless 911 caller. Implementation of the initiative is due by October of this year.

"It's a good idea," says Smith, noting that authorities already know where 911 calls from wired phones originate. "When I'm on a cell phone and I need to call 911, I don't want to worry about where I am—sometimes I won't know."

But setting up such a system will cost wireless companies money, and how they recoup some of the expense may cause controversy. Marketers are lining up to use this location-identification technology to aim wireless ads at customers. For example, when you stroll down the street near a McDonald's, you might get a wireless coupon for 50 cents off a Big Mac. ►

Top models include: Pentium® III Processor 750MHz' featuring Intel® SpeedStep™ Technology
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Industry groups and the FTC are working to establish guidelines for wireless marketing. Jules Polonetsky, chief privacy officer for DoubleClick, believes that strict rules will be in place before the debut of E911 and wireless ad serving.

"Wireless ad serving is in its infancy," says Polonetsky. "We can apply what we've learned on the Web to rules for the wireless world. Users should receive marketing information on their cell phones and handheld devices only if they ask for it."

In addition to wireless devices, interactive TV technology—such as WebTV, TiVo digital video recorders, and two-way digital cable—can send information about

what you watch back to company servers. The threat here is analogous to the way Web sites track your surfing habits online.

"As on the Web, the question will be how these companies let users know they're being tracked and what they do with the information they gather," says Smith.

BIG BROTHER GETS BIGGER

Even if the prospect of being watched by fast-food companies doesn't bother you, the notion of Uncle Sam spying on you might. Perhaps the most controversial proposed surveillance system is the FBI's DCS1000. Formerly known as Carnivore, the system will be installed at

ISPs to monitor e-mail messages for information about people under investigation. Think of it as an Internet wiretap.

No one disputes the need for law enforcement officials to conduct warrant-ed searches of the electronic communications of suspected criminals, but privacy groups and some members of Congress worry that the system can be used to spy on people not under investigation.

A second government-proposed system called Public Access to Court Electronic Records also has privacy experts concerned. Under the PACER system, anyone with a Net connection and some loose change can download federal court case records for 7 cents a page.

Though the most confidential records won't be available, people will still have access to files that may include Social Security numbers, credit card numbers, and other personal information. Paper versions of these court records have long been available to the public, but privacy-rights groups contend that easy access over the Internet will encourage unscrupulous parties to go on low-cost fishing expeditions to collect personal information.

Gene Youngblood of Moses Lake, Washington, was shocked to find his name, case number, and Social Security number posted on a Washington bankruptcy court site. Youngblood, a flexographic printer operator, and his wife filed for bankruptcy in May 2000.

"I never had to give anything to receive this information," says Youngblood. "Not a log-in, a password, an identification, or a dime of money. Anyone can download the Social Security numbers of every person to file for debt relief in eastern Washington since 1997. And with a bit more diligence, they can find debtor's addresses as well as other personal information. I tried searches for people I work with and found three cases. If I were the criminal kind, I could easily steal their identities."

LAWS OF THE LAND

On the Net, government agencies are both friend and foe of privacy-conscious consumers. But almost everyone involved in the privacy debate agrees that Congress, after fits and starts over the past couple of years, will soon pass a fed- ▶

FUTURE THREAT

The No-Privacy Workplace

What do Xerox, Dow Chemical, and the New York Times have in common? They've all fired employees for allegedly misusing company e-mail and Internet systems to distribute pornography or other inappropriate material. How did they know it was going on? They monitored their workers' online activities.

And studies show that workplace surveillance is a growing trend. According to a 2000 report by the American Management Association, 38 percent of the organizations it polled monitor

employee e-mail messages. That's up from 27 percent in 1999. A stunning 54 percent monitor workers' Internet connections, the first time the AMA has asked that question.

TOO MUCH TROUBLE? Virtually everyone agrees that companies have the right to monitor employees' online habits to ensure they do not misuse company time and equipment—provided they disclose the practice. But as workplace surveillance becomes ubiquitous, experts say, it may prove to be more trouble than it's worth.

In 1995, e-mail messages containing inappropriate jokes were used as evidence

in a sexual-harassment claim against Chevron Corporation. The case's \$2.2 million settlement prompted companies to monitor e-mail to avoid similar suits. But the door swings both ways.

"Sure, you can fire someone using electronic evidence; but a fired employee can turn around and use surveillance records against the company in a wrongful termination suit," says Richard M. Smith, chief technology officer for the Privacy Foundation.

Workplace surveillance can have other downsides. Carl Botan, a professor of communication at Purdue University and a member of Purdue's Center for Education and Research in Information Assurance and Security, is studying whether employees who know they are being monitored are unhappier and less productive.

"How is [monitoring] going to impact a person's enthusiasm for coming in to work? How will it affect employee loyalty and turnover? These are issues that managers really need to think about," says Botan.

—Brad Grimes



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eral law to govern how companies can collect and use information on the Internet.

The question is, will the law adopt an opt-out or an opt-in design? The former resembles the current practice of many sites: They assume that a user is willing to share information or receive marketing material unless the individual specifies otherwise. An opt-in model (which privacy advocates favor) starts with the opposite

assumption, so users must specifically ask Web sites to collect data or contact them.

Most recently, Representatives Chris Cannon (R-Utah) and Anna Eshoo (D-California) introduced a bill that would require Web sites to notify people of how their personal data is used and to let them control that use. Meanwhile, Senator John Edwards (R-North Carolina) has promised to reintroduce a more stringent law that

would require a site to obtain users' permission before it even begins tracking them with cookies.

According to observers, the milder opt-out bills like Cannon and Eshoo's have a better chance of passing.

"There will definitely be federal legislation this year," says Marc Rotenberg, executive director the Electronic Privacy Information Center. "We expect it to be baseline legislation that states can then build on."

PARTING SHOTS

Clearly, the online industry is taking steps to protect users' privacy even as it looks out for its business interests.

"Since we brought the DoubleClick case, there has been some improvement in the way companies deal with personal privacy," says attorney Ira Rothken. "But the ability to retain control of one's personal information needs to be the default of any site's privacy policy."

And some consumers wish people would take privacy in their own hands. "I don't want the government writing [privacy] laws they can't or won't enforce anyway," says Deb Hooper, a freelance Web developer from Fostoria, Ohio. "The best way would be for all of us to just boycott sites that don't offer opt-in."

To users who continue to relinquish personal information without considering the effects on their privacy, MEconomy's Craig Nathan stresses, "People need to understand that the value of their personal information is greater than the discounts they're being offered. Otherwise, companies wouldn't offer those deals."

Back in Massachusetts, as he discusses why he's pursuing privacy rights, Richard Smith says, "We have rules in our society for how we interact that people don't always think about. We don't spend a lot of time thinking about saying 'hi' to people, but if someone doesn't say 'hi,' we notice and it bothers us. Privacy falls in the same category. We don't always think about it, but when it gets abused, it bothers us."

Brad Grimes, former executive editor for PC World, is vice president of Content Foundry. Michael S. Lasky is a senior editor and Dennis O'Reilly is a senior associate editor for PC World.



LOOKING FOR SOMEONE TO BLAME for that unwanted e-mail cluttering your in-box? Start by checking the mirror. Spammers obtain our e-mail addresses in a variety of enterprising ways, but usually we inadvertently aid and abet them.

You can take a number of steps to eliminate spam from your in-box. Realistically, you can never get rid of it all. But here are some things you can do to cut out most of it.

GET AN EXTRA MAILBOX: Probably the simplest way to avoid all the spam rigmarole is to create a new e-mail address at one of the numerous free online services such as Hot-

mail or Yahoo Mail. Provide it when sites ask for an e-mail address that they obviously intend to send spam to, and the unwanted messages will go to this second address. If you're expecting to receive a legitimate e-mail message, such as an order confirmation, at that address, don't worry: It will stand out clearly among all the spam headers.

READ THE FINE PRINT: It pays to scan registration forms carefully. Sites that require you to provide an e-mail address and create a password will note that you'll be getting mail from them, and in some cases from their partners (better known as advertisers), if you don't check (or uncheck) a box on the registration page. Scroll through the whole page before clicking the *Submit* button. Also read the statement next to the opt-out box, since some require that you check it and others that you uncheck it.

UNSUBSCRIBE AT YOUR OWN RISK: Almost all the mailing lists you ask to be on will provide a way to unsubscribe at the end of the messages they send you. Usually it's as simple as replying with the word "unsubscribe" or "remove" in the address header. Sometimes you must go to the site, enter your ID and password, and then register your preferences.

But beware of replying to obvious bulk mailers or senders you've never heard of. They may offer you a way to opt out, but following their unsubscribe routine verifies your e-mail address, and you'll wind up with even more spam after they sell it to other spammers.

USE SPAM FILTERS: Most e-mail programs support some level of filtering. For example, in Microsoft Outlook, you can select *Tools>Message Wizard* and create a folder for spam. Then when you get an unwanted message, right-click it, select *Junk E-mail>Add to Junk Senders*. Thereafter, messages from that address will go directly to the spam folder. Similar methods are possible with Outlook Express, Netscape Messenger, and Eudora 4.2. But many spammers create new addresses with each message. To deal with them, you'll need a filter on steroids like Spam Buster or Spam Killer (both shareware programs are available from PC World's Downloads). They intercept spam messages and cleverly detect variations in a spammer's address. Both offer a quick way to report the senders to their domain's postmaster.

FIGHT SPAMMERS: Help stop spam at its source with these Web sites dedicated to fighting spam: CAUCE (Coalition Against Unsolicited Commercial E-mail; www.cauce.org), Spam Cop (spamcop.net), and JunkBusters (www.junkbusters.com).

—Michael S. Lasky

Dot Cons

Auction scams, dangerous downloads, investment and credit-card hoaxes—the ancient art of the swindle is alive and well on the Internet. Here's how to make sure that you don't become the next victim.

BY AOIFE McEVY AND EDWARD N. ALBRO



ILLUSTRATION BY RICHARD TUSCHMAN

Vmas Maxon thought she knew the ins and outs of online auctions. In fact, she was a big EBay fan. So when she decided to buy a DVD player last fall, the Web designer and resident of Crested Butte, Colorado, headed to the auction site. She found a model she liked, with a detailed product description, but there was one drawback: The seller was new to EBay and didn't have a single comment posted in his feedback profile. Maxon wasn't put off, though. "The listing looked very professional, and I was happy to see that the seller accepted PayPal [the payment service]," she recalls.

Maxon submitted a \$500 bid, and bingo—the DVD player was hers. Or so she thought. PayPal credited the seller's account for the full amount, but Maxon never received the player. And she wasn't the only one left high and dry. The same seller—supposedly operating out of Michigan—seems to have auctioned off roughly 500 items to about 200 people without ever delivering the goods. Maxon estimates that the scammer made off with over \$40,000 in "winning" bids.

EBay promptly suspended the seller from further transactions. Maxon filed complaints directly with the FBI, the Federal Trade Commission, and Michigan's state attorney general's office, but at press time the seller had not been charged with a crime. As far as Maxon and her fellow bidders can tell, he's still at large. "All this guy has to do is re-register at EBay with a new user ID, and he's back in business," says Maxon.

Those 200 online auction bidders in Maxon's case were among thousands of consumers ripped off by con artists on the Internet last year. According to the FTC, Internet-related crime increased in 2000 by over 14 percent; the federal agency received in excess of 18,700 complaints in 1999, and that number jumped to almost 21,400 in 2000.

Internet Fraud Watch, a program of the National Consumers League, also reports an increase in online fraud. "We had ▶



"I don't want to give EBay or any auction site my business again. Our communication about a fraudulent seller on EBay was halted...."

-XMAS MAXON, DISGRUNTLED ONLINE BIDDER

a hard time keeping up with the huge volume of complaints last year," says Susan Grant, IFW's director. "It wasn't possible to process every one."

As Internet fraud has ballooned, federal, state, and local law enforcement agencies have stepped up their efforts to combat it. Since the mid-1990s, the FTC alone has won 167 civil suits against 562 con artists. "We're getting better at staying ahead of the curve," says Eric Wenger, an attorney in the FTC's division of marketing practices. "But most of the time, we're dealing with a moving target."

And for all the progress that's been made, bad news continues to pile up. For one thing, reported scam incidents may

represent only the tip of the Web fraud iceberg. "Some people are still too embarrassed to come forward and file a complaint—no matter how big or small the cash amount is," says Audri Lanford, coeditor of consumer advice site Scambusters (www.scambusters.com).

And experts predict that even worse swindles may very well lie ahead of us: "Internet fraud will continue to go up as more new computer users come online—they are the vulnerable ones," suggests Wenger. "Scams have always proliferated on the Web because it's so easy to reach out to millions of consumers. But now, scammers are finding more ways to get money out of them."

BUYER'S REMORSE

Auction and E-Commerce Rip-Offs

Of the numerous types of online fraud, auction schemes remain by far the most common, according to statistics published by Internet Fraud Watch. Last year, 78 percent of all the complaints reported to IFW concerned auctions. Steep as that figure is, it's down from 87 percent in 1999. "Even though Internet fraud is up this year, auction scams have leveled off," says the FTC's Wenger.

But fraudulent merchandise sales at other types of Web shopping sites have increased sharply—from 3 percent in 1999 to 10 percent in 2000, reports IFW. Victims typically get flimflammed by doing business with fly-by-night Web sites that take the money and run.

E-commerce scammers frequently lure victims by dangling faddish, hard-to-find goods in front of them—a classic example being the Sony PlayStation 2 cons that popped up last holiday season. Two sites in particular, PS2storeusa.com and PS2storecanada.com, both based in New Brunswick, Canada, promised consumers that they had plenty of the elusive Sony game consoles in stock. Hundreds of hungry shoppers whisked off their payments but never got the goods.

Late in December, the Royal Canadian Mounted Police arrested 20-year-old Scott Byers in Moncton, New Brunswick. Byers was charged with fraud related to both sites; preliminary hearings begin in July.

How can you avoid being taken by an e-commerce con? For starters, don't assume that a slick, well-organized Web site you've never heard of is on the up-and-up. Be skeptical of sites that offer incredibly low prices or claim to have impossible-to-get products in stock. And make sure you check out merchant-review sites such as Gomez (www.gomez.com) for evaluations from experts or fellow consumers.

As for auctions: Buying from a seller with no feedback (or worse yet, with negative feedback) is inherently riskier than doing business with one who has a record of happy customers. Be wary of sellers

who insist on payment by money order, cashier's check, or other options that leave a burned buyer with little recourse.

THE UNHAPPY FEW?

With online auctions still notoriously at the top of the scam hit list again this year, why do people keep coming back for more? For one thing, auction sites claim that the chances of getting conned are small. EBay spokesperson Kevin Pursglove reports that 1 item in every 40,000 resulted in a fraud complaint in 2000, down from 1 in every 35,000 the previous year. The thrill of wheeling and dealing for a low price is another factor. It's one reason *PC World* named EBay the Web's best site last year.

For Tom Ogle, though, online auctions are not just about price. Ogle runs his own Seattle-based commercial photography business and relies on EBay for hard-to-find equipment. He spotted a listing for a new Epson scanner that could handle transparencies. Ogle won the auction for \$180 and sent a money order to the seller, who was based in San Jose, California.

Then he waited. And waited. Other bidders started complaining about the seller, and EBay responded by suspending the seller's account. Ogle ended up buying a new scanner locally at full retail price.

Eventually, Ogle did what many burned buyers have to do. He took the initiative and went after the seller himself—in this case by filing a report at the San Jose Police Department's Web site. The police called him the next day to follow up, and "I asked them to get a big guy in blue on his doorstep," recounts Ogle. The police did show up at the seller's door, and Ogle finally got his scanner—albeit a refurbished unit, not a new one. "Had I relied on EBay exclusively, I would've been seriously out of luck," says Ogle.

Even though Ogle's story has a (somewhat) happy ending, it highlights a complaint common among bidders burned by auction fraud. Sites claim that the measures they've set up promote safe trading, yet when an auction goes sour the site's response often sends a mixed message.

When EBay suspends a seller, no one is allowed to post feedback, including warnings, about the seller. So when feedback

gets shut down, many users jump onto EBay's message boards to spread the word about dubious sellers. But that too can lead to a dead end, as Maxon learned. "A few of us started a thread [at EBay's message boards] to alert people," she says. "EBay removed the thread because we had the seller's ID in the title." According to EBay, using a seller's ID in messages is inappropriate and violates the site's guidelines. Moreover, under its "auction interference" policy, EBay no longer lets members send e-mail messages to other bidders either before or after the auction closes.

More recently, EBay introduced another new rule: Members can no longer see other members' e-mail addresses. Instead, they must communicate through a forwarding system. Many members are furious, suspecting that this move will make it harder to detect shilling. Along with the auction interference rule, the ban on members' e-mail addresses also makes it harder for defrauded parties to band together. EBay says it imposed the new policies to make it more difficult for junk e-mailers to harvest e-mail addresses.

All auction sites encourage the ▶

HOW DO AUCTION SCAMMERS BAIT THEIR TRAPS? Once you've been burned, how easy is it to recover your money? I decided to find out the hard way. When a recently defrauded bidder tipped me off in January to a possible scam in progress, I jumped into the action.

DAY 1: The EBay listing is for a much-in-demand Sony PlayStation 2 game console. I send an e-mail message to the seller—let's call him "Gabe" (not his real name)—and ask about shipping policies. I don't have to wait too long. He replies with a cheery, ingratiating note.

DAY 2: Frenzied bidding is under way when I swoop in and win the auction with an offer of \$455. Gabe is so happy that he waives the shipping fee. Nice guy. He extols the virtues of PayPal: It's easy, reliable, and safe. I transfer \$455 to his PayPal account.



DIARY OF AN AUCTION GONE BAD Scammed Like Me

DAY 3: Gabe thanks me and promises to ship the console on Tuesday and to e-mail me with tracking information.

DAYS 7-14: Tuesday comes and goes. I pelt Gabe with increasingly panicky e-mail. No response—and no PlayStation, either.

DAY 15: I ask EBay for the phone number Gabe provided when he registered. I try calling, but the number is out of service. I alert EBay and wait to hear back.

DAY 16: For one fleeting moment, I think I'm covered by the \$100,000 of insurance touted on PayPal's home page. But that turns out to protect the money sitting in a PayPal account. Fraudulent transactions are covered for only \$200. And I'm not eli-

gible even for that, since Gabe was an unverified user—meaning that he hadn't registered a checking account with PayPal when he signed up with the service. I call my credit card company and speak with a rep who says that I might be able to reverse the charges—but the process could take two to three months. Yikes. I get the paperwork rolling.

DAY 17: An e-mail from EBay suggests I take my problem to PayPal. I write back, explaining that PayPal won't help. EBay's response explains that PayPal usually assists only fraud victims whose claims are denied by EBay. So why'd EBay tell me to start with PayPal?

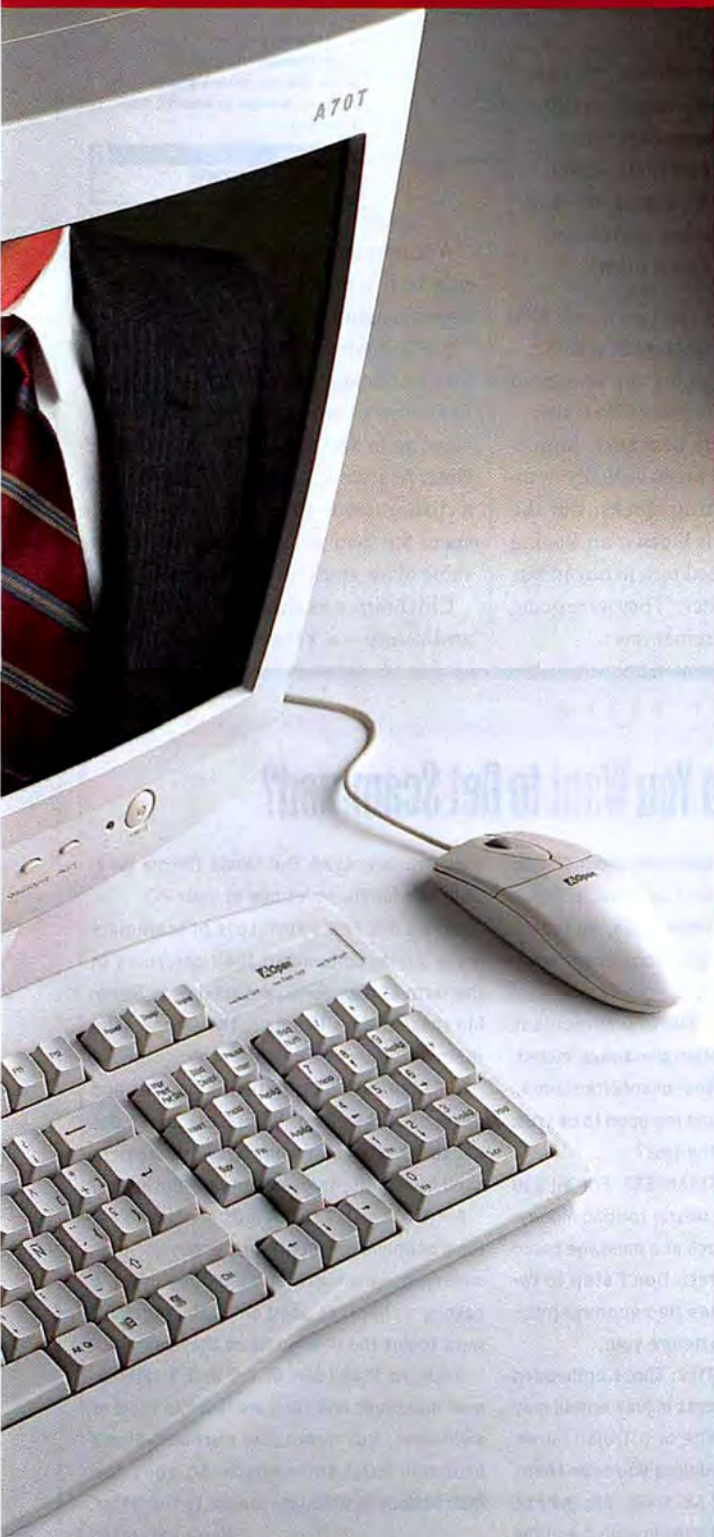
DAY 45: I notice that Gabe's EBay account is still active. I send EBay a couple of e-mail messages asking if they intend to terminate it. No answer.

DAY 58: Good news at last: My credit card company says that it has reviewed my situation and decided to reverse the charges. But after all the runaround and finger-pointing I encountered, I see why some burned bidders say that they feel as victimized by the recovery process as they did when they got scammed in the first place.

—Harry McCracken

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use of payment or escrow services to help transactions go more smoothly. Most sites also provide some kind of insurance coverage. Despite the various payment services and insurance plans, getting your money back—or at least getting help—is not always a cakewalk. Scam victims often complain of finger-pointing: The payment service may tell you to go to the auction site if you've been defrauded, and the auction site may point you back to the payment service.

BIDDER BEWARE

Instances of Internet auction fraud may decrease over time, but that doesn't mean that shoppers should be any less cautious. And despite progress by the FTC and others, "it's clear that we need to do more and improve our protection measures," acknowledges the FTC's Wenger.

Xmas Maxon agrees—and that's one reason she's walked away from auctions altogether. "I don't want to give EBay or any auction site my business again," says Maxon. "Our communication about a fraudulent seller on EBay was halted and made it impossible for new users, especially, to know what was going on."

For the time being, it seems, scammers will continue to find and exploit cracks in the system. And until the sites do more to protect buyers, fraud victims like Maxon are sure to remain disgruntled.

UNFUNNY MONEY

Investment and Finance Swindles

Harry Chisholm's friend was making money playing the stock market. And she shared with Chisholm the secret of her success: She was following the advice of an anonymous tipster who posted suggestions on the message boards hosted by

Answers to common questions

- Why have I been brought here?
- I want to stay with AOL, how do I keep my account?
- What if I don't have another Credit card?

Please follow these 8 quick steps to validate your information, then click "OK."

Enter your current credit card information exactly as it appears on your credit card or credit card statement.

Name from Card Statements _____
 Name as printed on Credit Card _____
 Address _____
 Address Line 2 _____
 Country: United States
 State/Province: Click to Select State
 City _____
 Zip/Postal _____
 Daytime Phone _____
 Evening Phone _____

AOL Accepts

Credit Card Type: Visa MasterCard American Express Discover

Credit Card Number: (e.g. 4234 5678 1234 5678) (No Visa)

Expiration Date: / /

Bank name:

Last 3 digits on back of credit card: Last 3 digits on back of credit card

Credit Card Limit:

YOU'VE GOT SCAMS: This fake America Online billing site (left) even asks members to enter their credit card limits—useful information for a crook. The fake site looks nothing like the real AOL Billing Center (right).

AOL Billing Center

Help

Harry999, welcome to the Billing Center!

Update Your Info

- Change Your Name or Address
- Change Your Billing Method or Price Plan

Do you have AOL Long Distance service? Now you can read your bill and get important information online.

Frequently Asked Questions...

- What pricing plans does AOL offer?
- Can I change my billing method?
- How long does my free trial last?
- Any extra charges for accessing AOL?
- Ask the Staff

Summary

Price Plan Info

Trial Offer

- AOL Billing Information
- AOL Price Plans

Keyword: Billing

the financial Web site Raging Bull.

The tipster was singing the praises of E-pawn.com, a Florida-based Web site.

Chisholm, of White Bear Lake, Minnesota, admits that he knew virtually nothing about researching stocks, but the things he read about E-pawn on Raging Bull's board convinced him to buy in big. According to the tipster, "They were going to be like EBay," he remembers.

Anonymous tipsters in stock scams may be con men themselves or innocent dupes caught up in the excitement.

So Chisholm, retired facilities manager for a technology consulting firm, bought a block of stock at \$6.50 per share. The price went up to \$8.50 and then started to decline. As it sank, Chisholm figured it was a chance to buy more E-pawn cheap. He spent \$41,809 to buy 17,100 shares. The value of his stock now? About \$800.

Chisholm was the victim of a pump-and-dump—a scheme in which con

EIGHT EASY STEPS

So You Want to Get Scammed?

Got some unwanted cash lying around? Getting ripped off online isn't too hard. In fact, if you follow all these simple rules, we practically guarantee that you'll soon count yourself among the conned.

DO BUSINESS WITH SPAMMERS: Miraculous pharmaceuticals, vacation giveaways, incredible work-at-home plans—unsolicited e-mail is full of deals that sound too good to be true. Why not put them to the test?

TAKE ADVICE FROM STRANGERS: For all you know, the anonymous tipster touting Money-DowntheDrain.com stock at a message board is really Warren Buffett. Don't stop to research the companies he recommends—someone might get in before you.

CLICK FIRST, THINK LATER: Those embedded links and file attachments in junk e-mail may lead to a sham Web site or a Trojan horse. But you'll never know unless you open them.

SHARE YOUR PC WITH ABANDON: You may be very careful about the sites you visit and the

files you download. But Uncle Bernie isn't. Still, he's family, so let him at your PC!

IGNORE THE FINE PRINT: Lots of scammers leave subtle hints about their chicanery in the form of pseudo-legal disclaimers. Reading these details is a pain, though, so skim them—or better yet, skip them altogether.

SURF UNPROTECTED: Antivirus utilities and personal firewalls help guard against the backdoor programs and password stealers used by identity thieves. But why bother?

PAY THEIR WAY: Credit cards are the safest form of online payment—for the buyer. Some sellers, however, demand a money order, a cashier's check, or good old cash. You don't want to jinx the deal, so do as they say.

WALK THE SEAMY SIDE OF THE WEB: X-rated e-mail messages and sites are favorite tools of swindlers. But honorable pornographers probably exist somewhere. So obey the instructions in those messages to the letter.

—Harry McCracken

artists use the Internet to fraudulently promote the stock, then sell their shares for a big profit, according to a federal indictment from the U.S. Attorney's Office in New York. This pump-and-dump had a particularly sinister twist, government officials say: It was run in part by the Mob. In the indictment, U.S. attorneys allege that two principals of E-pawn and a stock promoter went for help to DMN Capital Investments. That investment house worked with known Mafia members to commit stock fraud, another federal indictment alleges.

Last summer, the FBI charged 120 people, including members of the five organized-crime families of La Cosa Nostra, with securities fraud and related crimes. E-pawn was 1 of 35 companies that federal officials say the Mob helped to manipulate. Those frauds cost innocent investors approximately \$50 million.

The case taught Larry Chisholm a hard lesson. Now he does his homework before investing his money, and he ignores the advice he sees on message boards. "Investment message boards will probably be the cause of more people losing their shirts and jumping off the bridge than anything else," says Chisholm.

Beware of anyone on an investment message board who claims to have inside information, says Barry R. Goldsmith, executive vice president of NASD Regulation, which oversees the securities industry. Sham tipsters will say, "You're going to miss the boat, you have to buy quickly before the news gets out," he warns.

Instead, do thorough research before putting your money in any company, Goldsmith recommends. Good places to start include SmartMoney.com, Forbes.com, BusinessWeek.com, Hoovers.com, Morningstar.com, and Bloomberg.com.

NOT SO PRIME

Sad to say, stock manipulation is far from the only financial scam practiced on the Web. Another popular con is the "prime bank" scheme. One example, according to regulators in West Virginia and Texas, is the Tri-West Investment Club. The club, which at press time continued to advertise through its Web site, www.triwestinvest.com, promises investors



"Investment message boards will probably be the cause of more people losing their shirts and jumping off the bridge than anything else."

—LARRY CHISHOLM, OUT \$41,000 IN AN ALLEGED STOCK CON

returns of 10 percent per month through a "bank debenture trading program." There is "no risk of losing [your] investment," the site claims. And members who convince other people to invest reap even higher rewards, the site says.

The club has two big problems, according to West Virginia State Auditor and Commissioner of Securities Glen B. Gainer III. Problem number one: "Prime bank debenture trading is just nonexistent," says Gainer. And number two, offering investors a referral bonus for signing up friends and relatives—in essence running a pyramid scheme—violates securities laws, he says. Gainer ordered Tri-West to cease all operations in his state (officials in Texas issued similar orders). Tri-West officials did not respond to our multiple requests for comment on the charges.

Yet another common financial scam preys on a particularly vulnerable category of consumers: those people who already have money troubles. Scammers, often angling for victims through junk e-mail or in newsgroups, offer a guaranteed credit card to any interested party—even people with more debt than some Third World nations. Or they'll offer to finance a loan, perhaps to consolidate all the debts an unlucky person already has.

These kinds of offers have lots of catches. First of all, they insist that customers pay a fee up front just to cover the processing of their loan application. People who complained about the scams to the National Consumers League last year reported losing an average of \$138 on credit card offers and \$881 on loan offers.

What do applicants get in return? ►

Nothing, in many cases. The companies often disappear after collecting the fees.

In other instances, instead of sending a credit card, the companies send a list of hundreds of banks that offer credit cards, says Elizabeth Grant, an attorney in the FTC's division of marketing practices. For information on advance-fee loans, check out www.ftc.gov/ftc/consumer.htm.

The best way to avoid scams like these is to accept an unpleasant truth, IFW's Susan Grant says. "No one is going to give you a credit card or a loan if you've really got bad credit." Consumers should also bear in mind that most legitimate lenders don't ask for application fees at the outset. So a request like that "should immediately raise a red flag," adds Grant.

TECHNOLOGY ATTACKS

Trojan Horses and Other E-Flimflams

Sure, the Net lets con artists cheat more people more quickly. But it hasn't altered most of the swindlers' basic techniques, some of which are truly ancient. Caligula himself rigged Roman auctions using the same shill bidding that's alive and well on Internet auction sites.

These days, though, a thoroughly modern Internet crook is on the loose. Part scammer, part hacker, this tech-savvy troublemaker uses devious software and counterfeit Web sites to wreak havoc all over the place. Call him a digital grifter—and a growing threat.

Currently, these crooks' weapons of choice are Trojan horse programs, which typically arrive as e-mail attachments that look like harmless programs or innocuous files such as JPEG images. Double-click the files, though, and you launch a hostile program that may swipe your passwords or give hackers access to your PC and all the information therein.

"We appear to be going through a Trojan explosion," says Nigel Thomas, owner of Simply Super Software, developer of a utility that removes Trojan horse programs. "New Trojan horses are being found in the wild on almost a daily basis." Judging from the horror stories posted on

America Online message boards, newsgroups, and elsewhere, he's right.

Unfortunately, many of those Trojan horses are being found by folks such as Kathie Perez, a registered nurse who lives near Buford, South Carolina. Last year, America Online suspended Perez's account because it was used to generate spam. Perez isn't the type of person you would peg as a crazed spammer—and she wasn't. But the hacker who used a Trojan horse program to steal her AOL password was. At the same time, Perez's computer

was possessed by another Trojan horse that gave hackers control over it. One night, she remembers, her "screen turned upside down, then it turned blue. Then [the hacker] put a dirty picture up as wallpaper. I was really frightened."

Kathie Perez isn't sure how she ended up with such a severely infected computer. However, she does remember receiving some strange e-mail messages that claimed to have pictures attached—classic Trojan horse carriers. And a couple of her grown children downloaded files ▶

RESOURCES

Know Where to Go for Help

Avoid Rip-Offs in the First Place Are you an auction fanatic? A download demon? Arm yourself against Web scams of all types with the information at these sites:

ABOUT.COM Check out this comprehensive guide to Trojan horses. (www.about.com/compute/antivirus/cs/trojans)

CONSUMER SENTINEL This new FTC site offers statistics based on over 300,000 complaints. (www.consumer.gov/sentinel)

FEDERAL CONSUMER INFORMATION CENTER Home of the Consumer Action Handbook. (www.pueblo.gsa.gov/crh/respref.htm)

FEDERAL TRADE COMMISSION Tons of advice on how to stay safe. (www.ftc.gov/bcp/menu-internet.htm)

INTERNET SCAMBUSTERS Antiscam resources, news reports and tips galore, and a free monthly newsletter. (www.scambusters.org)

NATIONAL ASSOCIATION OF SECURITIES DEALERS Get the skinny on your investment broker or advisor. (www.nasdr.com)

NATIONAL CONSUMERS LEAGUE A consumer advice megasite. (www.nclnet.org)

NATIONAL FRAUD CENTER Fraud-avoidance tips and timely alerts. (www.fraud.org)

NORTH AMERICAN SECURITIES ADMINISTRATORS ASSOCIATION Links to investment watchdogs in 50 states. (www.nasaa.org)

SECURITIES AND EXCHANGE COMMISSION Investor education section. (www.sec.gov)

If You Get Burned... When you know or suspect you've been defrauded, these sites let you seek help, or at least warn others:

BETTER BUSINESS BUREAU If you've been

cheated by a business, this is the place to go. (www.bbb.org/bbbcomplaints)

FEDERAL COMMUNICATIONS COMMISSION For all phone-related scams, file your complaint here. (www.fcc.gov/cib/ccformpage.html)

INTERNET FRAUD COMPLAINT CENTER Get complaint forms and other useful statistical reports. (www.ifccfbi.gov/cfi.asp)

INTERNET FRAUD WATCH You can report any kind of Web scam at this site by clicking the link to its Online Incident Report Form. (www.fraud.org/internet/intset.htm)



SECURITIES AND EXCHANGE COMMISSION COMPLAINT CENTER Submit your reports about any problems with investments. (www.sec.gov/consumer/compform.htm)

SIMPLY SUPER SOFTWARE Home of Trojan Remover, a utility (available as a free demo) that undoes Trojan horse and password-stealer damage. (www.simplysup.com)

WEB POLICE This site targets international Internet crimes. (www.web-police.org/forms/wp_crimereport.html)

—Aoife McEvoy

FireWire 6-Port Hub

From BELKIN

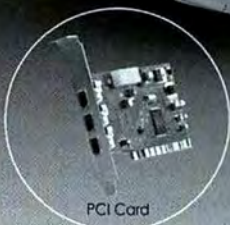
Intrinsic cable management meets compact symmetry and graceful lines. An arc of rear ports flows cables to the computer—function meets form. For all its awesome capabilities, such as a docking ring and 400Mbps transfer speed, you'll love what this hub does for your workspace. At Belkin, we're innovating to make the hottest interface the coolest.



Combo Card



Card Bus



PCI Card



The 6-Port Hub and other FireWire products are available at belkin.com. When you purchase the 6-Port Hub, please enter coupon code 13945261 for a free gift (while supplies last).

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to her computer when she wasn't around. This underscores three of the best ways to protect yourself (and your machine) against Trojan horses: Be extremely cautious about opening file attachments, especially from senders you don't know; run an antivirus utility at all times; and make sure that anyone who has access to your PC practices safe computing habits.

On the bright side, most reports of Trojan horse attacks mirror Perez's experience: exasperating and somewhat creepy, but not severely damaging. That doesn't mean, however, that more serious transgressions— Theft of banking information, for instance—never occur. "The technology exists, and my suspicion is that this is happening and we just don't know about it," contends Lisa Smith, product manager for McAfee's VirusScan utility.

DISREPUTABLE DIALING

Phone companies and consumer groups report a sharp spike in complaints about another type of dangerous download: dialer programs. These applets terminate your ISP connection and then dial another number. When your phone bill arrives, you discover an international call to an exotic locale such as Chad, Madagascar, or Vanuatu, billed at a long-distance rate that may top \$7 per minute.

Most often, dialers originate as downloads at X-rated sites, which tout them as providing access to adult content—no credit card required. Dialers usually include disclaimers that explain what they do and the charges a user could incur—although these disclaimers can be buried deep in multiple pages of fine print.

So are these dialers on the up-and-up? The FTC doesn't think so. Last year, it filed a civil suit against telecommunications company Verity International after hundreds of consumers complained of unexpected long-distance charges averaging \$225 per complaint. The FTC believes that the dialer programs often target the minors in a household rather than the grown-ups who pay the phone bill.

If dialer companies have their way, their software may soon be in use at an array of sites offering everything from music downloads to horoscopes. For now, however, one simple tip should protect you

from dialer damage: Stay away from online pornography, and make sure everyone else who uses your PC does the same.

EVIL DOT-COM TWINS

One last online con to worry about: rogue Web sites that try to pass themselves off as companies you know and trust. For instance, countless AOL users have received e-mail messages that pur-

but a newbie to the service might not know that. In February, three Massachusetts teenagers were charged with using this con to purloin credit card numbers, which they then used to buy over \$30,000 worth of computer and electronics gear.

Even a Web veteran might have been tricked by PayPai.com, the phony PayPal clone that popped up last year. An unknown number of PayPal users received e-mail messages announcing that they had a payment waiting for them. When they clicked on an embedded link, they were taken to www.paypai.com—a URL that in many typefaces is virtually indistinguishable from www.paypal.com. The PayPai site, which effectively copied the look and feel of PayPal's own site, sought to steal users' IDs and passwords when they tried to claim their "payments."

Fortunately, PayPai was quickly shut down, and there's no evidence that any user lost money. But its creator is still at large. And even if that person doesn't strike again, other like-minded schemers surely will—so click with caution.

TAKE CHARGE

When you consider the dizzying array of scams on the Web today, you might reasonably conclude that the Net has been a boon to bad guys everywhere. But that's only half the story.

True, "the Internet is a great platform for anyone who wants to engage in age-old scams in a new way," as Chris Musto, vice president of research at e-commerce analyst firm Gomez Advisors, concedes. "But it's also an unprecedented resource for consumers to guard against scams." Musto points to the wealth of online information that can help Net users spot scammers before it's too late.

As long as consumers frequent the Web, online con artists will try to cheat them. It's nice to think that the Internet itself could wind up making the swindler's job a little harder.

Edward N. Albrow is a senior editor, Harry McCracken an executive editor, and Aoife McEvoy a senior associate editor for PC World. Senior Associate Editor Andrew Brandt and Senior Reporter Tom Spring also contributed to this article.

FUTURE THREAT

Identity Thieves Smarten Up

Identity theft: The phrase itself is spooky. But most identity thieves on the Web are out to snag AOL passwords—and many of them fail, at that. Irritating, yes, but a little short of devastating.

In coming years, Web thieves are sure to invent more sophisticated, damaging techniques. And as we store increasingly valuable information online, identity theft will become more tempting. "In cyberspace, the things that are important are your personal data, your banking records," says Srivats Sampath, president and CEO of McAfee.com. "They're important to you, so they're important to the bad guys." Keep that in mind as the world grows ever more wired.

—Harry McCracken



port to be from AOL, explaining that the member's credit card information has expired or been lost in a server crash. A link takes the recipient to a fake clone of AOL's Billing Center. If the user enters a credit card number or any other personal data, it's silently e-mailed to the scammer.

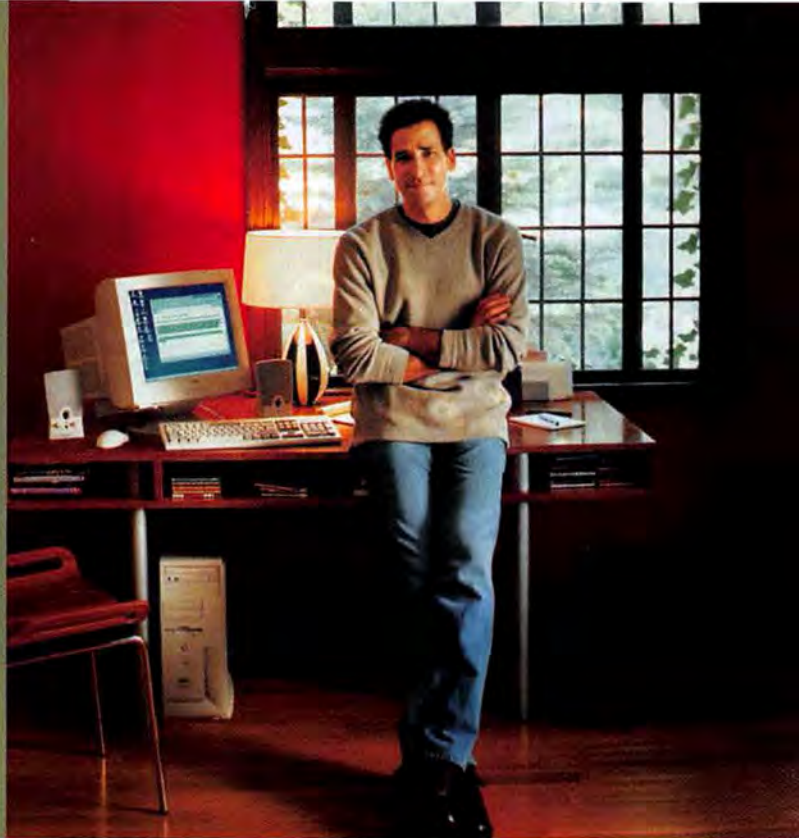
The ersatz AOL sites typically bear little resemblance to AOL's real billing area,

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that kicks?

a pc that plays DVDs
and burns CDs?

a \$1299 price tag?

i'm there.



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- 56K Capable* PCI Telephony Modem
- MS® Works Suite 2001 ■ MS® Windows® Me
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\$1699 or as low as **\$51** per mo. 45 mos.¹²

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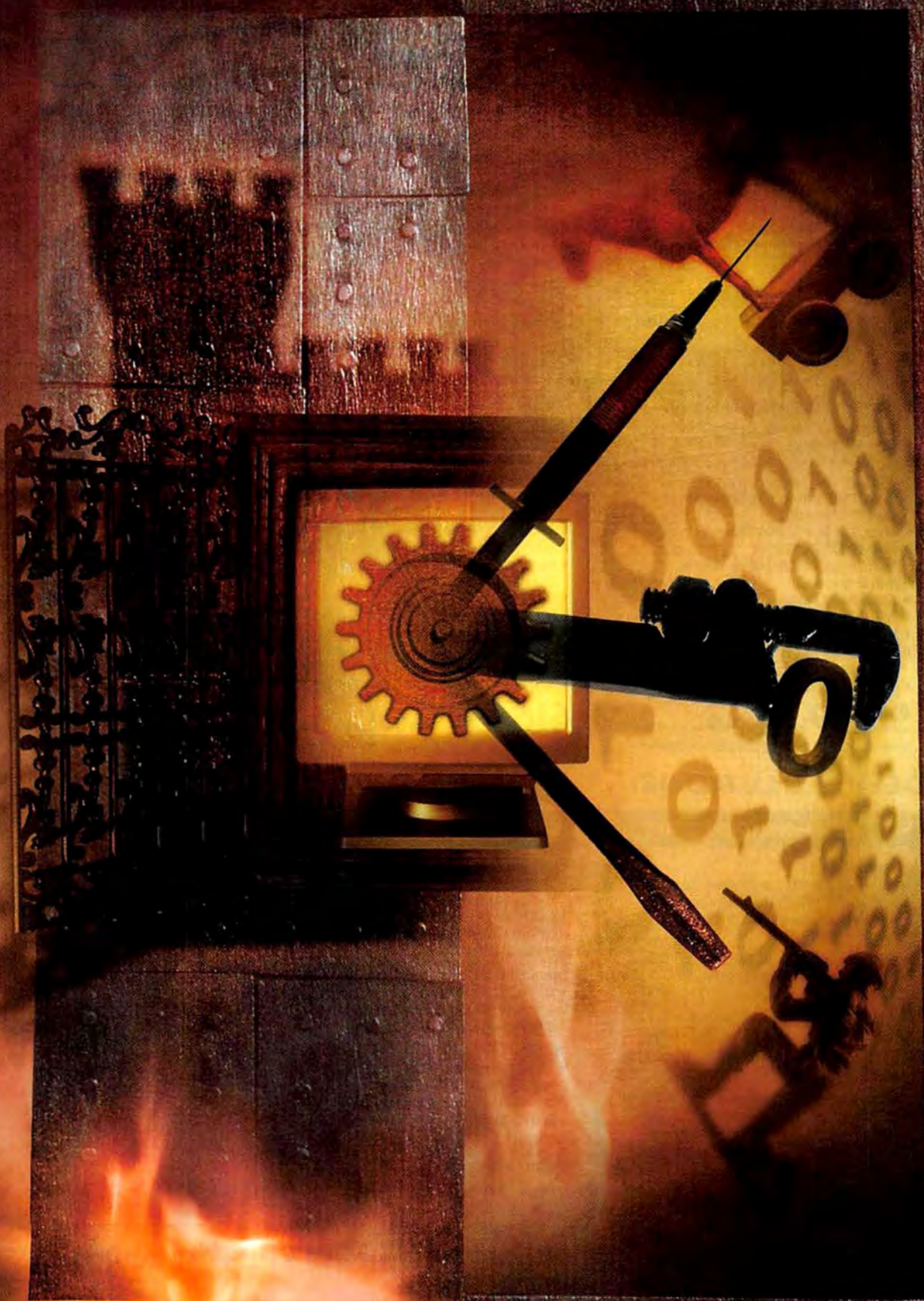
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Fortress PC

How can you patch up the holes and keep attackers at bay? Our ultimate guide to system security gives you the tools you need: antivirus utilities, firewalls, file encryptors, and other PC protectors.

BY STAN MIASTKOWSKI

As Henry Kissinger once said, "Even a paranoid has some real enemies." And anyone who uses a computer has something to fear from the Internet's scurvy crew of hackers, crackers, and virus writers, or from companies that want to track your surfing habits. But you don't need to be paranoid; you just need the right tools to protect your PC.

We compared almost two dozen hardware and software defenses against a variety of security and privacy threats, and we designed a tool kit of both must-have and optional products for each of three computing environments:

- a home PC used by one or more members of a family;
- a group of networked PCs in a small-business setting with limited IT support;
- a laptop used for business travel (see "Portable Security Tool Kit," page 126).

To create our tool kits, we looked at five antivirus utilities, six software firewalls, three hardware firewalls, four file-encryption products, a pair of e-mail encryptors, and two anonymous-surfing utilities. (For buying information and details on all the products we review, see the table on page 123.) We also looked at products for managing Internet cookies. Please point your browser to www.pcworld.com/reviews/cookie to see our picks.

Most Internet threats affect both home and office PC users. Some, such as viruses, are equally important to both groups. Other threats are more prominent for one group or the other: Companies that track Web surfing habits, for example, are a matter of concern mostly for home users who are worried about protecting their personal privacy.

Every home user should first install a reliable antivirus program to help defend against viruses and Trojan horses, which can do anything from stealing passwords to reformatting your hard drive to allowing hackers to take command of your system.

After guarding against viruses, home users may want a firewall to block potential exposure to outside attacks. The danger of being hacked is fairly small if you connect occasionally via a dial-up modem, but the risks are greater if you have a high-speed, always-on broadband connection such as DSL or cable. To further protect against snoops, you may choose to encrypt confidential files such as financial records and e-mail.

Surfing the Web presents additional dangers. Many sites (and their advertisers) track visitors' browsing habits. An anonymizing service can keep your identity and surfing preferences private. Finally, recent attacks on e-commerce Web sites, such as the infiltration of Egghead.com last December, raise concerns about hackers stealing credit card numbers from customer databases. Credit card companies are offering new services to reduce these risks.

If your home is also your office, or if ➤



"I think home users are definitely at an increased risk right now, especially those with twenty-four/seven broadband connections via DSL and cable modems."

-GEORGE KURTZ, SECURITY CONSULTANT

you are in charge of computers for a small business, you face additional challenges. You probably have a high-speed Internet connection and are therefore an easier target for snoops and troublemakers—especially if you run a Web site. You also have to manage securing an entire network against viruses and hackers. In addition, you may need to protect proprietary information by encrypting sensitive files and e-mail communications.

HOW WE TESTED

When choosing antivirus software, we considered vendors whose products have been effective in past *PC World* tests and independently certified by ICSA Labs for their reliability at catching viruses and repairing damaged files. We evaluated the ease of installing the products, running

them, and updating the all-important virus-signature files that protect against the latest malicious scripts.

The PC World Test Center evaluated how well firewalls distinguished between hostile and friendly activities. We planted the Back Orifice 2000 Trojan horse on a test system and attempted to access it from our attacking computer. We ran a port scanner to find open access points, and we tried connecting to a shared hard drive. Finally, we tested whether the firewalls blocked TSAdBot, a component of some freeware programs that downloads and displays advertisements while sending data back to its maker.

Along with blocking harmful connections, a firewall should permit legitimate Internet usage. We tested this by separately running seven common applica-

tions: Microsoft's Internet Explorer 5.5 and NetMeeting 3.0, WS-FTP LE 5.0, ICQ 2000, Napster 2.0, RealPlayer 6.0, and Symantec's PCHelp 9.2.

We tested file and e-mail encryption software, noted whether the products use trusted, peer-reviewed encryption standards, and looked for extra features, such as the ability to hide files. To evaluate anonymous surfing utilities, we observed whether the products caused noticeable slowdowns in surfing speed and whether they worked with software that requires cookies (such as Web-based e-mail).

Home Tool Kit

Must-Have

Antivirus utility: Norton AntiVirus 2001 or PC-cillin 2000

Optional

Firewall: BlackICE Defender 2.1 or ZoneAlarm Pro

File encryptor: Steganos Security Suite

E-mail encryptor: Sigaba Secure

Anonymous-surfing service: Anonymizer

We evaluated four home antivirus programs with proven track records: the ASP-based McAfee.com Clinic, plus the shrink-wrapped products McAfee Virus-Scan from Network Associates, Norton AntiVirus 2001 from Symantec, and PC-cillin 2000 from Trend Micro. We chose two PC antivirus tools—Norton AntiVirus 2001 (\$40) and PC-cillin 2000 (\$40 shrink-wrapped or \$30 as a download).

Last year's version of Norton AntiVirus took the Best Buy award in our February 2000 antivirus roundup, and it remains one of our favorites. Like other leading antivirus products, Norton combines the tried-and-true method of scanning for known virus signatures with a process known as heuristics, which attempts to intercept new, unknown viruses by examining programs for viruslike behavior. The product is easy to set up and, like any effective antivirus utility, has a real-time scanner that runs in the background. Norton's LiveUpdate engine checks for new virus definitions whenever you are ►

PRODUCT	Price	Best pick	Comments
Antivirus utility			
McAfee.com Clinic 888/622-3331 www.mcafee.com	\$30	Small office	Proven McAfee antivirus engine sold online provides full-time protection, automatic updates for \$30 per PC per year. Discounted 20 percent with the purchase of five or more licenses.
McAfee VirusScan ASaP 877/796-9246 www.mcafeesasap.com	1		This ASP version of the McAfee antivirus engine is easy to set up, effective, and automatic (including updates). Designed for networks with broadband, it is comparatively expensive.
Network Associates McAfee VirusScan 800/338-8754 www.mcafee-at-home.com	\$29		Effective, but not as easy to set up as other antivirus products. Provides scheduled automatic scans, but not automatic updates. Free engine and virus-signature updates in first year; \$5 per year thereafter.
Symantec Norton AntiVirus 2001 800/441-7234 www.symantec.com	\$40	Home	Effective protection from a past <i>PC World</i> Best Buy. Easy to set up and use. Five-user pack sells for \$160. Includes one year of virus-signature updates; additional updates are \$4 per year.
Trend Micro PC-cillin 2000 800/228-5651 www.antivirus.com/pc-cillin	\$40 ²	Home	Great interface, automatic updates, and fast virus scans. Includes a content filter for objectionable Web sites. No discount for multiple purchases.
Software firewall			
McAfee.com Personal Firewall 888/622-3331 www.mcafee.com	\$40		Easy to set up; includes a small list of preapproved apps. Automatically downloads updates. Discounted 20 percent with the purchase of five or more licenses.
McAfee PC FireWall ASaP 877/796-9246 www.mcafeesasap.com	1		Designed for networks, it is effective and easy to set up. Automatic updates require minimal user intervention. Relatively expensive.
Network ICE BlackICE Defender 2.1 650/532-4100 www.netice.com	\$40	Home	Needs minimal user input. Provides detailed information on attacks, including source IP address; logs suspicious network activity and displays information graphically. Does not monitor applications.
Symantec Norton Personal Firewall 2001 800/441-7234 www.symantec.com	\$50		Easy to set up and use; customizable security levels. Alerts let you screen traffic on the fly. Filters cookies and malicious scripts, and blocks Web-site attempts to harvest personal info from your system.
Zero-Knowledge Systems Freedom 2.0 514/286-2636 www.zeroknowledge.com	Free		Includes effective Web-based personal firewall, form filler, cookie manager, and ad manager. Works with common e-mail clients, but can be difficult to install and set up as well as finicky to uninstall.
Zone Labs ZoneAlarm Pro 415/341-8200 www.zonelabs.com	\$40 ³	Home	Highly configurable, network ready; stops outside attacks and lets you selectively allow or disallow Internet access by application. MailSafe quarantines potentially harmful e-mail attachments.
Hardware firewall and router			
Linksys Etherfast Cable/DSL Router 800/546-5797 www.linksys.com	\$149	Small office	Inexpensive; includes router for up to four networked PCs (and is expandable to 253 users). Overcoming some limitations on incoming services in the default configuration required extensive tweaking.
SonicWall Tele2 888/557-6642 www.sonicwall.com	\$450		High-priced for a unit that handles only four PCs, but advanced features include a virtual private network. Preset services allow for easy setup, but other services (such as ICG) are difficult to configure.
WatchGuard SOHO 2.2 800/734-9905 www.watchguard.com	\$450		Includes dynamic packet filtering; allows full outside access to one PC (useful for a Web server). Base price is for ten users; expandable to 50 (\$510 more). Can be tedious to install.
File encryptor			
CenturionSoft Steganos Security Suite 202/293-5151 www.centurionsoft.com	\$60	Home/ small office	Easy-to-use 128-bit encryption suite includes password management, file shredder, password-protected system lock, and encrypted e-mail. Considerable discounts for multiple licenses.
CyPost Navaho Lock with Voice 3.0 877/297-6781 www.cypost.com	\$50 ⁴		Provides up to 168-bit encryption to scramble files, text-based e-mail, and voice messages for e-mail attachment.
Network Associates PGP Personal Privacy 800/338-8754 www.mcafee-at-home.com	\$19		One of the first readily available encryption utilities, PGP provides 128-bit encryption and supports VPNs, but it is complex to set up and use. Does not support Windows Me.
Panda Software Panda Security 800/603-4922 www.pandasecurity.com	\$60		Supports 448-bit file encryption and provides PC access control including secure log-on, limits on access to software and hardware, and auditing of PC use. Not designed for Windows Me, NT, or 2000.
E-mail encryptor			
Hush Communications HushMail 801/990-3490 www.hushmail.com	Free		Easy-to-use Web-based encryption. Offers limited integration with POP3 e-mail programs (expanded coverage is in the works). Recipients of encrypted e-mail must also be registered HushMail users.
Sigaba Secure 650/572-6100 www.sigaba.com	Free	Home/ small office	Highly secure encryption keeps keys separate from messages by generating the keys at Sigaba servers. Easy to set up and use, but currently lacks support for some major e-mail clients.
Anonymous-surfing service			
Anonymizer 888/270-0141 www.anonymizer.com	\$50	Home	Easy to use and works with any browser. Allows the secure use of cookies with sites that require them. URL encryption hides browsing history from prying eyes. Secure tunneling version is \$110 per year.
Zero-Knowledge Systems Freedom 2.0 514/286-2636 www.zeroknowledge.com	Free		Free version includes anonymous surfing (but without URL encryption) and a firewall. Premium version (\$50) adds anonymous e-mail and chat. Requires tricky installation of application.

¹ Firewall, antivirus, and content filtering offered together at \$372 per year per PC for networks of 5 to 25 nodes.

² Download version costs \$30.

³ Free version offers core features for home users and nonprofit organizations.

⁴ Free ad-supported version available for home users.

connected to the Internet and automatically downloads the latest updates.

PC-cillin has a more graphical and intuitive interface than Norton's, it's a bit faster at scanning your entire PC for viruses, and it can more easily be set to automatically download virus updates. It also provides a basic password-protected content-filtering mechanism for blocking URLs of Web sites that home users may consider dangerous or inappropriate for children.

HOME FIREWALLS

Many home users—especially those with high-speed connections—should set up a software firewall. We tested the ASP-based McAfee.com Personal Firewall along with BlackICE Defender 2.1 from Network ICE, Norton Personal Firewall 2001 from Symantec, Zero-Knowledge

Systems' Freedom 2.0 (which includes anonymous surfing and cookie management), and Zone Labs' ZoneAlarm Pro. Overall, the software firewalls were impressive and effective—each passed all or nearly all of the tests we threw at it. We chose our two favorite tools—BlackICE Defender and ZoneAlarm Pro (each a \$40 download)—based on how easy they are to set up and use and how effectively they provide information to the user (such as details on blocked hack attacks). Earlier versions of both products shared the Best Buy in our September 2000 firewall roundup, "Make Your PC Hacker-Proof."

BlackICE Defender is a no-frills utility: It's easy to set up, it has an intuitive interface, and it doesn't need much attention. Resembling an antivirus program, it quietly checks all the Net traffic coming into

your PC against a database of known hacking methods and scans for known Trojan horses. (Updates can be set to run automatically.) It stopped all the attacks in our tests. If you want to know precisely what BlackICE Defender is doing, you can review a detailed list of suspicious probes and their originating IP addresses. Defender also provides an intuitive graphical display of all network activity, the intensity of outside probes, and their severity over a period of time.

ZoneAlarm Pro is considerably more complex. It not only filters incoming data but also watches which programs on your system attempt to access the Internet. You can allow connections on a case-by-case basis or tell ZoneAlarm to remember your preference every time the application runs. By watching individual programs, ZoneAlarm Pro can catch and block Trojan horses and "spyware" programs, which send information about you and your PC back to their makers. Pro includes a feature called MailSafe, which allows you to quarantine e-mail attachments that may carry viruses or Trojan horses. And if you opt to set up a small home network, Pro can also filter traffic passing through a gateway PC that uses network address translation or Internet connection sharing. With Pro installed on every PC, the gateway computer can monitor all traffic and applications.

Zone Labs offers home users a free version of ZoneAlarm that provides similar protection but fewer customization options and no network support. It also includes a simpler version of MailSafe. For home users who don't need Pro's extra features, the free download is a great choice.

FILE ENCRYPTORS

We looked at four file-encryption products—CenturionSoft's Steganos Security Suite, CyPost's Navaho Lock, Network Associates' PGP Personal Privacy, and Panda Software's Panda Security. Steganos Security Suite (\$60) wins our recommendation. It protects your data with extremely secure 128-bit encryption, which you activate by simply dragging and dropping a file onto an icon of a safe. You then unlock the data with a password.

But Steganos stands out because of ►

SAFETY TIPS

Security Advice From a Pro

George Kurtz, CEO of the security firm Foundstone and coauthor of the book *Hacking Exposed*, helps major corporations protect their systems from attack. He assisted *PC World* in developing a list of basic safety tips for PC users. For more advice, see our interview "Three Minutes with George Kurtz" at www.pcworld.com/news/kurtz.

BUILD WALLS AND LOCK WINDOWS. A firewall watches traffic coming into your PC and blocks suspicious activity. But on a properly secured system it should be only a second line of defense. Most users don't need Windows' printer and file sharing, for instance, and making sure they are turned off (via the Network applet in Windows' Control Panel) removes your greatest vulnerability. For detailed configuration tips, see "Unsafe at High Speed" at www.pcworld.com/heres_how/safebroadband.

REALLY USE ANTIVIRUS SOFTWARE. A good virus scanner is your most important security tool. But it's only as effective as it is current: Enable real-time scanning and be sure to update virus signatures and scan your drives at least once a week. Many antivirus packages allow you to set automatic drive scans and updates.

TOSS OUT MYSTERIOUS ATTACHMENTS. If you never let nefarious scripts into your PC, your virus scanner won't have to remove them. Don't open an attachment unless you are expecting it. And before running any attachment, save it to your hard disk and scan for viruses. For further advice on closing e-mail vulnerabilities, see "Batten Down Windows' Hatches!" at www.pcworld.com/heres_how/winsecurity.

APPLY SECURITY UPDATES. Software and OS vendors often release security fixes. Learn about the latest patches in our monthly *Bugs and Fixes* column at www.pcworld.com/heres_how/bugfixes and by checking with Microsoft at www.windowsupdate.microsoft.com.

—Sean Captain



ALL PC USERS!!

THIS IS AN URGENT MESSAGE

You are and will continue to be vulnerable and at the mercy of any virus or malicious acts of a hacker as long as you continue to rely and depend on software as your line of defense. There is only one way to truly protect your PC, Hardware!



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the many additional security features it offers. For example, you can use a process called steganography to create a hidden drive letter for encrypted data or to hide one data file inside another. Steganos also has a handy password-management utility for storing all your passwords in an encrypted folder; a virtual shredder, which ensures that deleted files cannot be retrieved; and a feature called SysLock that password-protects access to your computer. Steganos even lets you encrypt e-mail, although, as you'll see later, we preferred another product for this task. Steganos doesn't come with a manual, but it's so intuitive, you don't really need one.

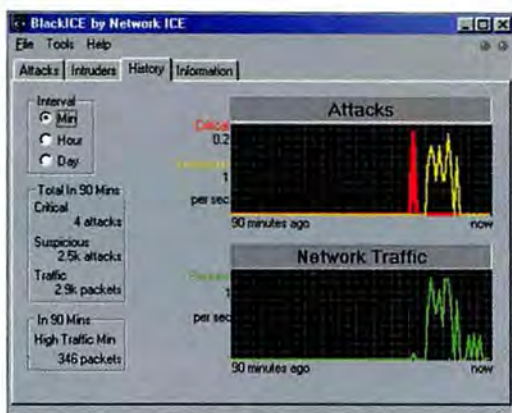
PRIVATE E-MAIL & BROWSING

Some users seldom send extremely sensitive information in e-mail, but everyone conducts some correspondence that is worth extra precautions to keep private. We looked at two e-mail encryption products that provide an additional measure of security. Hush Communications' HushMail and Sigaba Secure are both attractively priced: They're free. But we were

most impressed with Sigaba for its ease of use and its support of multiple types of e-mail.

To use Sigaba Secure, you first download a small plug-in for your e-mail utility. At the time of our testing, Sigaba supported the POP3 e-mail clients Microsoft Outlook and Eudora, as well as the Web-based e-mail services Yahoo Mail and Hotmail. According to Sigaba representatives, plug-ins for Outlook Express, Lotus Notes 5.0, and Novell GroupWise should be ready at the end of April.

HushMail, in contrast, supported only Web-based e-mail at the time we conducted our tests, although we learned at press time that Hush Communications was preparing to launch a new free version called HushMail Professional that will integrate into Outlook, Outlook Express, Netscape Messenger, Microsoft Internet Mail, Eudora, and Lotus cc:Mail. HushMail says the Professional version should be available by the time you read this.



BLACKICE Defender 2.1 normally keeps a low profile, but curious users can access detailed activity reports.

Sigaba uses 128-bit encryption based on the well-known Blowfish algorithm in a unique, extremely secure scheme that keeps the message and the decrypting key separate until they reach their destination. Sigaba's servers generate a onetime key when you send an encrypted message, and your recipient retrieves the key from Sigaba via a Secure Sockets Layer connection after receiving the e-mail. Your message never passes through Sigaba's ►

SAFETY ON THE ROAD

Portable Security Tool Kit

THE ANTIVIRUS UTILITIES AND FIREWALLS we recommend for home desktop PCs work just as well on laptops. You won't go wrong with Norton AntiVirus 2001 or PC-cillin 2000, or with BlackICE Defender or ZoneAlarm Pro. But laptop security has another dimension: Even if a hacker can't download your data, a thief can carry it off.

PORTABLE BUT ILLEGIBLE Though most thieves steal portables simply for the hardware, 10 to 15 percent of laptop thefts are targeted at valuable data, according to Gartner Group vice president William Malik. For data protection, we chose PC Guardian's Road Guardian Survival Package (www.pcguardian.com). This \$100 suite combines physical security—an antitheft cable with a lock—and file security in the form of Encryption Plus, which provides 192-bit encryption of files and e-mail. It's easy to use: Encryption is automatic for the files you designate, and files are automatically

PC World Recommends

Antivirus utility: Norton AntiVirus 2001 or PC-cillin 2000

Firewall: BlackICE Defender or ZoneAlarm Pro

File encryptor: Road Guardian Survival Package

Equipment security: Computrace and StuffBak



PC GUARDIAN, Computrace, and StuffBak.

a broadband line, or a dial-up connection. And a thief will have no idea the software is installed: It runs in stealth mode and can survive hard-drive reformatting. If you report your notebook stolen, Computrace and your local police will work to recover it.

Finally, sometimes a low-tech solution can save the day. The aptly named StuffBak (www.stuffbak.com) provides labels that you attach to your laptop (or virtually anything else). Each label costs \$2 and contains a message offering a reward for the item's return, a toll-free number, and a serial number that you register on the company's Web site. If an item is found, you pay shipping charges and a \$10 service fee to retrieve it. Obviously, thieves are unlikely to use StuffBak labels to return your PC; but if it's simply lost, or stolen and later disposed of, you may get it back.

—Stan Miestkowski

re-encrypted when you close them. Encryption Plus also supports e-mail encryption.

CALLING FOR HELP For an annual subscription fee of \$50, Computrace (www.computrace.com) provides software that periodically "phones home" (the Computrace monitoring center) when the notebook is attached to a LAN,

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Whether tracking of online surfing habits is truly harmful or merely annoying, it is a concern for a significant number of Internet users. It's easy for companies to do, even if you have a firewall installed. But anonymizing services put an end to that practice by routing your surfing through intermediate proxy servers, making it impossible to trace where the connection is coming from.

We tried out two products—Anonymizer and Zero-Knowledge Freedom 2.0—and we chose the venerable Anonymizer, which has been around since 1996. There's nothing to install with Anonymizer; you just sign up for the service and start surfing using your regular browser. A box appears at the top of each Web page showing that you're surfing anonymously, with all your Web traffic being routed through Anonymizer's proxy servers. Freedom 2.0 works similarly, although it offers a few more bells and whistles, such as a built-in firewall. Freedom 2.0 also requires that you use its software, which we found difficult to install and configure.

Like any anonymous-surfing utility,

Anonymizer slows down your browsing slightly. The delay is most perceptible during peak Web-surfing hours, and with a dial-up connection—the lag is not as noticeable over a broadband hookup.

In a world of often-free Internet utilities, Anonymizer is relatively expensive (\$50 per year). It's a proven and useful service, however, and it includes some handy features: Safe Cookies allows you to use Web sites that require cookies in order to function (such as Yahoo Mail). Anonymizer also encrypts URLs, ensuring that those with access to your machine won't be able to retrace your surfing steps. The truly paranoid can opt for a \$110-per-year version of the service that includes a "secure tunneling" encrypted connection between your PC and the Anonymizer servers to protect against the remote chance that a hacker may be intercepting your surfing activity.

CREDIT CARD SECURITY

Finally, for people reluctant to use their credit cards on the Internet, or afraid their families will bust the budget shopping online, three major credit card companies offer solutions.

American Express Private Payments (www26.americanexpress.com/privatepayments) is a free service for

Amex cardholders that creates a temporary card number for each transaction. Hackers who break into a Web site's customer database will get only this number (which expires after 60 days), not the real credit card number. Discover Card (www.discovercard.com) offers a similar service. And Visa Buxx (www.visa.com/pd/buxx/main.html) is a card with a

preset spending limit designed specifically for teenagers, so you can let the kids do a little online shopping without fear that they'll blow their college fund on eBay.

ALL-IN-ONE HOME TOOLBOX?

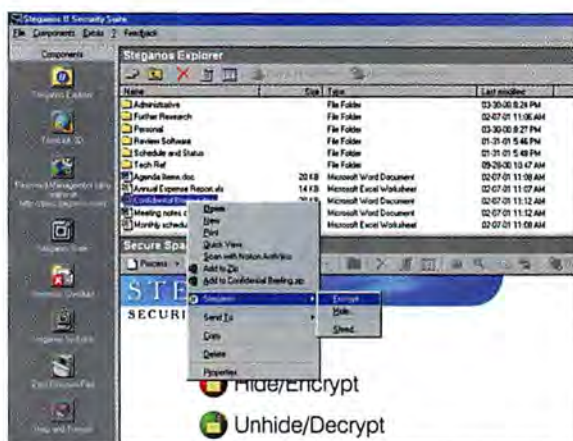
No single package includes all of the tools you need for complete home PC security, but some companies offer bundles with many of the key elements.

Symantec's Norton Internet Security 2001 (\$70), for instance, combines Norton's antivirus and firewall applications with its Privacy Control utility, which blocks cookies and banner ads; it also blocks Web sites from retrieving personal information from your computer. The \$80 Family Edition adds a Parental Control content filter that lets parents block access to Web sites they consider inappropriate for their children.

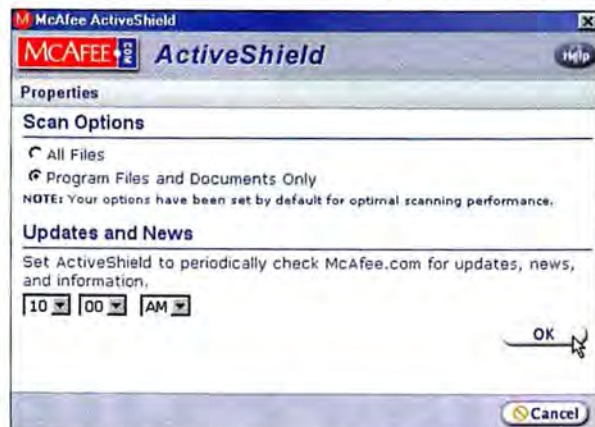
At press time, we learned that Trend Micro was planning to integrate the basic version of Zone Labs' ZoneAlarm into its PC-cillin product. As noted previously, PC-cillin includes a content filter.

Finally, Network Associates sells a boxed version of McAfee Office that includes the company's antivirus and firewall utilities, the PGP file-encryption application, and the Internet Guard Dog suite, which includes a content filter, a cookie manager, and an ad blocker. (Office also includes system maintenance tools such as diagnostic and repair utilities and a program uninstaller.)

None of these packages incorporates all of our tool-kit selections, but the ►



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Small-Office Tool Kit

Must-Have

Antivirus utility: McAfee.com Clinic

Firewall: Linksys Etherfast Cable/DSL Router

Optional

File encryptor: Steganos Security Suite

E-mail encryptor: Sigaba Secure

Although any reputable antivirus package is appropriate for a small workgroup, keeping each user equipped with the latest updates and virus signatures can be a never-ending battle. So we gave special weight to ease of installation and maintenance in our evaluations, and as a result, we chose the ASP McAfee.com Clinic as the friendliest product for a

workgroup to use. At \$30 per PC per year (or \$24 for orders of five or more), McAfee.com Clinic is priced competitively with shrink-wrapped products. Clinic also includes additional services, such as file-cleaning utilities.

Installation is simple—just sign up and download the engine. The unobtrusive, browser-based interface allows users to easily configure automatic scans and updates (but doesn't allow central administration). Clinic uses the same core antivirus technology as the shrink-wrapped McAfee VirusScan, but the ASP offering is considerably easier to use.

Of the three small-business hardware firewall/routers we examined—the Linksys Etherfast Cable/DSL Router, SonicWall Tele2, and WatchGuard SOHO 2.2—we chose the Linksys. It's inexpensive (\$149) and is both a firewall and a router that lets up to four networked PCs use one broadband Internet connection. You can expand your network to as many as 253 users by adding hubs or switches to the router. The Linksys passed all our

FUTURE THREAT

Your Next Virus Infection

Automatic updates aren't just for antivirus programs; viruses themselves are getting into the act. Raul Elnitiarta of Symantec's Antivirus Research Center says we can expect more scripts that download plug-ins to expand their capabilities, like the W32.hybris Trojan horse. Hybris was a "sleeper" for most of 2000, according to Elnitiarta, but by February 2001, it accounted for 40 percent of all suspicious scripts sent to SARC for analysis. "I think it sets the trend for the near future," he says.

Elnitiarta thinks that someday we may see more viruses infecting handhelds. Only three such scripts now exist (they were published on the Internet to prove their

feasibility), and all affect Palm-based devices: The Trojan horse Liberty and the virus Phage delete files, and the Trojan horse Vapor hides files. Liberty and Vapor can only be synched from an infected PC,

but Phage can be transmitted directly from one handheld to another when users beam files to each other. Elnitiarta says that cell phone viruses haven't appeared because the de-

vices don't share a common operating system—no one is writing viruses to target just Nokia phones, for example. But if a single OS becomes standard for handhelds, they'll be as hospitable an environment as today's Windows-based PCs.

—Seán Captain



RESOURCES

Safety in Knowledge

Forewarned is forearmed. Here are a few starting points if you'd like to dig deeper.

ON PCWORLD.COM:

- Keep Web Snoops at Bay (www.pcworld.com/dec2000/homeoffice)
- How It Works on viruses, personal firewalls, file encryption, and Web cookies (www.pcworld.com/how_it_works)

ON OTHER SITES:

- McAfee Virus Information Library (vil.nai.com/vil/default.asp)
- VMYths.com (www.vmyths.com)
- InfoWorld Security Watch (www.infoworld.com/opinions)
- Gibson Research Corp. (www.grc.com)

attack tests and was relatively easy to use. The default setup—essentially plug and play—works fine for most uses, although you'll have to do some tweaking if you want to use two-way communication apps, such as PCAnywhere, over the Internet.

The same encryption products we recommend for home are the best choices in an office as well: Steganos Security Suite and Sigaba Secure. Anonymous surfing is unlikely to be a concern for businesses. But if employees have a legitimate business reason to cloak their surfing—and if managers feel it is worth the investment—we recommend Anonymizer.

PRUDENT, NOT PARANOID

However you access the Net, you'd be wise to safeguard your security and privacy. If you don't have minimal protection—an antivirus utility and (for many people) a software firewall—you're living on borrowed time. Security threats are on the rise, and your online privacy isn't guaranteed. You can protect yourself. ■

Stan Miastkowski is a contributing editor for PC World, and Seán Captain is an associate editor for PC World.



FOR MORE about the best ways to secure your computer, go to www.pcworld.com/may2001/threats.

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Hacker Nation

Computer intrusions have more than tripled in the last two years. Who are the people trying to get their hands on your data, and why? We got answers from some experts—including hackers themselves.

BY KIM ZETTER

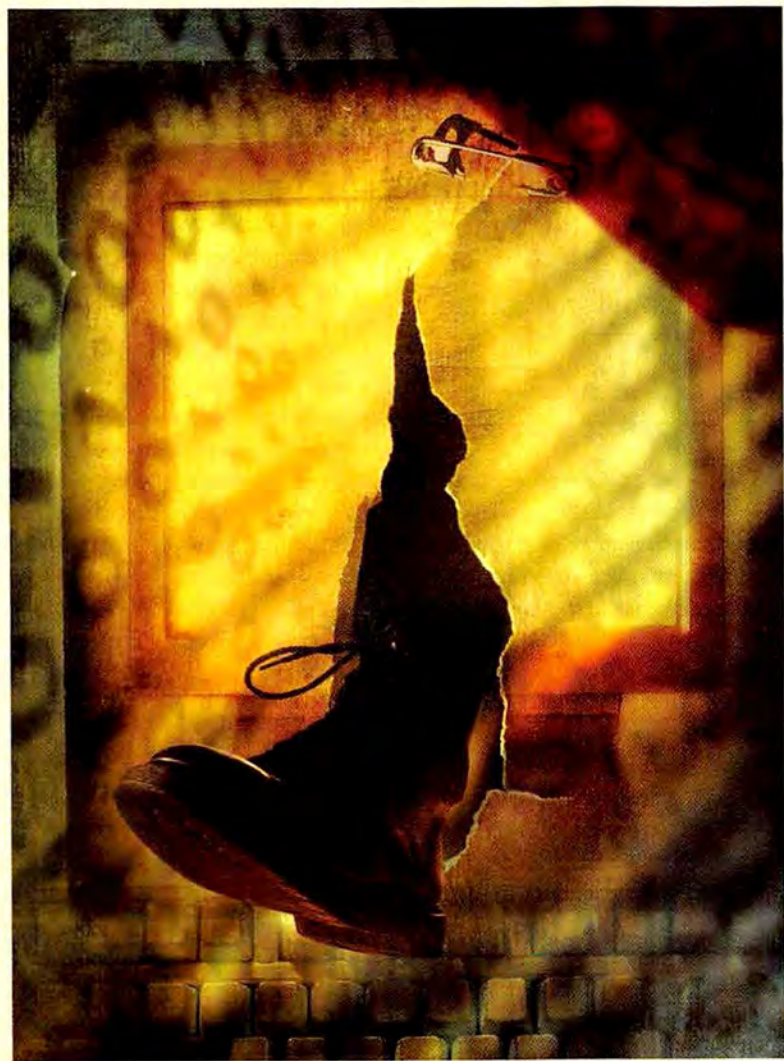


ILLUSTRATION BY RICHARD TUSCHMAN

He couldn't be more than 12 years old—a "tween," in the parlance of the Britney Spears generation. But that doesn't stop him from possessing the swagger of a pop star as he takes a swig of Jolt Cola, stubs out a cigarette, and squints at the screen that has held his attention for the past 6 hours.

With the sides of his scalp shaved bare, he resembles a *Mad Max* ruffian perched amidst yards of cable and tables piled high with jury-rigged circuit boards, souped-up laptops, and phone-surveillance equipment. He's one of hundreds of hackers who have turned the Alexis Park Resort in Las Vegas into a makeshift commando station for the annual hackers convention, Def Con (from the military's term for its levels of alertness). Throughout the weekend, tag teams of hackers will work furiously to "get root on" (gain control of) a server the conference organizers have set up, while fending off opponents trying to oust them. It's an age-old game of capture the flag, played out on a digital field.

But it isn't all games for this underage cybersoldier. Because hacking has become nothing in recent years if not a good career move. Yesterday's hackers are today's security gurus, with more corporations counting on them for protection.

Once considered the domain of geeks and freaks, hacking now claims members ranging from the body-piercing-and-gothic crowd to the Bermuda-shorts-and-loafers contingent. The latter are hackers and ex-hackers who now work as systems administrators and consultants.

One reason there are so many types of hackers these days is that hacking—at least as manifested in its simpler forms such as Web page defacement and ▶



"I used to say that the [security] problem was going to get worse before it would get better.

Now I just think it's going to get worse."

—JEFF MOSS, FOUNDER OF DEF CON

denial-of-service attacks (which overwhelm a site with data to prevent users from accessing it)—has never been easier.

TOOLS OF THE TRADE

The Internet is filled with Web sites that offer tips and tools for the neophyte hacker. Kids, criminals, and terrorists are some of the people who avail themselves of this information—so more and more intruders are knocking at port doors.

"The barrier to entering the hacker world has become very low," says 30-year-old Jeff Moss, a former hacker and security consultant who founded Def Con. "If you have a political motivation against wheat farmers and you want to deface [their] Web page, you could just go online and learn how to [do it]."

Despite tighter Web security and stricter penalties for breaking into systems, hacking attacks have more than tripled in the past two years. The government's Computer Emergency Response Team reported about 5000 cases of corporate hacking in the United States in 1999 and more than 17,000 cases in 2000. And those are just recorded cases; to avoid negative publicity, most companies don't report attacks. The statistics cover network break-ins (which can give a hacker access to data files), Web site vandalism, denial-of-service attacks, and data theft. The FBI estimates that businesses worldwide lost \$1.5 trillion last year due to security breaches perpetrated from within and without.

The risks are personal and professional: Hackers can steal passwords and bank

account numbers from your home PC or grab trade secrets from your company network. Last October, criminal hackers broke into Microsoft's corporate network and accessed source code for its software.

Hacking also poses risks for national security—sophisticated terrorists or hostile governments could conceivably crash satellite systems, wage economic warfare by interfering with financial transfers, or even disrupt air traffic control.

GOOD AND BAD HACKERS

Not all hackers have malicious intentions. Some hackers work for companies to secure their systems, and some contribute to security by notifying software vendors when they spot a vulnerability.

"Breaking things...is easy," says Syke, a 23-year-old security professional and member of the hacking group New Hack City. "Building a solution...is difficult, but arguably more fulfilling."

But for every hacker who swaps his black hat for a white one, dozens of others continue to keep governments and companies on their toes. In February, hackers protesting free trade broke into the World Economic Forum's system and stole credit card numbers for at least 1400 government and business leaders—including, reportedly, Bill Gates and Bill Clinton.

Moss says that hacking will get worse. "I used to say the problem was going to get worse before it would get better. Now I just think it's going to get worse. Bad software is being written faster than vulnerabilities are exposed. The trend is toward more features [in applications], and the more features you have, the less security you get."

Face it: Hackers are not going to go away. So it's worthwhile to know who they are and why they do what they do.

IDLE HANDS

People see movies like *War Games* and think hackers are going to start World War III," says Deth Veggie, a member of Cult of the Dead Cow, one of the oldest hacking groups (since 1984). "The truth is that computer hackers for the most part are smart, bored kids."

[Editor's note: Most hackers adopt a nom de hack; we've used these in place of some real names when requested to do so.]

It's true that the majority of hackers getting attention these days are bored kids. Hackers usually start in their teens and stop by the time they're 30. But anyone can be a hacker—from the 16-year-old who defaces Web sites to the 36-year-old who sabotages a former employer's server. For their part, people in the underground say that not all hackers are true hackers.

BY ANY OTHER NAME

It used to be that hacking had nothing to do with breaking the law or damaging systems. The first hackers, who emerged at MIT in the 1960s, were driven by a desire to master the intricacies of computing systems and to push technology beyond its known capabilities.

The hacker's ethic, an unwritten dictum governing the hacker world, says that a hacker should do no harm. Richard Thieme, a regular speaker at Def Con, says that a hacker should "pass through a network without a trace." But somehow that message has gotten lost in the noise of Web defacements and data thefts.

Hacker purists get riled when anyone confuses them with *crackers*—intruders who damage or steal data. But while some hackers are quick to claim the moral high ground, the line between hacker and cracker is often blurred. Most hackers, for instance, don't believe it's criminal to break into systems and rifle around. The law, of course, thinks otherwise.

"[J]ust because something is illegal doesn't mean it's wrong," says Veggie. "But...once you go in and destroy data or damage the system, that's where...you stop being a hacker and you become a criminal."

T12, a 20-year-old who admits to some questionable hacking conduct, says he wouldn't normally damage a site. But if a phone company were to illegally switch his long-distance carrier and start billing his calls at \$10 a minute, he wouldn't hesitate to take action. "This is the kind of thing where I would feel free to just deface their site and make it as public as possible."

Diablo, a teenager with the Romanian hacking group Pentaguard, says that a hacker should "never abuse his powers." But, he adds, "If you penetrate a server and change the main page, nobody is hurt. The admin gets embarrassed, and that's all."

Pentaguard has defaced more than 100 Web sites—most of them government- and military-related—and Diablo says that he's careful: "I never delete [or] steal data [and] never crash the system."

This may be true, but Jon Shimabuku, manager of one site Pentaguard defaced (owned by the Hawaii state legislature), says that his office had to pay \$4000 for several new large-capacity hard drives (since the police confiscated the hacked hard drives as evidence), and the site was down for a week until the drives arrived.

SIGNS OF THE TIMES

Hacking has definitely changed in the last 40 years. Talk to any hacker over 25, and he's likely to lament the passing of the good old days, when coding was an art form and learning how systems worked was an exercise in persistence. New hackers today are often younger and less skilled than their predecessors, and more likely to focus on showy exploits than the noble pursuit of knowledge, say older hackers.

Fosdick, a 26-year-old programmer who has been hacking since he was 11, ►

COMPANY SYSTEMS

Are You Vulnerable to Hacking?

HACKERS AND CRACKERS are everywhere, but you may think your company's system is too minor for them to notice. Not true. Hackers don't always target specific machines—they scan hundreds with special programs to find any that might be vulnerable to attack. The intruder could be a teen hoping to use your system to launch an attack on a Web site, or a bitter ex-employee looking for payback.

"The Internet today is like a walk through a vineyard, with the attackers stopping here and there to pick a grape at their leisure," says Sun Microsystems' security chief, Brad Powell. "The feast is seemingly never-ending."

Even a secure company network can be riddled with holes like badly configured routers that expose data in transit to snoops. Think your firewall will protect you? Not always. Attacks at Microsoft and EBay prove otherwise. Here are tips for securing your systems.

PROBLEM: WINDOWS VULNERABILITIES Hackers often break into computers through well-documented holes (they read security alerts, too) when users don't install patches.

SOLUTION: INSTALL PATCHES Microsoft's Critical Update Notification (www.microsoft.com) tells you when new patches are available. Be sure to install them on all your PCs.

PROBLEM: UNPROTECTED COMPUTERS Hackers often enter networks through old computers that are no longer in use. This can happen when administrators forget to disconnect an ex-employee's system from the modem or network. An older system is less

likely to have the latest security patches installed. And a shared terminal that's not attached to any one employee is often overlooked when security updates are done. Any workstation that's left on and connected to both a modem and the network gives hackers one way to dial in to the machine, bypass the firewall, and gain access to the network. **SOLUTION: SECURE OLD COMPUTERS** Inventory your systems, and unplug from the network any that no one uses anymore. If a networked



computer is shared, make sure it receives the same security updates as other systems.

PROBLEM: LAX ENCRYPTION PRACTICES You encrypt important data on your server, but you neglect to encrypt remote backups. Hackers can target data on a less-protected off-site machine that stores backups.

SOLUTION: ENCRYPT DATA Encrypt data every place it's stored, including PC hard drives.

Security is an ongoing task. It's not something you install and forget about, according to Powell; it's something you live.

—Andrew Brandt

calls the Internet generation of hackers "hollow bunnies"—like gigantic chocolate Easter bunnies "filled with nothing but air." Ten years ago, he says, hackers respected information and machines, and had to possess knowledge and skills to hack. Now novices use hacking programs without understanding them and are more likely to leave havoc in their wake.

Script kiddies receive the bulk of hacker disdain. These are the graffiti kids who download canned scripts (prewritten hacking programs) for denial-of-service attacks or paint-by-number Web defacements—the latter nearly always including shout-outs to the hacker's homies.

The risk here is that an unskilled hacker could release wanton mayhem in your systems. The hacker might download a buggy hacking tool to your network that goes awry, or execute a wrong command and inadvertently damage your machines.

But script kiddies tend to disappear after a year, says William Knowles of security training firm New Dimensions International. "This is the generation of instant gratification, and if they can't get the hang of Back Orifice [a more advanced hacking program], they get bored and move on."

BIGGER THREATS

Script kiddies may get attention, but experts agree that the most dangerous hackers are the ones who don't make any noise: criminal hackers and cyberterrorists.

"The truly dangerous people," says Fossdick, "are hacking away in the background, drowned out by the noise and pomp that the script kiddies and denial-of-service packet monkeys have been making."

Hacking, says Michael Erbschloe, author of the upcoming book *Information Warfare: Surviving Cyber Attacks*, "has evolved into professional crime. Amateur hackers are falling into the minority, [and now] the fear is the criminal and the terrorist."

These are people like the Russian crack-er group who siphoned \$10 million from Citibank in 1994 and the mafia boss in Amsterdam who had hackers access police files so he could keep ahead of the law.

Four years ago, Moss says, crime syndicates approached hackers to work for them. Now, with so many easy-to-use hacking tools on the Internet, criminals

hardly need hackers to do their dirty work.

But the cyberelement that everyone fears most is one we've yet to see: Foreign governments, terrorists, and domestic militia groups hacking for a political cause.

The Department of Defense says its systems are probed about 250,000 times a year. Frank Cilluffo, director of the Information Assurance task force at Washington, D.C.'s Center for Strategic and International Studies, says it's difficult to tell if probes are coming from enemies seeking military data or from "ankle biters"—harmless hackers on a joyride. Regardless, he says, authorities have to investigate every probe as a potential threat.

The likelihood of obtaining top secret information in this way is small, says Cilluffo, since classified data is generally stored on machines not connected to the

Net. A more problematic assault, he says, would focus on utilities or satellite and phone systems. CSIS says that 95 percent of U.S. military communications run through civilian phone networks. An attack on these systems could impede military communications.

As we went to press, Navy officials reported that last December hackers broke into a Navy research facility in Washington, D.C., and stole two-thirds of its source code for satellite and missile guidance systems. The Navy says the source code was an "unclassified" older version.

Cilluffo doesn't think that a large-scale cyberattack is imminent. But he points out that members of terrorist groups such as Hezbollah have been educated in Western universities and are capable of developing such attacks in the future.

"Most [software] companies won't do anything about a problem until [hackers] make it public.

Then they have to fix it."

-OPTYX, A HACKER SINCE THE AGE OF 15



PHOTOGRAPH: KATHERINE LAMBERT

WHY HACKERS HACK

Aside from criminal and political motives, the reasons that hackers hack range from malice and revenge to simple boredom. And despite the image of hackers as dysfunctional loners, many are drawn to hacking by the sense of community it gives.

Veggie, an old-timer at 27, says he found a sense of belonging in the hacking world. "I grew up in a small town and was sort of the weirdo there. What attracted me to [hacking] was that I found other people like me. I was a smart kid [but] an underachiever, because I was completely bored in high school and unhappy. And I found other smart and interesting kids out there."

Of course, a big part of hacking's attraction is the sense of power that comes from uncovering information you shouldn't possess. A hacker called Dead Addict once described to Thieme the high that comes from discovering valuable information, followed by the low that comes from realizing you can't do anything with it. "That's the trouble with being God," Thieme quotes Addict as saying on his Web site (www.thiemeworks.com). "You can look but you can't touch."

Fosdick knows a little of that rush. He says that he once broke into a hazardous waste firm and found "pretty evil insider information" that no one was meant to see. Though he didn't act on the information, he did log it for possible use later. "Just in case I felt like being socially active."

But many hackers who begin as system voyeurs graduate to more serious activities. "It's easy to be lured to the dark side when you get easy gratification messing around with AOL users," Moss says. "You're not old enough to drive a car or vote, but you can exert...power over a network."

WHITE HATS

A lot of the reasons that hackers hack fade with age. Life fills their time, and their ethics begin to change. The majority eventually find their interest waning.

Ben Williamson, a 21-year-old systems administrator and security consultant in Los Angeles, says, "You only have three directions to go with hacking: You can keep doing the same old tricks; you can become a real criminal cracker; or you can use those skills wisely to build new soft-

ware and create a more secure Internet."

Securing the Net is an interest many hackers develop (especially now that employers are hiring them for their skills). They lament that the public never hears about their positive acts, such as patching a hole on their way out of a site and letting the administrator know they fixed it.

Optyx, a 19-year-old hacker and security

FUTURE THREAT

Malicious Code in Software

Malicious code embedded in software is not new; users have always run the risk of downloading a virus or a Trojan horse with shareware and games from the Net. The occasional intruder has even been found in shrink-wrapped products. But the hack into Microsoft's source code last October raises worries that popular software may be the next target.

Although Microsoft says its code was not altered (the code was compared with previous backups) it's possible that a criminal hacker could get into a software manufacturer's code and insert a Trojan horse. So unless software companies improve their security, you may find yourself the recipient of a gift horse in your next accounting package. —K.Z.



consultant, got his first job at 15 after hacking into a small ISP. After exploiting the hole for six months, he sent the administrator a note telling him to fix it, but the guy wrote back saying he didn't know how. Optyx sent him the patch code to seal it, and the administrator offered him a job.

But usually, Optyx says, fixing holes is a thankless task. "Most companies just focus on the fact that you hacked them

and want to come after you with a lawsuit. It's made hackers reluctant to help them. Now I still fix machines, but I won't tell an administrator I've done it."

An even sorer point between hackers and vendors is the issue of releasing vulnerability exploits. These are findings about a security problem that hackers (and researchers) post on the Net.

Vendors say hackers expose the holes for anyone to exploit, and should instead report them to vendors first so they can fix them. Optyx says the hacking community frowns on people who don't notify vendors, but when they do, vendors often ignore them. "Most [software] companies won't do anything about a problem until you make it public. Then they have to fix it."

Robert Steele, a former CIA officer, says vendors have a duty to develop secure software and that hackers force them to admit their errors. "Manufacturers are grossly negligent in selling software that doesn't stand up. What if they were producing cars that were this unsafe? The software they give us is not safe to drive in cyberspace."

Veggie agrees. "Anything that's attached to the Internet is potentially hackable," he says. "And if [you're] using a Windows 95 or 98 machine, nothing that is on that computer is secure at all."

Both Veggie and Steele believe that better security is in everyone's interest, and that hackers play a crucial role in this.

"The hacker kids who are going to Def Con today are...the software architects of tomorrow," says Veggie. "The same thing that makes them hackers makes them valuable to employers in the future."

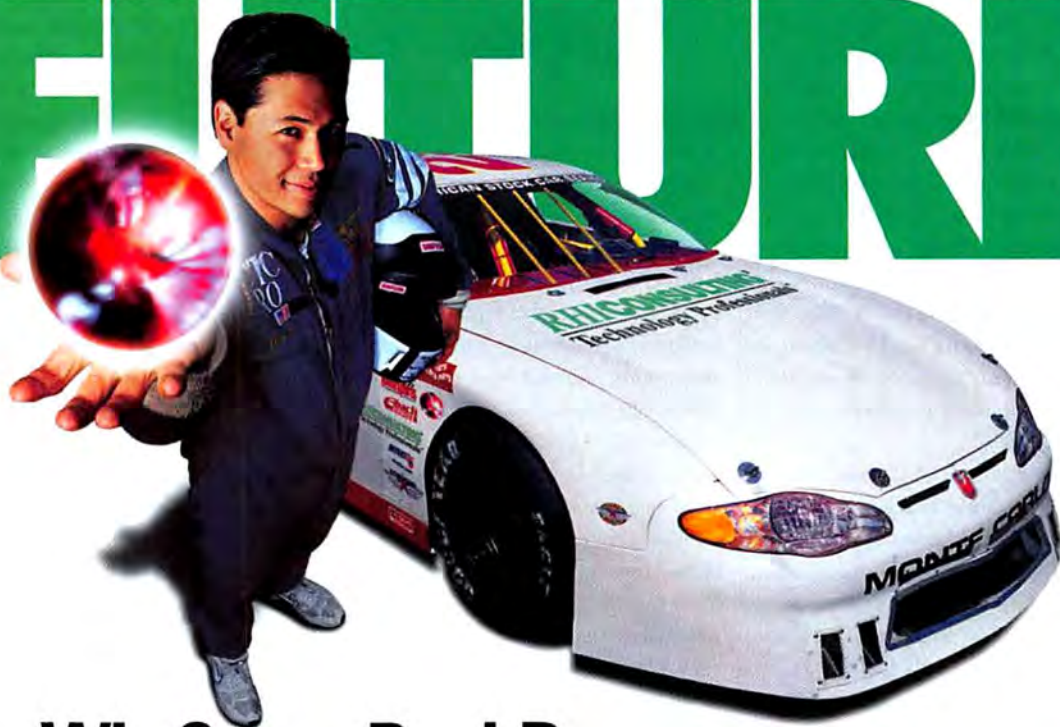
All of this points to the fact that while hackers may be the Internet's greatest annoyance, we ignore their warning about security at our peril. As Moss notes, the network that can't guard against a bored 19-year-old hacking in his spare time can't hope to protect itself from a hostile government or tech-savvy terrorist. ■

Kim Zetter and Andrew Brandt are senior associate editors at PC World. Michael Gowan contributed research to this piece.



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Safe Kids

Warning: The Web can be hazardous territory for children and teenagers. Try these 23 parent-approved tips to defend them against Internet dangers—from overzealous marketers to online criminals.

BY GREGG KEIZER

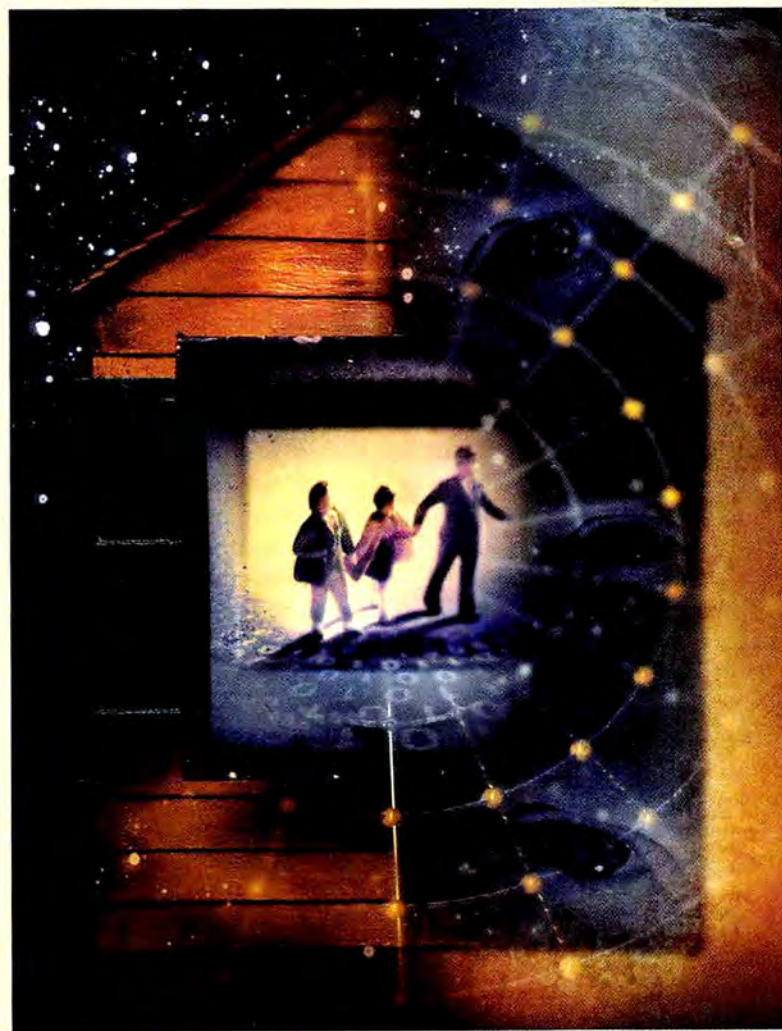


ILLUSTRATION BY RICHARD TUSCHMAN

You wouldn't put your child unsupervised in the middle of a city, would you?" asks Susan Grant, a National Consumer League vice president for Public Policy and director of its Internet Fraud Watch. "The Web is like that city." And it has a dark side.

Kids can come across malicious marketing, harassing e-mail, invasion of privacy, fraud, and hacking on the Internet. They may even encounter—or, out of curiosity, seek out—pornography and gambling sites. The FBI's statistics show that "in 1996, [the agency] investigated 113 online child pornography and sexual exploitation cases," says Angela Bell, a spokesperson for the FBI. "Last year it had more than 1500."

Even though that's a mind-bending 1200 percent increase, your family isn't defenseless. Nor is the statistic a reason to panic. The Internet is still a great resource for your child's schoolwork research, keeping in touch with friends, and playing online games.

Through my own experience as a father of a 15-year-old girl and with the help of academic researchers, child-advocacy experts, law enforcement officials, and other parents, I've gathered 23 ways to keep kids safe on the Net. "There's no magical cocoon that you can put your child in to protect them from bad things," says Grant. "It takes effort on your part."

START SMART

Before monitoring your children's online activities or enforcing rules on their Web access, think about what you need to accomplish and consider the consequences. Bear these points in mind:

Maintain trust. Overprotecting your kids might convey that you don't trust them. Make sure your kids understand your intentions for watching over them.

Respect privacy. Kids have a right to privacy as long as you know they're safe. While you should keep tabs on their online habits, exercising too much authority can be construed as spy- ▶



"I insisted that my daughter give me her password on her own AOL account. I reassured her that I would not use it, except when I think there's a danger."

CLIFF DUTTON, TECHNOLOGY CONSULTANT

(pictured with wife Barbara Tannenbaum and daughter Molly)

ing, which can lead to family conflict. Balance your supervision and think about how your kids might react.

Be realistic. Understand what your kids are exposed to both online and in the real world. To determine what you allow them to see on the Web, think about the music they hear and the movies they see. Be clear on each other's expectations.

Keep Younger Kids Safe

Without limiting free speech, be aware of the information presented to your kids," says Cliff Dutton, a technology consultant and father of two from Providence, Rhode Island. With this idea of commonsense supervision, I've compiled

ten hands-on, real-world tips for families whose preteens surf the Web. Though this batch of tips is aimed at children ages 7 to 11, some apply to kids of all ages.

Go online together. "The only time my 8-year-old daughter is on the Web is when my wife or I are with her," says Neil Warne, an architect from Eugene, Oregon. This practice makes the online journey a family affair, keeps children away from undesirable sites, and allows you to steer your kids to sites you think match their interests and age groups.

Monitor your child's online activities. "I know of only one thing that works," says Bob Ryan, a desktop computing support specialist from Hadley, Massachusetts, whose daughter has been Web surfing since she was 9. "You make

it clear that you have the right to see what sites they visit, what they type, and who they talk to." Some parents say enforcing a surveillance strategy is more difficult with older, privacy-minded teens. "My 12-year-old daughter is pushing back as she grows," says Dutton. But he's stayed firm and knows "she's safer as a result."

Establish rules. Create and enforce policies that your children must follow when they're online. Remind them to consult you when they see confusing or questionable content. Provide instructions on what kinds of sites they can visit, when they can go online, and how long they can stay there. For examples of such guidelines, visit the Federal Trade Commission Web site (www.ftc.gov/bcp/conlinepubs/online/sitesee) and Safekids.com (www.safekids.com/kidsrules.htm).

Remind your child not to give out personal information. Malicious marketers target kids for private information such as name, address, phone, and shopping preferences. In fact, according to an EPrivacy & Security Report (www.emarketer.com)—which surveyed over 1000 parents and kids ages 5 through 13—75 percent of children are willing to share personal information online in exchange for free stuff. Explain to your kids that on the Internet, some people are not who they claim to be.

Know your child's friends. Even if you restrict your children's Web access at home, they can still log on from places where you can't keep tabs on them. Talk to the parents of your kids' friends and gauge their take on safe surfing. Express your concerns about enforcing rules.

Be aware of your legal rights as a parent of a Web-surfing child. "It's important that parents know the legal limits of how personal information from children is handled," says the National Consumer League's Grant. Under the 1998 Child Online Privacy Protection Act (COPPA), Web sites aimed at children under the age of 13 must include a notice about the types of information the sites collect from kids, how that information is used, and whether it's shared with others. Parents must be notified by e-mail, regular mail, fax, or phone and must agree with the information collection before the

site can capture, use, or share personal data. For more about COPPA, go to the FTC's site (www.ftc.gov/bcp/conline/pubs/online/kidsprivacy.htm).

Protect passwords and create hard-to-decipher user names. Tell your kids never to give out their passwords, even to someone who claims to work for your ISP. (ISPs already know your password; they'll never call and ask for it.) Whenever you create user names or screen names, don't use aliases that reveal your children's real name, age, or gender. Teach your kids to follow this practice if they ever generate their own online identities.

Be wary about posting family photos in Web sites. Use a photo-sharing site that offers password or other security protection. At Zing.com (www.zing.com), for instance, you can create online photo albums that aren't visible to the public, and you can even choose the specific albums that you want to allow your friends and family to view.

Use filtering software. Though this would be my last resort, filtering programs like Cyber Patrol (www.surfcontrol.com) and NetNanny (www.netnanny.com) can provide nervous parents with some comfort and assistance; they filter or block specific Web sites or subjects, and they restrict activities such as online chats and file downloads. Like many parents, I'm not comfortable with such a *priori* censorship—it's no substitute for an honest discussion with your kids—but you may feel differently. Another troublesome aspect of filtering programs: None of them are foolproof, and at times they block worthwhile sites, such as those about breast cancer (simply because of the trigger word "breast"). For a list of filtering tools, check out GetNetWise.com (www.getnetwise.com).

Consider a prefilted ISP. If you're thinking about using filtering software, you should also look at ISPs such as Family.net (www.family.net), FamilyConnect (www.familyconnect.com), and MayberryUSA (www.mbusa.net). These services block sites at the ISP's end, before they reach your home. They definitely aren't for everyone: They're typically even more restricted than filtering software, and

many don't include an override option that gives parents unfiltered access. Still, they may be simpler than software filtering in multimachine households.

Tackle Teen Safety

Teenagers are most at risk on the Internet, in part because parents have loosened the strings that restrain their activities. Older kids use the Web differently, too. "[They] have individual interests, tend to go online when they're bored, and are interested in talking to other people," says Janis Wolak, a research assistant professor with the Crimes Against Children Research Center at the University of New Hampshire (www.unh.edu/ccrc). "Plus, there's an element of kids being

curious about sexual things," which are easy to find online. These ten tips can help you keep kids ages 12 and up safe.

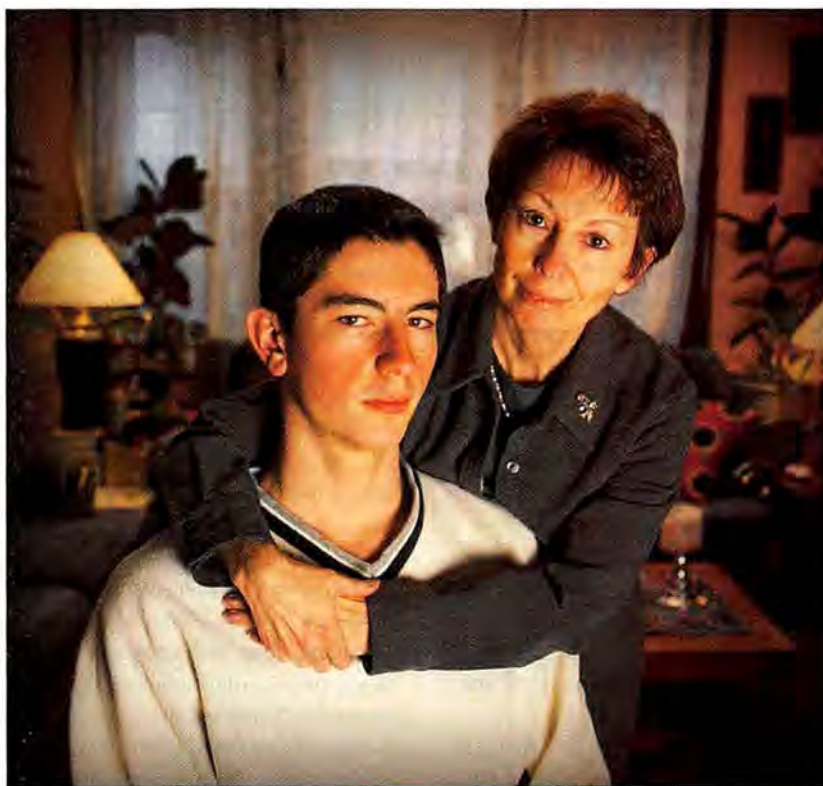
Speak truthfully. Open the lines of communication between you and your children. Don't just set the ground rules for Internet use and leave it at that. "It's important to talk frankly with your kids about sexual solicitation and pornography," says Wolak. If they accidentally click a link to an innocent-sounding but actually offensive Web site, make sure they explain to you what happened and understand what they should do in the future. Encourage them to confide in you when they see inappropriate text or graphics.

Know your child's online habits. As kids grow older, most parents keep less careful tabs on their activities, but you shouldn't completely ignore what ►

"It's important to be in the vicinity of the home computer, giving a peek every so often. Kids need to know that they're being monitored."

GILIANE BADER-WECHSELER, UNIVERSITY ADMINISTRATOR

(pictured with son Chris)



they're up to. Find out about the Internet activities your kids participate in, including music downloads, AOL chats, Usenet newsgroups, IRC chat, and instant messaging. Keep your child's e-mail address as private as possible and set privacy preferences in the software your kid uses.

Set the computer in plain sight.

Some parents decide to put the family's PC in a common area of the house. "It's important to be in the vicinity, giving a peek every so often," believes Giliane Bader-Wechsler, a mother of a 17-year-old son and an administrator at Boston University. "They need to know they're being monitored."

Crack down on chat. When the Crimes Against Children Research Center polled 1500 children and parents about online safety, chat proved to be the most dangerous Internet activity. In fact, 65 percent of online sexual solicitations happened in chat rooms. Instant messages were a distant second at 24 percent; Web sites at 4 percent; online gaming sites, message boards, and newsgroups at 3 percent total; e-mail at 2 percent; and unknown sources at 2 percent. Chat is dangerous because most rooms are not moderated and may be frequented by shady characters. If your children use chat, monitor their sessions and steer them toward moderated chat rooms. Some of the same cautions apply to instant messaging. Dutton's daughter has received sexual solicitations through AOL instant messages. Wary of such incidents, he asked her to remove an offensive screen name from her buddy list. "She and her friends understand that there are limits and know that their parents are watching," says Dutton.

Step on spam. Typically kids come across sexual material through e-mail distributed by adult sites. Even if these messages don't include explicit photos, they almost always embed links to their sites; one click, and your child can be viewing hard-core porn. So install a spam-sniffing utility like Spam Killer (www.spamkiller.com), which blocks unwanted e-mail. Or ask your ISP if it offers a spam filter. For more tips on battling spam, see "Spam: It Happens" on page 104.

Enforce a time limit. "Parents I've spoken to want to make sure that their

kids aren't online until 4 a.m. on a school night," says Tom Powledge, a product manager for Symantec, which makes Internet security software. Imposing a limit can minimize visits to chat rooms, while still allowing access for schoolwork. If informal limits don't work, consider a utility such as Lockdown (www.securitysoft.com), Cyber Patrol, or NetNanny, that prohibits Web access at certain hours.

FUTURE THREAT

When a Stranger Calls

New technologies come with new risks.

Text messaging on cell phones (PC-based instant messaging gone mobile), for example, may not be popular in the United States yet, but it's all the rage in other countries. You can be sure that harassers, solicitors, and obscene callers will latch on to this technology. So keep tabs on your child's cell phone usage.



Scrutinize the browser's history file. Betty Ollen, an administrator at Boston University and the mother of two teens, is as pragmatic as parents come. "If kids want to," she says, "they can get around controls or filters you put in place." Having discussed acceptable use of the Internet with her 14- and 16-year-olds, she relies on the home computer's history file to review the sites they visit and determine whether they are toeing the line. In Internet Explorer, for instance, you can see a list of recently visited sites by selecting View/Explorer Bar/History.

Manage your ISP account. Control your family's Internet account and its password. "I insisted that my daughter give me her password on her own [AOL] account," says Dutton, who voiced his

concern about AOL Instant Messenger's potential for abuse. "I reassured her that I wouldn't use her password [except] when I think there's a danger." If you access your child's e-mail or saved chats, explain your reasons for doing so.

Outwit online fraud. Web auctions (such as EBay) are the most common paths to fraud, according to the Internet Fraud Watch. Warn kids about the dangers. "Parents should help children with analytical skills, no matter what the media; point out the difference between ads and other content and how to tell whether something is believable or not," says Grant. Restrict online purchases without permission, even if teens have their own credit card. And check your credit card bills for unusual charges.

Report suspicious characters. If your child is sexually solicited or stalked online, inform local authorities. You can find links to state police departments at GetNetWise (www.getnetwise.org/trouble). Report incidents to your ISP and to the National Center for Missing and Exploited Children's CyberTipline (www.missingkids.com/cybertip), which will forward your report to law enforcement officials and, when appropriate, to the sender's ISP. If an online contact tries to lure your child into a face-to-face meeting, contact the FBI (www.fbi.gov/contact/fo/fo.htm).

FIGHT BACK

The Net city has its bleak side, sure, but not all its streets are risky. The Web is a great place for kids to learn, congregate, and entertain themselves. You just have to educate your child about staying away from the dangerous parts of town. "I think most kids have a lot of common sense," says Wolak. "In most cases, they know how to get out of [harmful] situations." That may be true—but only if you show them how.

Gregg Keizer, the father of a 15-year-old daughter, is an Oregon-based writer. ■



TO FIND A COMPREHENSIVE list of Web sites with additional child-safety tips, go to www.pcworld.com/may2001/safekids.

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PC WORLD



Eyes on the Spies

HERE'S HOW TO STOP THE THREE MOST COMMON METHODS SNOOPS USE TO MONITOR YOU ON THE INTERNET.

1 Cookies



The most familiar and most widely adopted monitoring tool is the cookie. A cookie is a small data file—usually

containing a unique identification number—that your Web browser stores on your hard drive when a site sends it a certain command. Every time you request a page or item from the site, the server connects that request to your unique identification number, giving the company an exact record of what you viewed on its site.

Some Web sites use the cookies to keep track of an online “shopping cart”; others want to record every click you make at a site. Cookies aren’t necessarily malicious, but they do let sites or advertisers make a click-by-click record of your surfing habits. Cookies from ubiquitous ad servers like DoubleClick can track you on every site for which they serve ads.

HOW TO DEFEAT COOKIES

Sites use cookies for various reasons. If you completely disable them, many Web sites won’t work the way you want them to. But you can limit the number of cookies your browser consumes.

1 Use cookie blockers: The free CookieWall from Analogx.com and Guidescope from Guidescope.com, for example, let you set cookie rules for each site you visit.

2 Periodically clear your cookie file: If you use Netscape, search for a file named cookies.txt and delete it. If you use Internet Explorer, navigate to c:\windows\Temporary Internet Files and C:\Windows\Cookies and delete the entire contents of both folders.

2 Web Bugs



Insidious and more difficult to fight than cookies, Web bugs are minute, invisible graphics that load with a

Web page. Because Web bugs behave just like banner ads, they provide your computer’s unique IP address and the location of the page you’re looking at to the server that sends the bugs—but because you don’t see them, you never know they’re there. Web bugs can also identify you by setting cookies and, if you return to the same page later, retrieving them.

HOW TO DEFEAT WEB BUGS

Web bugs are basically graphics files. If you disable image loading in your browser, you won’t be bugged, but you won’t see any other graphics, either—and that’s a trade-off most people aren’t willing to make. But these tricky files can be fooled.

1 Stop cookies first: Before you try to block the Web bug itself from loading, you have to disable cookies. You can use the tools we list in the column at the left. If you use Internet Explorer 5.5, you can use a beta tool that lets you block or allow cookies on a page-by-page basis. Download it from microsoft.com/windows/ie/download/preview/privacy.htm.

2 Use privacy-protecting Web proxy software: Freedom (from Zeroknowledge.com), Internet Junkbuster (from Junkbusters.com), and Guidescope are all forms of proxy software. They block your real IP address by loading the Web page first to their servers and then to your computer. The drawback: Using Web proxies can slow your surfing.

3 Trojan Horses



Trojan horses present themselves to the victim as something worth possessing—such as a small game or an

image file—to mask their true mission: to sneak into a PC and surreptitiously monitor, control, damage, or steal data. Trojan horses themselves may not cause damage, but they let hackers or spies sift through your PC’s files, disable virus-checking software, or even use your PC to mount a distributed denial-of-service attack against another PC on the Internet. Legitimate sites typically do not use Trojan horses.

HOW TO DEFEAT TROJAN HORSES

1 Use antivirus software: Most tools can detect nearly all Trojan horses. To protect against emerging new ones, keep your virus definition files updated.

2 Use a Trojan horse remover: Some antivirus tools detect but can’t remove Trojan horses. Simply Super Software’s Trojan Remover (www.simplysup.com) is designed to rid your PC of sneak attackers.

3 Maintain a personal firewall: A firewall can protect you even if a Trojan horse gets in. Software like ZoneAlarm, free from ZoneLabs.com, can tell you if a program surreptitiously lets someone else view or control your PC’s data.

4 Don’t open attachments: Victims must allow the Trojan horse into their PC and activate it. Most Trojan horses arrive as e-mail attachments, so never open an .exe file until you know exactly what it does. Then scan the file with antivirus software anyway, before you run it.

—Andrew Brandt ■



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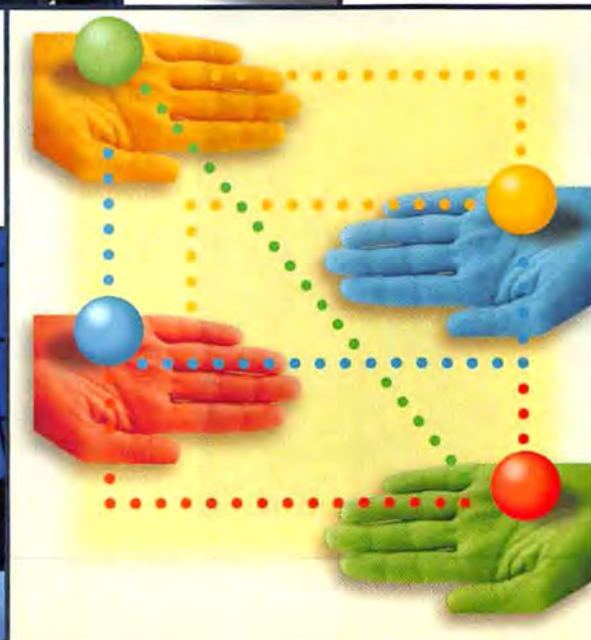
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PC WORLD'S ENTERPRISE TECHNOLOGY



Have you been wondering what to do with all the processing power, surplus hard disk space, and high-speed Internet connections you've built up over the past few years? Take a clue from Napster. The renegade MP3-swapping site may be on the ropes, but the technology it uses—peer-to-peer networking—is all the rage. In a peer-to-peer network, powerful client PCs take on the role of servers, enabling direct communication among systems that stands to lower IT costs and raise corporate productivity. In this month's *Enterprise Technology*, we explore nascent peer-to-peer solutions for corporate networks. Are they any better than current client/server applications?

Have comments on this *Enterprise Technology* section? E-mail suggestions and feedback to enterprise@pcworld.com.

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Peer-to-Peer Gets Down to Business



PEER-TO-PEER
helps DPR
Construction's
Lee Rocklage keep
viruses at bay.

Napster put peer-based networking on the evening news. Now businesses are using similar technology to collaborate, share data, and more.

By Brad Grimes

IF YOU THINK Napster has been a boon only to music buffs and copyright lawyers, think again. Sure, the rise and fall of the MP3-sharing Web site spotlighted important issues of intellectual property and copyright law. But it also demonstrated the power of peer-to-peer networking, an architecture that could transform enterprise computing and help your company lower costs and improve productivity.

If that sounds far-fetched, consider the problem that Shawn Fanning faced when, as a music-starved college student, he sat down to create Napster. Fanning knew that millions of people scattered around the world had MP3 files sitting on their hard disks. He wanted to help them share that music, but he knew it would be impractical to collect all the MP3s on a central server. Never mind the cost and the copyright obstacles; the sheer size of all those files—and the constant demand for uploads and downloads—made physical centralizing impossible.

PHOTOGRAPH: ROBERT HOLMGREN

Instead, Fanning turned to peer-to-peer networking. The files stay where they are—on individual hard drives. Napster simply maintains a central list of who has what and, when a user requests a song, puts the user in touch with the source to exchange the MP3 directly.

Scratch out "MP3" and substitute "corporate data," and you begin to see why peer-to-peer networking has suddenly become one of the hottest topics in enterprise computing.

"There is a lot of hype surrounding peer-to-peer computing that may overstate its importance," says Tim O'Reilly, president of O'Reilly & Associates, a Sebastapol, California-based research and publishing firm that has been examining leading-edge technology since 1978. "But that doesn't change the fact that every business will be using a form of peer-to-peer computing at some point. The only questions are, how soon and how extensively?"

Clearly, peer-to-peer networking has the potential to lower costs and raise productivity by redefining traditional network structures. But to change the way corporations do business, peer-to-peer solutions must demonstrate a clear advantage over traditional solutions, which only a few have managed to do so far.

GETTING HERE FROM THERE

DESPITE ALL THE recent attention, peer-to-peer technology is nothing new. Network architectures of this type have been around for at least 30 years. And Microsoft Windows operating systems have included primitive peer-to-peer file- and printer-sharing capabilities since the advent of Windows for Workgroups.

Nevertheless, three recent advances have permitted serious peer-to-peer development: higher bandwidth, cheap storage, and powerful desktop processors. As decentralized companies adopted high-bandwidth Internet connections and high-powered PCs, it was just a matter of time before software developers figured out how to leverage those resources.

Moreover, the benefits of such networking can apply to companies of all sizes. "Because peer-to-peer is so flexible

and potentially inexpensive, it's enticing for small companies that can't afford something like Lotus Notes," says Kevin Werbach, editor of Esther Dyson's *Release 1.0* technology newsletter. "Yet many peer-to-peer applications focus on the hard problems of large businesses that client/server solutions failed to solve, such as knowledge management."

At their heart, all peer-to-peer technologies share data and resources among clients. What the sharing accomplishes for companies distinguishes one solution

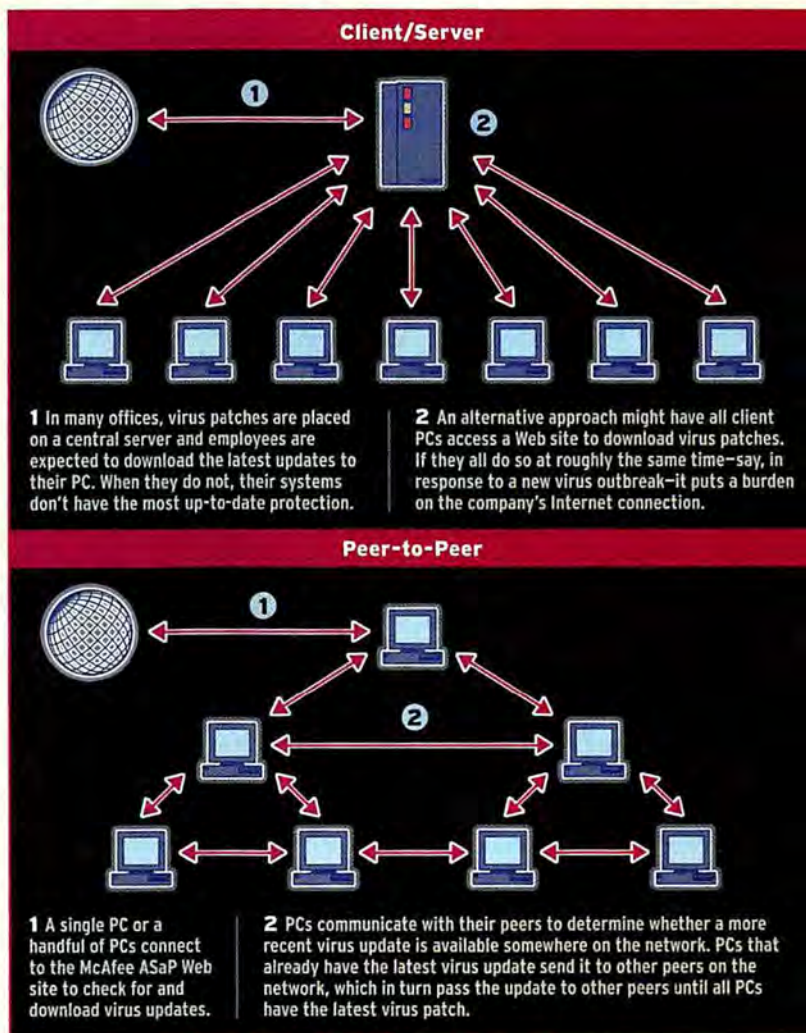
from another. For our purposes, peer-to-peer applications fall into three groups important to enterprise computing: on-line collaboration, file sharing and management, and distributed computing.

ONLINE COLLABORATION

PEER-TO-PEER SOLUTIONS that enable workers to interact in real time are an obvious way to use a network to facilitate direct communication between workstations. Various flavors of collaboration programs have existed for a long time—from client/server groupware like Lotus ▶

Peer-to-Peer vs. Client/Server

PEER-TO-PEER SOLUTIONS come in various shapes and sizes. One particularly effective use of peer-to-peer technology is McAfee ASaP's VirusScan ASaP, which uses the application service provider's Rumor technology to distribute virus updates from PC to PC within an organization. It is more effective than client/server-type solutions because it ensures that virus protection is up-to-date, and it relieves the network of excess traffic.



Notes and ERoom, to Web-based services like the well-regarded but now-defunct HotOffice (see "When Your ASP Goes Under" on page 158).

In the past, collaboration was unwieldy to manage and widely underutilized. Workers often preferred phone conferences and e-mail to online threaded discussions and shared folders. But with the growth of products like Microsoft Net-Meeting and instant messaging (IM)—both of which are peer-to-peer applications at heart—businesses are starting to

take a second look at online collaboration.

"People are seeing instant messaging as an enterprise application platform, with telephony and other collaboration tools as part of the solution," says O'Reilly.

GET INTO THE GROOVE

ONE NOTABLE NEW peer-to-peer product comes from Groove Networks, founded by Ray Ozzie, the creator of Lotus Notes. Groove, which was still in preview mode at press time, offers downloadable client software that lets users create "shared spaces" with others on the network.

A user running Groove invites participants into a shared space using e-mail or IM. When they accept, the space appears on each participant's screen.

The group can then use IM, threaded discussions, and shared whiteboards to communicate. If a participant drops a Word file into the shared desktop space, for example, Groove launches the same file on other users' systems. The software encrypts all communication—including the initial request for a meeting—to make the space secure.

Sound familiar? Functionally speaking, it is. But a peer-to-peer solution like Groove doesn't require central administration or server resources. Groove's shared spaces are dynamic and vanish when users decide they don't need them. Unlike both client/server- and Web-based solutions, Groove isn't built around fixed interfaces, and it uses XML to display information and to transmit just the changes from the group's collaboration.

Groove's advantages have already won some converts, one of whom is John Sequeira of ECratchit, a bookkeeping and accounting application service provider.

Sequeira began testing Groove last year in collaboration with a team of about 15 developers. "We use people from outside the company, and we needed to be able to collaborate with them in real time without our IT guys giving them access to our network or worrying about security," he says.

While actual code remains safely sequestered at ECratchit headquarters in Braintree, Massachusetts, Sequeira and his group use Groove to track open issues like bugs. "It's better and more secure than e-mail," he says. For now, though, Groove runs only on Windows—so if your company has a heterogeneous network, some people will be left out of the loop.

FILE SHARING AND MANAGEMENT

THOUGH FILE SHARING may be part of a collaboration platform such as Groove, it's more recognizable as a stand-alone solution that doesn't entail interaction among people at their desktops. Perhaps the most obvious example is Napster.

Most public peer-to-peer schemes are

Peer-to-Peer Solutions

Automate Business Processes

SHARING DOCUMENTS and collaborating in real time are fairly straightforward tasks. But in today's world of electronic commerce, collaboration goes well beyond simple online discussions. A new solution from Consilient—a start-up based in Berkeley, California—brings additional intelligence to peer-to-peer networks in order to streamline entire business processes.

Handling electronic procurement, supply-chain management, and other processes entails bringing together different departments, resources, and business systems. Sophisticated solutions from companies such as Ariba attempt to integrate these parts, but they can do only so much—especially when it comes to connecting third-party systems.

Consilient wants to automate business processes that span large, diverse groups without necessarily integrating existing systems (a big hassle when many companies are involved). Its peer-to-peer solution relies on something the company calls Sitelets to pull together needed information.

"This technology lets companies span the many barriers in how people work," says Erik Freed, chief technology officer for Consilient. "Sitelets provide a framework for unifying systems and applications within a virtual peer-to-peer process. Enterprises benefit from seamless unification and collaboration

between business units, customers, and suppliers. Ultimately, there's less friction between business units, which increases productivity and opens the door to newer, more efficient business models."

Sitelets themselves are software agents written in XML code that include the vital characteristics of a virtual business process.

These XML documents can be delivered over the Web, through e-mail, or even via a PDA; all parties involved in the business process

add information along the way. As Sitelets pass from person to person in a business process, they keep track of who added what information and report back to the company, telling it where the Sitelet is in the process.

For example, if your company needs to automate the task of budgeting, you likely require endless approval loops, proposals, and data from various departments and business partners. With Consilient, you design a Sitelet that describes the budgeting process (routing, data, reports, visual layout, and so on) and collects the necessary information and approvals. The Sitelet becomes an organized container for all the data.

Consilient previewed its solution last fall and was preparing to sell it (at as-yet-undetermined prices) to enterprises shortly after we went to press. Freed says it will be available primarily through system integrators.



"People create knowledge and they store it on their desktop. It would be nice if they would publish it to a central location, the way client/server knowledge management is supposed to work, but people are lazy."

—ANDREW MAHON, GROOVE NETWORKS

relatively unstructured, untamed territory, however. In an enterprise, file sharing is more likely to take the form of knowledge or document management.

"People create knowledge and they store it on their desktop," says Andrew Mahon, director of strategic marketing for Groove Networks. "It would be nice if they would publish it to a central location, the way client/server knowledge management tools are supposed to work, but people are lazy. Peer-to-peer solutions allow people to look around and find the knowledge."

One company working on controlled methods of sharing files is Roku, of Chantilly, Virginia. Its Roku Share program allows users to drag documents into local, shared folders where workgroups can access them. All Roku connections are encrypted using secure socket layer; packets going over wires are encrypted, too.

Other companies are adapting peer-to-peer techniques to solve nagging corporate problems such as virus protection. Last May, DPR Construction of Redwood City, California, began using an antivirus program from an ASP called MyCIO.com to protect its 1400 desktop computers. At press time, MyCIO changed its name to McAfee ASaP (www.mcafeecasap.com). The program—VirusScan ASaP—uses peer-to-peer technology to check whether systems have the latest virus protection.

Why did DPR make the move? "We got caught by the Love Bug virus," says DPR's network manager, Lee Rocklage. "We have over a thousand machines, but only a couple hundred had updated virus profiles. People simply hadn't downloaded them."

With VirusScan ASaP, which costs DPR just \$1600 a month for all 1400 of the company's terminals, the first five workstations that log on to the Internet each day get the latest virus patches from the McAfee ASaP Web site. Those workstations then pass along the updates to the

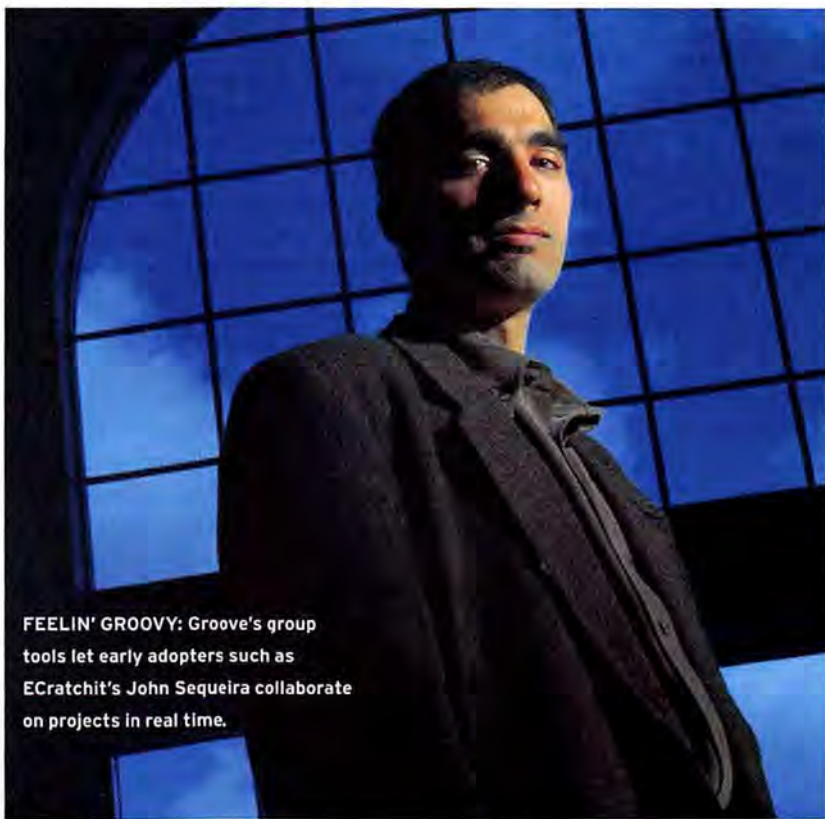
company's other systems, including computers at remote sites that tap into the network through a virtual private network.

"This ensures that all our workstations get the latest virus updates as soon as they log on," says Rocklage. "It happens behind

the SETI@home project, managed by a group of researchers at the Space Sciences Laboratory of the University of California, Berkeley. SETI stands for Search for ExtraTerrestrial Intelligence.

SETI's analysis requires processing power that large systems can't supply economically. So with SETI@home, volunteers who use the Internet download a screen saver that grabs instructions from SETI and performs calculations when a connected computer isn't otherwise in use.

Other businesses—such as Juno Online Services—are attempting to resell sub-



FEELIN' GROOVY: Groove's group tools let early adopters such as ECratchit's John Sequeira collaborate on projects in real time.

the scenes, and it means not everyone needs to log on to the [McAfee ASaP] site to get the patch, which helps keep the load on our Internet connection under control."

DISTRIBUTED COMPUTING

IT'S STILL A NICHE technology, but distributed computing is the most innovative use of peer-to-peer technology—and may offer corporations the greatest benefit.

Under distributed computing, a network of end-user systems pools its spare processing power to perform enormous computations. One familiar example is

scribers' idle computer resources to companies that need the extra power.

Systems such as these cross firewalls and don't lend themselves to central control. Businesses tend to prefer solutions that run on their own networks, like the one JP Morgan Chase uses to analyze financial products. Since 1998, the company has employed pools of 200 PCs to crunch complex models for products such as derivative contracts. "It is a huge cost savings over a traditional supercomputer," says Steve Neiman, head of high-performance computing at the company. ▶

"We're talking 85 to 90 percent savings."

Peter Lee, CEO of DataSynapse, which sells distributed computing solutions to companies in the financial and energy industries, claims that nearly every company has untapped power at its disposal.

"Even on the capital markets floors, where things always seem very busy, they have systems with idle capacity in excess of 60 percent," says Lee. "We have one customer that had a one-hour bottleneck in processing portfolio options. Now it takes that bottleneck and distributes it over 100 machines, and the same process gets done in a minute."

STUMBLING BLOCKS

WITH RESULTS LIKE that, you might expect peer-to-peer solutions to gain acceptance rapidly. But IT departments, in particular, remain suspicious. "On the

surface, peer-to-peer is bad news for IT," explains Mahon of Groove Networks. "They don't see a big upside—maybe some cost savings or network utilization savings, but nothing big. What they see are bandwidth and maintenance issues. But the reason they see that is Napster. Napster caused bandwidth problems and hurt network performance. But that's not what peer-to-peer is about for businesses."

Still, peer-to-peer tools may bog down a network infrastructure that's too weak to handle them—especially when called upon to move and manipulate large files. Groove, for example, uses an algorithm that takes into account the size of a piece of data and the number of people it needs to reach. If a network bottleneck seems likely to occur, Groove sends the data to a relay server that fans it out to participants.

In addition, peer-to-peer networks risk major security breaches when data travels

around corporate servers and outside firewalls. And if files never cross a centrally managed server, how can networked systems protect themselves from viruses?

Proponents of peer-to-peer tools argue that these drawbacks are not fatal. "It's not much harder to address security in a peer-to-peer environment than it is in a client/server environment," says Werbach. "But any company looking at a peer-to-peer network must make sure it comes with a security solution."

"In the end," adds O'Reilly, "companies may not necessarily go out looking for peer-to-peer solutions. Peer-to-peer will be built into the products they already use. For instance, a new Oracle database may be able to spread itself over 200 systems." If that happens, peer-to-peer networking will have sneaked into the enterprise the way many other significant advances did—through the back door. ▶

Peer-to-Peer Resources

Who's Who in Peer-to-Peer Development

HERE'S A SAMPLING of the hundreds of peer-to-peer companies, initiatives, and analysts. These sites and solutions aren't necessarily better than others. With peer-to-peer systems in their infancy, test various free downloads to determine what works best for your business.

RESOURCES

OpenP2P.com: A comprehensive site from O'Reilly & Associates, OpenP2P.com has wide-ranging information on peer-to-peer networking, including in-depth analysis and information on solutions. **P2PTracker.com:** This site provides news and data on peer-to-peer computing, including solution details and simple reviews.

Peer-to-Peer Working Group: Get information on peer-to-peer standards-in-progress from a consortium that includes Fujitsu PC, HP, Intel, and others. (www.peer-to-peerwg.org)

COLLABORATION TOOLS

Groove Networks: Built by some of the engineers who created Lotus Notes, Groove offers instant messaging, threaded discussions, a whiteboard tool, and more. (www.groove.net)

Ikimbo: Ikimbo offers various collaboration tools for controlling and managing communication, including plug-ins for things like digital-rights management, virus scanning, and file compression. (www.ikimbo.com)

EZmeeting: This site provides real-time chat and whiteboard tools, as well as document management. (www.ezmeeting.com)

FILE SHARING AND MANAGEMENT

Roku: Roku Access and Roku Share enable you to work with and share key files on your PC from either a browser or a Web-enabled phone. (www.roku.com)

NextPage: The NextPage site

treats servers as peers. Consequently, managed content looks as though it's stored locally, no matter where you are at the time that you access it. (www.nextpage.com)

McAfee ASaP: Formerly known as MyCLO.com, this ASP division of Network Associates features VirusScan ASaP, which manages and distributes virus patches over a peer-to-peer network. (www.mcafeeasap.com)

DISTRIBUTED COMPUTING

DataSynapse: This company maintains a network of broadband-only members. It resells its members' idle PC capacity, but it also has a platform for corporate infrastructures. The service targets energy and financial industries. (www.datasynapse.com)

Entropia: Entropia resembles

DataSynapse, but most PC resources go to research projects. Members choose the projects to support, such as AIDS research. (www.entropia.com)

SETI@home: Purely a research effort, SETI@home uses members' spare system resources to search radio signals from space for signs of extraterrestrial life. (setiathome.ssl.berkeley.edu)

United Devices: This site resells members' processing power and offers a corporate platform. It can harness power from PCs, from Macs, and from Linux-based systems. (www.ud.com)



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When Your ASP Goes Under

AS AN EARLY customer of HotOffice, John Simmons thought he had a good relationship with the application service provider. Senior vice president at The Greeson Company, a wholesale food broker in Grand Rapids, Michigan, Simmons had hired HotOffice to allow some 80 employees to share applications and documents over the Internet. And he enjoyed frequent personal contact with HotOffice's support staff and management.

So it came as a shock when he logged on to HotOffice last December and read that the company was folding.

Just six days earlier, Simmons had talked with an upper-level manager about

problems with the service. "He assured me that they had received additional funding and would soon be upgrading their reliability and speed," he recalls.

Instead, The Greeson Company—like many other firms—found itself in the crosshairs of the consolidating ASP market. In April 2000, The Gartner Group market research firm projected that the ASP

business would balloon to more than \$25.3 billion annually by 2004, up from a figure of just \$1 billion in 1999. Yet today, Rita Terdiman, vice president of market research for Gartner, says she expects most ASPs either to go out of business or to be acquired by then. "By 2003 or so, there will probably be only 20 or 40 large ASPs left," she says.

AN ASP MELTDOWN

RECENT HIGH-PROFILE failures include Red Gorilla, HotOffice, and Pandesic, the joint venture formed by Intel and German enterprise software vendor SAP. In February, Agilera completed its acquisition of Applicast, and enterprise software maker J.D. Edwards abandoned efforts to host its own software less than a year after stepping into the ASP business.

The move toward consolidation reflects market fundamentals, says Stacie Kilgore, senior analyst at Forrester Research. "First, there were just way too many companies chasing this market. Second, there were a lot of business models that just didn't make sense," she says.

So how can a company that does business with an ASP protect itself? The box at left, "Five Steps to Survival," lays out detailed advice, but in general the idea is to research prospective service partners

thoroughly and try to build protections against failure into the agreement you make. "There are two things I always hear," says Eric Murphy, executive vice president of business development for Agilera. "The first is financial stability. The second is ability to scale."

Customers must also understand how they fit into the ASP's strategy. "They should question the level of focus on the specific applications and services pertinent to them," says Murphy.

Of course, John Simmons had done exactly that—and still wound up having only two weeks to migrate his data to another provider. "The first week was shot trying to get our bearings," says Simmons. "[After we decided what to do], we had less than a week to train our team."

Things turned out okay. HotOffice not only arranged for clients to switch to Intranets.com, a competitor, but also published guides on how to do so. Still, Simmons remains adamant that relationships are critical to protecting the business.

"You want to bring focus to your issues so you're not dealing with a different tech support person each time," Simmons recommends. "That's one thing that you can't be bashful about when you're working with an ASP."

—Michael Desmond ►

Five Steps to Survival

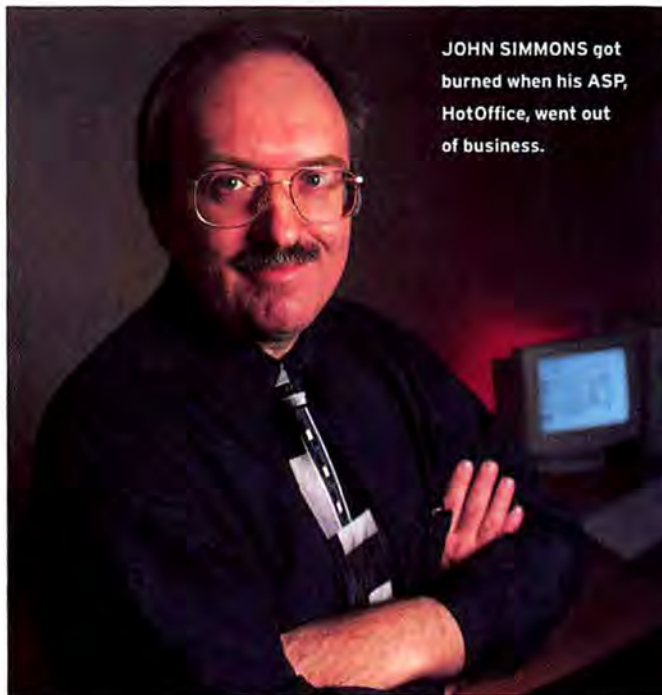
1 RESEARCH Check the financial health and backing of the ASP. Find out what firms it is partnering with in areas such as server hosting, Internet access, and software integration. In hard times, the player with the deepest pockets is the most likely to survive.

2 NEGOTIATE Extend the service-level agreement to include a commitment by the ASP to protect your data and applications in case the service finds itself in distress. Specify how the transfer of data and applications should occur, including channels to the ASP's key partners.

3 ENGAGE Work actively with the ASP to identify and resolve issues. Form personal relationships with key people in its organization, and leverage those relationships to smooth the transition if the ASP fails.

4 CHALLENGE If your ASP is being acquired, challenge the existing and incoming management to show why the merger makes sense to you as a customer. Be alert for signs that the new company may move away from services that are critical to your business.

5 SIMPLIFY Before you customize any applications, consider the impact on future transitions. If you need to get your data out of that ASP, will you be able to use it elsewhere without months of development?



JOHN SIMMONS got burned when his ASP, HotOffice, went out of business.

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"After downloading a new music application, my computer went haywire."

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PROVEN SOLUTIONS FOR STORAGE MANAGEMENT

Secure Networks on the Cheap and Easy

THERE'S NO DENYING that virtual private networks make a ton of sense for companies that need to connect remote offices. Rather than leasing expensive, dedicated, high-speed lines, VPNs allow you to establish a secure network connection over the free, public Internet.

But building your own VPN requires a large up-front investment in hardware and software, as well as lengthy setup and ongoing maintenance. And if you outsource your VPN services, you can get roped into expensive, custom solutions.

Those options weren't appealing to Harvey Golomb, chairman of Falls Church, Virginia-based Netscan IPublishing. Netscan provides online state legislative and regulatory information. The compa-

ny had long used e-mail and FTP to communicate among its offices in Virginia, Pennsylvania, and Florida but decided it needed something better.

"We needed a secure wide-area network, but we didn't want to buy or install any expensive hardware," says Golomb.

Netscan adopted a solution from OpenReach, one of a new breed of providers of software-based VPNs. Customers register at the OpenReach site (www.openreach.com), install OpenReach Gateway software, download their VPN settings to a floppy disk, and boot it up on a dedicated PC with high-speed Internet access. This system becomes their VPN gateway. They repeat the process for each office they wish to connect and end up

with a secure VPN, complete with firewall protection, 168-bit encryption, and more.

OpenReach monitors the VPN, but the customers manage it. "Occasionally they'll call and say, 'Hey, did you know your Florida site is down?'" says Golomb.

The software can run on anything from a 200-MHz Pentium II to the latest PCs. Golomb says his VPN is running on "old, used PCs that were just lying around." Moreover, the solution works with any existing network hardware and can connect hybrid LANs consisting of servers, printers, Macs, and Unix workstations.

OpenReach charges a monthly fee per location (\$99 and up). Ultimately a company can reap big savings—up to 70 percent over ATM and frame-relay VPNs—and suffer fewer networking headaches as a result.

—Brad Grimes



Balancing Act: Manage Your Growing Traffic

THE NASDAQ may have spent the winter in the doldrums, but Web traffic keeps going up. Those site visits and the resulting transactions are great, but who has the money to perform a major server upgrade, never

mind the cost of disrupting operations?

TicketMaster Corporation knew that it didn't. Back when the company was preparing to merge with Web-based entertainment service CitySearch, the staff had a sudden, chilling insight.

"The existing server farm was not able to handle the load we were expecting to generate from the combined company," says Mike Batchelor, lead Internet systems engineer for the Los Angeles-based company. "At the time, we couldn't modify the application very much, since it was already generating revenue. So we decided to go with the existing service and



NORTEL NETWORKS' Alteon ACEswitch 180

duplicate it in multiple locations."

Today, a pair of load-balancing devices sits in front of each of TicketMaster's five server clusters, parceling out traffic to the most available systems.

Batchelor says that the new hardware allowed TicketMaster to build on its existing servers, rather than requiring it to scrap the previous system altogether.

Load-balancing devices also keep transactions humming when a server in a cluster fails—and that can happen under the intense load generated by ticket sales for a Britney Spears concert, says Batchelor. Load balancers react to the situation by spreading traffic among the remaining servers.

Batchelor's team opted for powerful

Alteon ACEdirector 3 load balancers from Nortel Networks, but small businesses can find more affordable options. The slim and trim \$3495 SonicWall Load Balancer-Internet Appliance (888/557-6642, www.sonicwall.com) provides four 10- and 100-mbps ethernet ports and can support small clusters of up to 20 servers. The devices can be paired so that a backup load balancer is ready to step in if the primary unit fails.

Growing businesses may opt for more capacity and features. Nortel's \$14,995 Alteon ACEswitch 180 (888/258-3661,

www.alteonwebsystems.com) links to networks via 10-, 100-, or 1000-mbps ethernet connections to provide traffic-management functions. The unit can route traffic based on criteria such as data type and content, making it easy to send secure transactions to one set of servers while Web page requests go to another.

—Michael Desmond ■



SONICWALL Load Balancer-Internet Appliance

ria such as data type and content, making it easy to send secure transactions to one set of servers while Web page requests go to another.

READY, SET, Enjoy!

Let's face it, most of what you use a computer for is boring. Word processing (yawn). Spreadsheets (snore), budgets, e-mail (ho hum). On the other hand—Doom III, **yeeeeoww!**

T

ODAY'S SUPERCHARGED DESKTOP PCS ARE IDEALLY SUITED TO FILL A DUAL ROLE. Used as a machine to streamline business operations, computers are incomparable time savers and productivity boosters. But man—and woman—do not live by bread alone: we need an occasional treat. And one way to get it is to follow the advice heard in one of Broadway's great musicals, *Gypsy*. The song's title is "Let Me Entertain You," and your computer can do that quite well.

If music is the way you let up on life's throttle, you have a good number of choices for your diversions. One encyclopedic range of products comes from MAGIX Entertainment, a leading vendor of high-performance, interactive music entertainment software that lets the artist in you prevail over the technician.

For example, MP3 Maker Gold lets you convert, edit, and burn up to 12 hours of MP3 format music on a single CD. Perfectly suited for MP3 lovers and "DJJs" (digital disk jockeys), you can quickly rip

CDs and save the files on your hard drive. What's more, MP3 Maker Gold includes the industry's fastest converter to accelerate encoding and save you time.



MP3 Maker Gold Mainscreen, by MAGIX

Naturally, the program is Internet-savvy. Its MP3 finder allows you to enter an artist or song name and it lists all MP3 Web sites where the song is available for download.

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Social scientists disagree on which is the most evocative of the five senses. Some say it's scent; others insist it is music. Either way, an immersive soundtrack can shift your mind into neutral, put your worries on hold, and transport you to another world.

Other special features include a music organizer to add order to your music file collection and professional sound effects to add pizzazz—like reverb or echo—to your music. You can even fine-tune your music with a 10-band equalizer.

One of the reasons for the popularity of audio editing and CD rippers is that they solve an irritating problem: you buy a compact disc because it has two or three tracks you like, but then you discover there are two you can only tolerate, and two or three that you absolutely can't stand. MP3 Maker Gold will elegantly solve that problem too. It will burn both audio and data CDs, eliminating the need to buy an expensive standalone burner.

HEAR HERE

Whether your audio entertainment tastes run toward recording your own music or mixing other people's, make no mistake—the right software and hardware brings sound to life. Whether you are a hobbyist or a professional, you can now find all the tools you need for building a first-rate studio within the footprint of a PC. And the sky's the limit: add professional software, and

you could wind up with a full-blown digital audio studio in your basement.

To move beyond the hobbyist level, you'll need more than software. At a minimum you'll need a high-quality audio card, preferably with 3-D reverb capability, and two, preferably four, speakers positioned strategically around the room to provide a home theater effect. Vendors can simulate 3D audio, also known as spatial sound, to give you the illusion of total immersion in the digitized environment.

While we're on the subject of immersive audio, take a hard look at your speaker system. Even the most sophisticated audio processing will sound like a bad long-distance connection to Jupiter if played back through low-end speakers. And here's one place where size doesn't count: some diminutive speakers produce a rich, room-filling sound with great bass by taking advantage of a room's acoustics.

When you get to the level that demands high-level

control over the recording, editing, and mixing process, it's time to think about graduating to software for professionals. In addition to their wide range of consumer music, dance, and video mixing software, MAGIX's Music Studio Generation 6, a digital MIDI and audio sound recording studio, offers full control over your MIDI hardware along with a 256-track integrated MIDI sequencer and a 24-track hard-disc recorder to let you turn your collection into an ear-popping mix that fits in with your every mood.

So go ahead—transform your PC into a complete recording studio. Take your music and video productions to the next level with Generation 6's advanced array of composing, arranging, recording, editing, and mastering products. They offer features once available only to professional studios.

THE "STORE MORE" SOLUTION

Ironically, high-quality audio and video editing systems lead to a pleasant problem: in short order, you start to run out of storage space. What's more, if you opt to share your files, you need a way to distribute them to business clients, friends, and family.

The solution is to offload those audio files and images and free up space on your PC's hard drive. For that, a high-capacity removable media drive such as Iomega's ultra-thin 250-Mbyte Zip drive can't be beat. Two USB models are available: one connects via a PCMCIA port and the other connects directly to the USB port.

The PCMCIA model doesn't require an external power supply; it draws its power from the port. In addition to their generous storage capacity, Zip disks offer an added advantage: they can read and write data up to three times faster than other removable media drives, up to a speedy 900 KB/second—a plus when dealing with large audio files. USB 2, a standard presently under development, will support data-transfer rates of 40 Mbytes per second, so get ready for your collection to burst its borders.



MP3 Maker Gold



Iomega's 250 ultra-thin 250 Mbyte Zip drive



Enjoy digital photography but don't like being tied to a computer?
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FotoShow™ digital image center – the perfect complement to your digital camera.

With the simple push of a button, the FotoShow viewer copies your digital photos from both CompactFlash™ and SmartMedia™ memory cards and saves them securely onto any Zip® disk. You can then organize, edit and show your photos on any television, anywhere, without a computer. It's like having a digital photo album with unlimited pages. You'll never have to worry about running out of memory again. FotoShow also doubles as a Zip drive and is available now at fine electronic retailers in your area or from iomega.com. More than 40 million people around the world trust iomega, the company that invented quick, affordable, dependable digital space.

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Hansol Electronics not only packs the most performance and value into their individual monitors, they also guarantee it with the most robust warranty in the industry. And whether you use your computer for recreational game playing, your profession, or your home, Hansol has a monitor that will fit your power, style, and size requirements—and your budget.



Hansol's multi-function 700F lets you wall-mount an image from five different sources.

A multinational company based in Seoul, Korea, and formerly part of Samsung, Hansol Electronics makes the number one display sold in the U.K. today, and it is a top brand in Europe and Asia. Well-known for their quality and reliability, Hansol displays are U.S. trade compliant and built to exacting standards. With one of the lowest failure rates worldwide (typically below .5%), Hansol Electronics is a leading supplier on many U.S. federal contracts, as well as a major supplier for European requirements.

Hansol's goal is to improve the ergonomics and computing experience for every user, at a price you can afford. The award-winning monitor maker is a leader in the "flat" revolution, with its flat CRT and LCD displays and its commitment to a "flat" cost of ownership. Hansol is the only brand in its price range to offer the Platinum Exchange warranty, which covers Hansol flat CRTs and LCDs for everything, including all freight and advanced replacement, for a full three years.

The company's range of products gives customers many price-performance options. Hansol displays feature TFT LCDs with features such as a TV tuner and dual

VGA/dual video inputs at a value price, Dyna-Flat CRT models that offer crisp, flat images and vivid colors, videocamera-equipped displays for instant videoconferencing (the 720CA), Web appliance designs for an all-in-one network device solution (the 710WA+), and a full line of conventional displays.

With Hansol's 17" 710D flat CRT display, for example, you get LCD ergonomics—reduced eye fatigue, improved productivity, improved image clarity, and reduced ambient light reflection—at a CRT price. With the revolutionary Dyna-Flat tube and a maximum resolution of 1600x1200, the 710D goes beyond the expectations of a 17" monitor.

Hansol customers also benefit from the company's drive to leverage converging technologies and apply the best available solutions to its products. The company makes the only 17" LCD that is five units in one. As easy to use as it is functional, the 700F lets you wall-mount a beautiful image from five sources: two 15-pin analog inputs; an S-video input; RCA video input; and a TV tuner with co-ax connector, powered speakers, and a wireless remote control.

Finally, as part of its commitment to bring better performance and value to systems, Hansol is partnering with manufacturers and resellers to provide innovative solutions such as touch displays, kiosks, conferencing solutions, and all-in-one PCs. In the U.S., look for Hansol technology in new online gaming rooms expected to open in selected areas, through a partnership with HanaHo, a U.S. market leader in arcade-style gaming using the PC format. HanaHo has standardized on Hansol's 19" 920D for the U.S. market, which features 1600x1200 resolution, a flat CRT image, and fine .25mm dot pitch. In the Asian market, Hansol is the number-one gaming display.

Wherever you find Hansol displays—in the office, at home, in a PC arcade—you'll find high-quality, high-value products that are reliable, affordable, easy to use, and backed by the best exchange warranty in the industry.



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PC WORLD

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RIGHT Power, RIGHT Price

Edited by Richard Baguley



DELL DIMENSION 4100: Hits the
price/performance sweet spot.

THE BUZZ ON PC processors always hovers around the highest of the high-end: When will the first 2-GHz CPU appear? How many trillions of calculations per second will it handle? But by aiming your sights just a bit below the cutting edge of processor (and other component) performance, you'll locate the sweet spot where you can obtain high speed without the high cost, and you might not even notice the performance difference.

Case in point: Dell's latest Dimension 4100 sits atop this month's *Top 10 Value PCs* chart. It doesn't have the latest processor on the planet; it's based on a 1-GHz Pentium III.

But it has plenty of power, achieving a solid score of 198 on our PC WorldBench 2000 tests. That's faster than the score posted by Dell's own Dimension 8100, which comes with a P4-1500. Dell saved enough money on core components to add a slew of extras, such as an excellent 19-inch Dell M991 monitor (number two on our *Top 10 Monitors* chart this month) and a 12X/8X/32X CD-RW drive, and still hit a highly attractive \$1729 price—several hundred dollars less than the P4 systems currently sitting atop the power chart. Though we've found P4 systems to be faster at running some enhanced programs (and more high-end programs are being updated to take advantage of the P4), you won't see a difference in most office applications.

READING THE FIGURES

THIS MONTH we've received a number of e-mail messages from readers asking why some systems running Windows NT get higher PC WorldBench 2000 scores than

those running Windows 2000. In general, systems running NT get higher benchmark scores than systems with the same configuration running Windows 2000;

and the latter systems achieve higher scores than systems running Windows 98 or Windows Me. In calculating chart positions, we compensate for these differences so that no PC gains an unfair advantage. On our charts, compare like with like: Look at the numerical score of

an NT system relative to that of other NT systems, and don't directly compare the PC WorldBench scores of systems running different OSs. Instead, to evaluate performance among systems with different operating systems, compare the word performance scores (such as Very Good or Outstanding). For more information, see www.pcworld.com/benchmark.

SCAN THE SLIDES

ON THE *Top 10 Scanners* chart, an increasing number of the best scanners are being bundled with transparency adapters. These adapters allow you to scan slides or film negatives. For instance, the Microtek ScanMaker 5700, which debuts at number two on this month's corporate scanners chart, includes a transparency adapter as part of the basic package that sells for a very reasonable price of \$450. Not too long ago, vendors customarily offered this component as an option costing hundreds of dollars extra, but a number of manufacturers now include it as standard equipment. An optional automatic docu-

ment feeder is also available for the ScanMaker 5700, but it does add to the cost.

Freelance writers Jon L. Jacobi, Dan Littman, Kirk Steers, Joel Strauch, and Carla Thornton, and PC World editors Richard Baguley, Tracey Capen, Lisa Cekan, Rebecca Freed, Alexandra Krasne, Kalai Murugesan, Kalpana Narayana-murthi, Melissa J. Perenson, and Alan Stafford contributed to this month's *Top 100* section. Curt Buehler, Ulrike Diehlmann, Matt Halloran, Robert James, Elliot Kirschling, Jeff Kuta, Danny W. Lam, and Thomas Luong of the PC World Test Center performed testing. See page 14 for contact information. ▶

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following information should answer them.



How do the charts work? Each month we test a large number of PCs, printers, monitors, graphics boards, and scanners, and compare them with previously reviewed products. Only the best products land on the Top 10 and Top 15 charts, which are refreshed monthly. System configurations are shown as tested. Vendors may have since changed components.



What does the overall rating mean? This 100-point scale reflects results from our hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 70s is above average.



What does the PC WorldBench 2000 score mean? It's a measure of how fast a PC can run a mix of common business applications as compared with our baseline machine, an HP Pavilion 8380 with a PII-400 CPU, 96MB of RAM, and an 8GB hard drive. For example, a PC that scores 200 is twice as fast as the baseline system.



Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores are based on surveys of PC World readers and on anonymous support calls made by PC World staff. The policies score is based on vendor support policies.



THE MICROTEK SCANMAKER 5700 includes a transparency adapter for scanning slides.



POINT YOUR browser to www.pcworld.com/reviews/topcharts for late-breaking reviews of desktop computers and other products covered in the Top 100. You can find details about the PC WorldBench 2000 test suite and how we run it at www.pcworld.com/benchmark.

TOP 10 POWER PCs

	POWER SYSTEM	Month tested	★ Overall rating	Street price (2/2/01)	PC WorldBench 2000 performance score ¹	Faster	Base configuration
1	 Gateway Professional S 1500 800/315-2536 www.gateway.com	NEW	84	Expensive: \$2687	Very good	200	Very good: Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 40GB hard drive, 19-inch monitor, Windows 2000
2	 Polywell Poly 830K7-1100 800/999-1278 www.polywell.com	Feb 01	83	Average: \$2405	Outstanding	240	Very good: Athlon-1100, 256MB of SDRAM, 256KB L2 cache, two 30GB hard drives with RAID card, 19-inch monitor, Windows NT 4.0
3	Dell Dimension 8100 800/388-8542 www.dell.com	Feb 01	83	Very expensive: \$3249	Very good	194	Very good: Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 40GB hard drive, 19-inch monitor, Windows 2000
4	Polywell Poly 850GB-1500 800/999-1278 www.polywell.com	NEW	83	Expensive: \$2999	Outstanding	205	Very good: Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, two 30GB hard drives with RAID card, 19-inch monitor, Windows 2000
5	Sys Performance 1100T 800/613-9963 www.sys.com	Dec 00	83	Inexpensive: \$1981	Very good	229	Good: Athlon-1100, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows NT 4.0
6	Xi Computer 1100K MTower SP 800/432-0486 www.xicomputer.com	Jan 01	82	Average: \$2279	Outstanding	180	Good: Athlon-1100, 128MB of SDRAM, 256KB L2 cache, two 30GB hard drives with RAID card, 19-inch monitor, Windows 98 SE
7	HP Vectra VL800 800/752-0900 www.hp.com/desktops	Apr 01	81	Very expensive: \$4148	Outstanding	208	Outstanding: Pentium 4-1500, 256MB of RDRAM, 256KB L2 cache, 40GB hard drive, 21-inch monitor, Windows 2000
8	Tangent Medallion Pro 800/800-5550 www.tangent.com	Jan 01	80	Very inexpensive: \$1795	Outstanding	201	Good: Pentium III-1000, 256MB of SDRAM, 256KB L2 cache, 30GB hard drive, 17-inch monitor, Windows 2000
9	ABS Performance Ultra 800/876-8088 www.abspc.com	Mar 01	80	Average: \$2379	Very good	196	Very good: Athlon-1100, 256MB of SDRAM, 256KB L2 cache, 40GB hard drive, 19-inch monitor, Windows 2000
10	HP Vectra VL400 800/752-0900 www.hp.com/desktops	Oct 00	79	Average: \$2220	Good	188	Good: Pentium III-933, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows 2000
 Best Buy		Percent of overall rating ▶		Price: 15 percent	Performance: 20 percent		Base configuration: 10 percent

¹ A system's performance word score is relative to the scores earned by other PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 167.

² We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).



IT'S WHAT'S INSIDE that counts. Take, for instance, the Gateway Professional S 1500, which grabs the top spot this month. This 1.5-GHz P4 machine exhibits imposing performance on our PC WorldBench 2000 tests and features an intuitive tool-less design that makes upgrading as easy as using a Lego set. Another PC equipped with a 1.5-GHz P4 also debuts on the chart this month—the spiffy-looking Polywell Poly 850GB-1500, which divides 60GB of storage between two hard drives connected by a RAID controller for extra speed. The Poly comes onto the chart at number four.

1 GATEWAY PROFESSIONAL S 1500



WHAT'S HOT: This well-designed, gray-and-beige midsize tower has two front-mounted IEEE 1394 ports to connect devices such as digital video cameras and CD-RW drives. The sturdy side panel pops off easily, thanks to two sliding switches on the rear of the tower, and most components inside

have tool-less release mechanisms. Even the power supply swings out with the flip of a switch. Text looked sharp right up to the highest resolution of 1600 by 1200 on the 19-inch Gateway EV910 monitor, and our test images had deep, luscious colors. **WHAT'S NOT:** The system lacks a reset button, so after a hard crash you may have to cycle the power off and on to restart.

Because this Pentium 4 system uses RDRAM, future memory upgrades won't be cheap: Gateway charges \$300 for an extra 128MB of PC 800 RDRAM.

WHAT ELSE: The Gateway Professional S 1500 earned a score of 200 on our PC WorldBench 2000 tests—a little slower than some P4-based systems we've seen (such as Gateway's E-4600XL), but most users wouldn't notice the difference. Our test system came with an 8X/4X/32X CD-RW drive, which provides flexible long-term data storage capabilities, but Gateway offers a 12X/8X/32X drive for just \$24 more. A quick-setup poster and color-coded and icon-labeled rear ports made assembling the system simple. The thick system manual packs lots of information—including helpful color illustrations and a thorough overview of the case's tool-less components—but it's not specific to this system. Two open PCI slots and four open drive bays await upgrades, although

Extra features	Design and expandability ²	Vendor's system reliability	Tech support quality/policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Very good: ATI Radeon SDR graphics card (32MB SDRAM), 8X/4X/32X CD-RW drive, V.90 modem, network adapter, Microsoft Office 2000 Small Business Edition	Good: tool-less slots and bays; midsize tower; 4 open drive bays, 2 open slots	Good	Fair/Outstanding	24/7, toll-free	3/3
Very good: Creative Labs Tech G80040 graphics card (64MB SDRAM), 4X DVD-ROM and 4X/4X/24X CD-RW combo drive, network adapter, Lotus Smart Suite Millennium Edition	Good: roomy interior; midsize tower; 3 open drive bays, 3 open slots	¹	Fair ³/Good	24/7, toll-free	3/5
Very good: Dell NVIDIA GeForce2 GTS Ultra graphics card (64MB DDR SDRAM), 12X DVD-ROM drive, 12X/8X/32X CD-RW drive, V.90 modem, network adapter, Office 2000 SBE, case lock	Good: well-organized interior; midsize tower; 3 open drive bays, 3 open slots	Outstanding	Good/Good	24/7, toll-free	3/1
Very good: Leadtek WinFast GeForce 2 Ultra graphics card (64MB DDR SDRAM), 16X DVD-ROM drive, 4X/4X/32X CD-RW drive, network adapter	Very good: new case design; midsize tower; 4 open drive bays, 3 open slots	¹	Fair ³/Good	24/7, toll-free	3/5
Good: Matrox Millennium G450 Dual Head graphics card (32MB SGRAM), 8X/4X/32X CD-RW drive, network adapter	Very good: cluttered but roomy case; midsize tower; 5 open drive bays, 3 open slots	¹	Good ³/Good	24/7, ⁴ toll-free	Varies ⁵ /5
Good: Hercules 3D Prophet II GTS graphics card (64MB DDR SDRAM), 16X-40X CD-ROM drive, V.90 modem, Microsoft Office 2000 Professional	Good: spacious interior; midsize tower; 3 open drive bays, 4 open slots	¹	Fair ³/Outstanding	24/7, toll-free	3/3
Very good: HP NVIDIA GeForce2 GTS graphics card (32MB SGRAM), 12X DVD-ROM drive, network adapter, HP's EdiaTools, Protectools, Toptools management software	Satisfactory: top panel difficult to replace; desktop; 2 open drive bays, 4 open slots	Good	Fair/Good	24/7, toll call	3/3
Good: Gainward 3D AGP NVIDIA GeForce2 MX graphics card (32MB SGRAM), 12X DVD-ROM drive, network adapter	Good: difficult to access interior; midsize tower; 5 open drive bays, 5 open slots	¹	Fair ³/Outstanding	16/7, ⁶ toll-free	3/3
Outstanding: Creative Labs 3D Blaster Annihilator 2 Ultra graphics card (64MB DDR SDRAM), 16X-40X CD-ROM drive, 12X/10X/32X CD-RW drive, V.90 modem, Microsoft Office 2000 SBE	Good: tidy interior; midsize tower; 2 open drive bays, 3 open slots	¹	Fair ³/Fair	9/5, toll-free	3/lifetime
Good: Matrox Millennium G400 graphics card (16MB SGRAM), 4X/4X/32X CD-RW drive, network adapter, HP's EdiaTools, Protectools, Toptools management software	Good: easy to access memory; midsize tower; 2 open drive bays, 5 open slots	Good	Fair/Good	24/7, toll call	3/3
Extra features: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent	Support and warranty: 15 percent		

¹ Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs. For tech-support quality, this rating may also depend on our anonymous support-quality calls.

² Support hours drop to 9 hours Monday-Friday after one year.

³ Six years on CPU and main RAM, three years on other parts.

⁴ Eleven hours on Saturday and Sunday.

the system is pretty well outfitted already. Microsoft's Office 2000 Small Business Edition comes bundled with this package, and the included modem and network adapter prepare this system for any network or broadband environment. In our most recent anonymous service and reliability tests, Gateway earned an overall score of Good.

BEST USE: The Professional S 1500 is a powerful performer. With its excellent display and IEEE 1394 ports, it would work well as a digital video processing machine. Its strong software bundle makes this workhorse Gateway ideal for any small to medium-size office.

2 POLYWELL POLY 830K7-1100

WHAT'S HOT: Based on an Athlon-1100 processor, the Poly 830K7-1100 blazed to a score of 240 on our PC WorldBench 2000 tests, setting a new high for systems running Windows

NT 4.0 (for details on making comparisons between OSs, see the Top 100 introduction, page 167). This souped-up powerhouse offers 256MB of RAM and 60GB of storage on two 30GB hard drives that are connected by an IDE RAID card—a setup that reads and writes data faster than a single drive can.

WHAT'S NOT: The Poly 830K7-1100's unusual 4X/4X/24X CD-RW and 4X DVD-ROM combination drive uses one less drive bay than a configuration with two separate drives. The rather large keyboard's keys clack loudly during typing, and its backspace key is annoyingly small.

WHAT ELSE: The 19-inch ViewSonic G5790 monitor, which currently owns the number three slot on our *Top 10 Monitors* chart, displayed rich colors and sharp text at 1024 by 768 resolution. The Poly



THE GATEWAY PROFESSIONAL S 1500 includes two IEEE 1394 ports for connecting video cameras and other devices.

830K7-1100's shiny silver midsize tower case looks more like a tiny train engine than a corporate system. To access its interior, you must remove the entire case, though it comes off easily when you push two buttons on the sides. The interior is crowded, but three open PCI slots and three open drive bays provide ade- ▶



THE POLYWELL POLY 850GB-1500 features Polywell's swanky new aluminum case styling and a RAID card.

quate expansion room. A large box holds the accompanying detailed system manual and the thorough documentation for individual PC components.

BEST USE: Any work environment, large or small, could benefit from the Poly 830K7-1100's combination of speedy performance and attractive features.

New on the Chart

4 POLYWELL POLY 850GB-1500

NEW WHAT'S HOT: Based on a 1.5-GHz Pentium 4 and running Windows 2000, the Poly 850GB-1500 posted a 205 score on our PC WorldBench 2000 tests, very close to what we've seen from other P4-1500 systems. This machine uses two

30GB hard drives connected to an IDE RAID card; together they look like one big 60GB drive on your desktop, but disk-intensive tasks run more quickly. Leadtek's WinFast GeForce2 Ultra graphics board helped the 19-inch ViewSonic PS790 monitor display sharp text—even at the high resolution of 2048 by 1536.

WHAT'S NOT: You won't bag this Poly cheap. It sells for \$2999, and the expensive RDRAM that it uses means that memory upgrades will be pricey as well—adding 128MB will cost \$225.

The KeyTronic keyboard serves up noisy typing and has too small a backspace key.

WHAT ELSE: Polywell's large, silvery mid-size tower case looks very cool, though the system would have looked even better had the keyboard, mouse, and monitor enclosure matched it. After you remove two thumbscrews, the sturdy side panel pops off easily. Cables (especially the ones going from the RAID card to the hard drives) clutter up the interior, but you'll find plenty of expansion room beneath them, thanks to four open drive bays and three open PCI slots. A thumbscrew secures each slot, so you can add and remove expansion cards without tools. A 4X/4X/32X CD-RW drive provides a solid (but not top-of-the-line) backup option.

Presenters and movie watchers will appreciate two other components: the excellent Cambridge SoundWorks PCWorks five-speaker set and the 16X DVD-ROM drive.

BEST USE: If you can afford this beautiful and powerful system, you'll be rewarded with the envy of all your office mates.

Also of Note

SHARP-EYED READERS will notice that last month's number one system (the Gateway E-4600XL Deluxe) is nowhere to be found on this month's chart. Because the specifications of that system are so close to those of the new Gateway Professional S 1500, we did not include it. When we're presented with two extremely similar machines from the same vendor, we sometimes remove the older one. In this case, the two machines share the same CPU, memory, and other features, but the E-4600XL Deluxe is designed more for corporate environments (with a number of remote-management features) while the Professional is aimed at small and home offices, where the system won't be managed by an IS department.

In contrast, the two Polywells that made the chart—the Poly 830K7-1100 and the Poly 850GB-1500—are dissimilar systems equipped with different processors, memory types, and prices. As a result, each earns its own place on the chart. ▶

PHOTOGRAPH ABOVE: RICK HIZNER; ILLUSTRATION BELOW: DOUG ROSS

Driver Updates: A Quick Way to Speed Up Your PC?

TECH TREND GETTING THE latest version of a device driver—the software that communicates between a piece of hardware and your operating system—can make your PC run faster, improve its stability, and even add new features. But look before you leap: Some new drivers cause more problems than they solve.

Updating your graphics card driver can enhance video performance. For example, NVIDIA's Detonator 3 graphics board drivers, released late last year, extensively improved almost every card. "In some cases performance increased so much it was as if the end user got a completely new board," says Andrew Fear, software product manager at NVIDIA.

We've seen definite speed increases in some graphics cards after installing new drivers. When we retested a Hercules 3D Prophet II MX graphics card with updated drivers, we saw an overall performance improvement of more than 10 percent.

Most of the time, however, it isn't necessary to upgrade the drivers

on your system. If everything is working and you're happy with the speed, don't upgrade. But if your system is unstable or you need a particular new feature (such as DirectX compatibility or support for a

new program), you should check the latest available drivers to see whether they fix the problem.

System manufacturers such as Dell and Compaq provide drivers and updates that are specific to their systems through their Web sites.

Intel offers a generic driver that works with any system incorporating an Intel chip set, but Intel spokesperson George Alfs recommends using the system manufacturer's driver in preference to the generic one, since some vendors

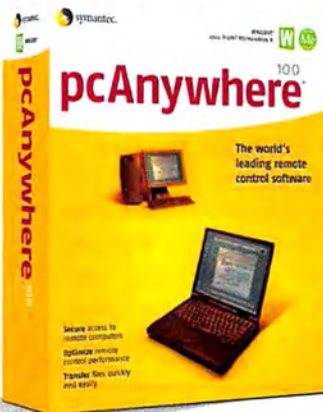
alter the drivers to work better with their machines.

Web sites such as Driver Zone (www.driverzone.com) and Totally Drivers (www.totallydrivers.com) can be good places to find direct links to drivers for your particular system.



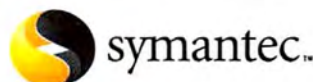


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TOP 10 VALUE PCs

	VALUE SYSTEM	Month tested	★ Overall rating	Street price (2/2/01)	PC WorldBench 2000 performance score ¹	Base configuration
1	 Dell Dimension 4100 800/388-8542 www.dell.com	NEW	89	Expensive: \$1729	 Outstanding 198	Very good: Pentium III-1000, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, 19-inch monitor, Windows 2000
2	 Gateway E-3400XL Deluxe 800/428-3929 www.gateway.com	Mar 01	88	Expensive: \$1747	 Outstanding 190	Very good: Pentium III-933, 128MB of SDRAM, 256KB L2 cache, 40GB hard drive, 17-inch monitor, Windows 2000
3	Micro Express MicroFlex 11B 800/989-9900 www.microexpress.net	Mar 01	86	Very inexpensive: \$1099	 Outstanding 175	Very good: Athlon-1100, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 17-inch monitor, Windows 98 SE
4	Tangent Valera 800/800-5550 www.tangent.com	NEW	85	Average: \$1595	 Outstanding 216	Very good: Athlon-1200, 256MB of SDRAM, 256KB L2 cache, 30GB hard drive, 17-inch monitor, Windows 2000
5	ABS Conquest GL 800/876-8088 www.abspc.com	Apr 01	83	Inexpensive: \$1299	 Very good 160	Outstanding: Athlon-1100, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows Millennium Edition
6	Sys Taskmaster 850D 800/613-9963 www.sys.com	NEW	83	Inexpensive: \$1226	 Very good 175	Very good: Duron-850, 128MB of SDRAM, 64KB L2 cache, 30GB hard drive, 19-inch monitor, Windows 2000
7	Micron ClientPro Cn 800/642-7667 www.micronpc.com	Oct 00	82	Expensive: \$1823	 Very good 158	Very good: Pentium III-933, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
8	NuTrend Athlon Mega 2 888/482-6678 www.nutrend.com	Apr 01	82	Inexpensive: \$1289	 Good 154	Outstanding: Athlon-950, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows Me
9	Compaq Deskpro EX 800/345-1518 www.compaq.com	Nov 00	80	Average: \$1474	 Good 193	Very good: Pentium III-733, 128MB of SDRAM, 256KB L2 cache, 15GB hard drive, 19-inch monitor, Windows NT 4.0
10	Tiny T-Bird Business Edition 888/818-8469 www.tinydirect.com	Mar 01	80	Average: \$1599	 Very good 160	Outstanding: Athlon-1000, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows Me
 Best Buy		Percent of overall rating ▶		Price: 17 percent	Performance: 18 percent	Base configuration: 10 percent


¹ A system's performance word score is relative to the scores earned by other PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 167.

² We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).



THOUGH OUR Best Buy this month remains a Dell Dimension 4100, it seems like one from a parallel dimension where everything looks nearly the same but details make it better. This 4100 offers a 1-GHz Pentium III CPU (upgraded from the PIII-933 in the previous version). Also new this month are the Athlon-1200-powered Tangent Valera at number four and the inexpensive and speedy Duron-850-based Sys Taskmaster 850D at number six.

1 DELL DIMENSION 4100


 **WHAT'S HOT:** The latest update of Dell's Dimension 4100 sped to a score of 198 on our PC WorldBench 2000 tests—an impressive 20 points above the average mark for PIII-1000 systems carrying 128MB of RAM and running Windows 2000. That performance score rivals the average mark achieved by 1.5-GHz P4 systems, and the Dimension 4100 costs far less than one of those new PCs. The excellent 19-inch Dell

M991 monitor produced vibrant, rich colors in our test images and crisp text that began to blur only at its maximum resolution of 1600 by 1200. Dell earned a score of Good on our tech support ratings. **WHAT'S NOT:** Though you can take off the side panel of this tall, thin, beige midsize tower by removing a single thumbscrew, reattaching the panel is more difficult. **WHAT ELSE:** A speedy 12X/8X/32X CD-RW drive makes for fast data backups, while the software bundle includes the

Microsoft Office 2000 Small Business Edition suite. Five open PCI slots and four open drive bays offer plentiful expansion opportunities. The system manual contains lots of detailed troubleshooting information, and a quick-setup poster and color-coded and icon-labeled rear ports aid assembly. Typing on the Dell QuietKey keyboard proved smooth, though the clackiness of the keys belies the name.

BEST USE: For a reasonable price, this Dimension runs circles around comparable PCs. Small to medium-size businesses will appreciate its performance and the vendor's strong record for reliability.

2 GATEWAY E-3400XL DELUXE

 **WHAT'S HOT:** This Pentium III-933-based model blazed to a score of 190 on our PC WorldBench 2000 tests; that's 13 points higher than the average posted by similarly configured Windows 2000 systems. The E-3400XL

Extra features	Design and expandability ¹	Vendor's system reliability	Tech support quality/policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Good: ATI Radeon graphics card (32MB DDR SDRAM), 12X/8X/32X CD-RW drive, network adapter, Microsoft Office 2000 Small Business Edition	Good: replacing cover takes some work; midsize tower; 4 open drive bays, 5 open slots	Outstanding	Good/Good	24/7, toll-free	3/1
Very good: ATI Rage Fury Pro graphics card (16MB SDRAM), 12X/8X/32X CD-RW drive, Zip 250 drive, network adapter, Intel LANDesk Client Manager, Microsoft Office 2000 SBE	Satisfactory: tool-less hard drive removal; desktop; 0 open drive bays, 3 open slots	Good	Fair/Outstanding	24/7, toll-free	3/3
Outstanding: ELSA Gladiac 32 graphics card (32MB SGRAM), 12X DVD-ROM drive, 8X/4X/32X CD-RW drive, V.90 modem, network adapter	Good: loads of expansion room; midsize tower; 3 open drive bays, 4 open slots	³	Fair ³/Outstanding	24/7, toll-free	4/4
Good: EVGA NVidia GeForce2 MX graphics card (32MB SDRAM), 12X-40X CD-ROM drive, network adapter, Corel WordPerfect Office 2000	Good: PCI support bar blocks drive bays; midsize tower; 4 open drive bays, 4 open slots	³	Fair ³/Outstanding	16/7, ⁴ toll-free	3/3
Very good: NVidia TNT2 M64 graphics card (32MB SDRAM), 16X DVD-ROM drive, V.90 modem, network adapter, Corel WordPerfect Office 2000	Very good: spacious interior; midsize tower; 4 open drive bays, 2 open slots	³	Fair ³/Fair	9/5, toll-free	3/lifetime
Good: Gigabyte GA-GF1280T graphics card (32MB SDRAM), 22X-48X CD-ROM drive, network adapter	Good: small but neat interior; minitower; 2 open drive bays, 2 open slots	³	Good ³/Good	24/7, ⁵ toll-free	Varies ⁶ /5
Good: VisionTek NVidia TNT2 M64 graphics card (32MB SDRAM), 20X-48X CD-ROM drive, network adapter, Microsoft Office 2000 SBE, Norton AntiVirus, LANDesk Client Manager	Good: tool-less case removal; midsize tower; 5 open drive bays, 5 open slots	Good	Good/Outstanding	24/7, toll-free	Varies ⁷ /1
Very good: Leadtek WinFast GeForce2 MX graphics card (32MB SDRAM), 16X DVD-ROM drive, V.90 modem, network adapter, Corel WordPerfect Office 2000	Very good: roomy but messy interior; minitower; 4 open drive bays, 2 open slots	³	Fair ³/Good	24/7, toll-free	3/lifetime
Good: Mitac NVidia TNT2 M64 graphics card (16MB SDRAM), 20X-48X CD-ROM drive, network adapter, Compaq Intelligent Manageability	Satisfactory: roomy interior; midsize tower; 2 open drive bays, 2 open slots	Good	Fair/Good	24/7, toll-free	3/1
Outstanding: PMC PixelView GeForce2 MX graphics card (32MB SDRAM), 8X DVD-ROM drive, 4X/4X/24X CD-RW drive, V.90 modem, network adapter, Microsoft Office SBE	Satisfactory: crowded interior; minitower; 1 open drive bay, 1 open slot	³	Good ³/Good	24/7, toll-free	3/1
Extra features: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent	Support and warranty: 15 percent		

³ Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs. For tech support quality, this rating may also depend on our anonymous support-quality calls.

⁴ Eleven hours on Saturday and Sunday.

⁵ Support hours drop to 9 hours Monday-Friday after one year.

⁶ Six years on CPU and main RAM, three years on other parts.

⁷ Five years on CPU and main RAM, three years on other parts.

Deluxe comes loaded with such corporate features as a network adapter (with Wake-on-LAN), Intel LANDesk Client Manager remote administration software, and chassis-intrusion detection. You can remove the hard drive without tools: It pops out of the case after you pull a ring on the side.

WHAT'S NOT: Though the 17-inch Gateway EV700 monitor rendered vivid colors on our test images, text looked blurry at 1024 by 768 resolution and nearly illegible at the maximum resolution of 1280 by 1024. You're supposed to be able to access the side-mounted expansion slots without tools, but the cover was wedged in so tightly that we had to use a screwdriver to pry it off. In our latest survey of *PC World* readers, respondents rated Gateway's business machines Good for reliability but just Fair for service.

WHAT ELSE: The E-3400XL Deluxe packs Iomega's Zip 250 drive for backing up data, but that drive sits right next to the

floppy drive, inviting disk mix-ups. A 12X/8X/32X CD-RW drive gives you another backup option. The hefty system manual contains lots of useful color illustrations, although it isn't specific to the E-3400XL.

The slightly sluggish Gateway keyboard allowed us to type quietly and smoothly. **BEST USE:** This office-ready machine makes a good match for any midsize to large business seeking a powerful PC with management options.

New on the Chart

4 TANGENT VALERA

NEW **WHAT'S HOT:** With a 1.2-GHz Athlon processor and 256MB of SDRAM, the Tangent Valera achieved a stunning



ALL PORTS TO THE FRONT: The Tangent Valera includes USB, headphone, and microphone ports at the front of the case, making it easier for users to plug in and remove USB peripherals.

score of 216 on our PC WorldBench 2000 tests—the highest mark we've seen from a PC running Windows 2000. Getting inside the case is easy: After you slide a switch, the solid side panel comes off ►

and goes back on smoothly. For future expansion, Tangent supplies five open PCI slots. Unfortunately, one is located so close to the AGP slot that a card installed in it could touch (and thereby damage) the video card; this makes the slot unusable.

WHAT'S NOT: To reach the RAM slots, you must work around a support bar for the PCI cards, which stretches from the top to the bottom of the interior, as well as an extra metal panel that surrounds the drive bays. The 17-inch Optquest Z70 monitor displayed rich colors, but text looked blurry at 1024 by 768 resolution and became hard to read at the screen's maximum resolution of 1280 by 1024.

WHAT ELSE: The standard beige midsize tower has two USB ports, a microphone, and a headphone port on the front of the case; the pass-through cable connecting those ports to the motherboard further crowds the already messy interior. A quick-start guide and a bound Tangent

manual with a detailed troubleshooting section and generic system information come with the system. The GeForce2 MX graphics board includes S-Video and digital video output ports. Corel's WordPerfect Office 2000 comes bundled, and a network adapter makes this Tangent ready for connection to a network.

BEST USE: Very fast and quite reasonably priced, the Tangent Valera would make an excellent small-office system with lots of room for expansion.

6 SYS TASKMASTER 850D

NEW **WHAT'S HOT:** Sys's Duron-850 system scores an impressive 175 on our PC WorldBench 2000 tests—18 points higher than the only other Duron-850 PC running Windows 2000 that we've tested, and 6 points above the average for PIII-866 systems running Windows 2000. With help from a GeForce2 MX-based graphics board (which offers extra

ports for S-Video and composite output), the 19-inch Optquest Q95 monitor displayed rich colors and sharp text.

WHAT'S NOT: Sys doesn't supply a system manual with any of its offerings, though it does pass along documentation from the manufacturers of the individual components. The basic beige minitower lacks a reset button, too.

WHAT ELSE: Opening the tower entails loosening two thumbscrews and popping off the flimsy side. Inside, the small but neat interior contains two open PCI slots and two open drive bays. Expansion cards can be added without tools, thanks to a thumbscrew that holds down a panel securing the PCI cards. The Wake-on-LAN-enabled network adapter prepares this Taskmaster to connect to an office network or a broadband modem. The sturdy Sys keyboard sports hot keys for sleep, wake-up, and power on and off, but its annoyingly small backspace key may force you to go on hunt-and-peck missions when correcting mistakes.

BEST USE: This inexpensive, powerful system and its large, clear display are well suited for any small-office environment.

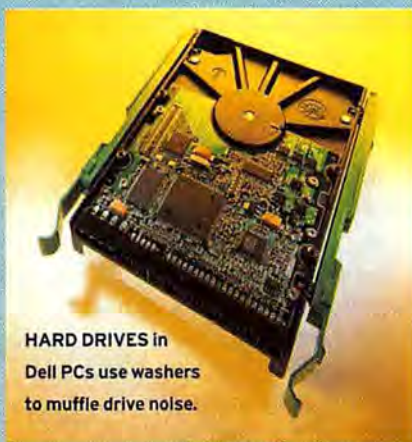
Shhh! Keep That PC Quiet

TECH TREND BUZZING HARD drives, growling CD-ROM drives, vibrating system fans. *PC World* often gets letters from readers complaining about how noisy their computers are. As offices strive to maintain quiet environments, many of today's PCs don't fit in. With companies looking to cut down on background noise, various vendors are incorporating new techniques to silence their products.

"European standards for noise levels in the workplace are more stringent than in the U.S.," says Bela Gombos, senior product manager for Toshiba America's computer systems group. "The importance of silent computing plays a large part in European IT purchasing," he adds. Now, some U.S. companies—especially those that use confined workspaces, such as call centers—have grown eager to obtain less-noisy PCs.

Harvey Rosenblum, director of marketing for Dell's OptiPlex Special Projects, says, "Dell expects all customers who are putting more workers in smaller spaces to appreciate and demand quieter PCs."

Both Dell and Toshiba are using innovative methods to silence components inside their corporate lines; Dell's new OptiPlex GX150



HARD DRIVES in
Dell PCs use washers
to muffle drive noise.

uses vinyl polymer "washers" at mounting points of the hard drive to keep the drive's vibrations from echoing through the chassis.

Similarly, a special foam in Toshiba's Equium 8000S cradles the hard drive. Both systems also use designs that cool without requiring high-speed, noisy fans.

Right now, quiet computer operation is viewed as a special feature instead of as a requirement, except in a few sound-sensitive workplaces, says Gombos. "But as PC speeds increase and the need for quiet cooling mechanisms rises, the purchasing trend toward silent machines will gain momentum."

Also of Note

THE KINGDOM Royale PIII-933 competed for a place on our chart this month but fell just short. An Iomega Zip 250 drive adds to this Kingdom's appeal, but the combination of a mediocre monitor and an above-average price of \$1799 held it back. The Royale achieved a PC WorldBench 2000 test score of 173—4 points below the PIII-933 group average.

Meanwhile, the Compaq Deskpro EXS came with an excellent Compaq P900 19-inch monitor, which delivered vibrant colors and sharp, legible text at even the maximum resolution of 1920 by 1200. This PIII-800 system earned a 165 on our PC WorldBench 2000 tests—5 points below the average for similarly configured systems. For the PC's price (\$1628), we would have liked to see more than a plain 20X-48X CD-ROM drive and a skimpy (by today's standards) 15GB hard drive. These deficiencies helped keep the Deskpro EXS off the *Top 10 Value PCs* chart. ▶



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VL950SL	VL950ST	PR960F
<ul style="list-style-type: none"> • 19" / 18" VIS • Short-length CRT • 0.25 dot pitch • Flat Square • 1600 X 1200 max. res. • TC092 	<ul style="list-style-type: none"> • 19" / 18" VIS • Short-length CRT • 0.25 dot pitch • Flat Square • 1600 X 1200 max. res. • 4+1 USB power hub on swivel base • TC095 	<ul style="list-style-type: none"> • 19" / 18" VIS • Sony FD Trinitron® CRT • 0.24 mm aperture grille • 1600 X 1200 max. res. • 4+1 USB power hub • BNC connectors • TC099
PR1400F	EX1300	PV880
<ul style="list-style-type: none"> • 21" / 19.8" VIS • Sony FD Trinitron® CRT • 0.24 mm aperture grille • 2048 X 1536 max. res. • 4+1 USB power hub • BNC connectors • TC099 	<ul style="list-style-type: none"> • 21" / 20" VIS • High Contrast Flat Square • 0.22mm horizontal dot pitch • 1800 X 1440 max. res. • 4+1 USB power hub • BNC connectors • TC099 	<ul style="list-style-type: none"> • Full 18.1" TFT Active Matrix Flat Panel • True 1280 X 1024 SXGA resolution • 160° horizontal & vertical viewing • Dual analog input • 4+1 USB power hub • Tilt and swivel stand • TC095, Energy Star®, VESA DPMS™



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TOP 15 NOTEBOOK PCs

POWER NOTEBOOK: \$2700 AND OVER		Month tested	★ Overall rating	Street price (2/2/01)	PC WorldBench 2000 performance score ¹	Base configuration
1	IBM ThinkPad A21p 888/746-7426 www.ibm.com/thinkpad	Feb 01	89	Very expensive: \$4019	Outstanding 182	Very good: Pentium III-850/700, 15-inch active screen, trackpoint, 256MB of SDRAM, 32GB hard drive, Windows 2000
2	Acer TravelMate 739TLV 800/733-2237 www.acer.com/aac	Apr 01	86	Average: \$2999	Good 157	Good: Pentium III-850/700, 15-inch active screen, touchpad, 128MB of SDRAM, 20GB hard drive, Windows 2000
3	HP Omnibook 500 800/752-0900 www.hp.com/notebooks	Mar 01	83	Average: \$3039	Satisfactory 149	Satisfactory: Pentium III-600/500, 12.1-inch active screen, eraserhead, 128MB of SDRAM, 20GB hard drive, Windows 2000
4	Micron TransPort LT 800/642-7667 www.micronpc.com	NEW	83	Average: \$2986	Good 154	Satisfactory: Pentium III-700/550, 13.3-inch active screen, touchpad, 128MB of SDRAM, 20GB hard drive, Windows 2000
5	WinBook Z1 800/965-9349 www.winbook.com	NEW	83	Average: \$3399	Very good 172	Very good: Pentium III-850/700, 15-inch active screen, touchpad, 128MB of SDRAM, 30GB hard drive, Windows 2000
MIDRANGE NOTEBOOK: \$2000 TO \$2699		Percent of overall rating ▶		Price: 14 percent	Performance: 20 percent	Base configuration: 5 percent
1	Gateway Solo 5300 800/846-2000 www.gateway.com	Feb 01	88	Inexpensive: \$2074	Good 147	Good: Pentium III-650/500, 14.1-inch active screen, touchpad, 128MB of SDRAM, 10GB hard drive, Windows 2000
2	Fujitsu PC E-6571 877/372-3473 www.fujitsupc.com	Apr 01	87	Inexpensive: \$2099	Very good 157	Good: Pentium III-750/600, 14.1-inch active screen, touchpad, 128MB of SDRAM, 20GB hard drive, Windows 2000
3	Compaq Presario 1700T-850 800/345-1518 www.compaq.com	Feb 01	84	Average: \$2297	Outstanding 145	Very good: Pentium III-850/700, 14.1-inch active screen, touchpad, 128MB of SDRAM, 32GB hard drive, Windows Me
4	HP Omnibook XE3 800/752-0900 www.hp.com/notebooks	Jan 01	82	Inexpensive: \$2249	Satisfactory 133	Very good: Pentium III-700/550, 15-inch active screen, touchpad, 64MB of SDRAM, 10GB hard drive, Windows 2000
5	Compaq Armada E500S 800/345-1518 www.compaq.com	Apr 01	82	Expensive: \$2604	Good 134	Good: Pentium III-800/650, 14.1-inch active screen, touchpad, 128MB of SDRAM, 10GB hard drive, Windows 98 SE
BUDGET NOTEBOOK: UNDER \$2000		Percent of overall rating ▶		Price: 17 percent	Performance: 17 percent	Base configuration: 5 percent
1	Dell Inspiron 3800 800/388-8542 www.dell.com	Jan 01	93	Very inexpensive: \$1199	Good 113	Satisfactory: Celeron-600, 12.1-inch active screen, touchpad, eraserhead, 64MB of SDRAM, 5GB hard drive, Windows 98 SE
2	WinBook Si 800 CD 800/965-9349 www.winbook.com	Apr 01	86	Inexpensive: \$1299	Very good 128	Satisfactory: Pentium III-800, 12.1-inch active screen, touchpad, 64MB of SDRAM, 6GB hard drive, Windows Me
3	Fujitsu PC I-4187 877/372-3473 www.fujitsupc.com	Apr 01	85	Inexpensive: \$1249	Satisfactory 107	Satisfactory: Celeron-550, 12.1-inch active screen, touchpad, 64MB of SDRAM, 10GB hard drive, Windows 98 SE
4	Toshiba Satellite 2805-S202 800/867-4422 www.toshiba.com	NEW	85	Average: \$1799	Very good 135	Very good: Pentium III-700/550, 14.1-inch active screen, eraserhead, 128MB of SDRAM, 10GB hard drive, Windows Me
5	Micro Express NP4800C 800/989-9900 www.microexpress.net	Mar 01	85	Average: \$1699	Outstanding 139	Very good: Pentium III-800/650, 14.1-inch active screen, touchpad, 128MB of SDRAM, 20GB hard drive, Windows 98 SE
Best Buy		Percent of overall rating ▶		Price: 20 percent	Performance: 14 percent	Base configuration: 5 percent

¹ Performance word scores reflect comparisons of PCs in the same price category running the same operating system. For more details, see "Your Guide to the Top 100" on page 167.

² Unless otherwise noted, all notebooks come with a lithium ion battery.

³ Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive.



AFTER HOLDING steady for a couple of years—mostly due to high screen costs—laptop prices are trending downward again. It's now easier than ever to find a brand-name notebook in the \$1000-to-\$1200 range with a fast processor, an active-matrix screen, a decent-size hard drive, and a comfortable keyboard.

A compelling example: Dell's Inspiron 3800, our top budget machine for the fifth month in a row, has fallen \$150 since January, to \$1199.

Not a bad deal for a 12.1-inch active matrix screen, 5GB of storage, and dual pointing devices. Similarly equipped laptops are available for around the same price (or less) from Compaq, IBM, and Fujitsu. On the midrange side, Gateway's Solo 5300 has shed \$200 since February, to \$2074, and earns a Best Buy for the first time. Fujitsu PC's E-6571, at \$2099, costs \$800 less than it did last month.

Extra features ²	Design and ease of use	Battery life (hours:min)	Travel weight (pounds) ¹	Vendor's system reliability	Tech support quality/policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Very good: multipurpose bay, 8X DVD-ROM drive, built-in modem, Lotus SmartSuite	Excellent: decked-out system includes video-in, 1600 by 1200 screen, huge hard drive	Good/ 3:45	Heavy/ 8.3	Good	Good/ Fair	24/7, toll-free	3/3
Very good: multipurpose bay, 8X DVD-ROM drive, built-in modem and network interface, Microsoft Works 2000	Very good: built-in fingerprint reader helps foil data thieves	Very good/ 4:23	Heavy/ 8.1	Good	Good ⁴ / Fair	24/7, toll-free	1/1
Very good: two multipurpose bays, 12X-24X CD-ROM drive, built-in modem and network interface	Excellent: legacy-light ultraportable with steady keyboard and full-featured media slice	Good/ 3:09	Average/ 7.5	Good	Fair ⁴ / Fair	24/7, toll call	1/1
Very good: multipurpose bay, 8X DVD-ROM drive, built-in modem and network interface, Office 2000 SBE	Very good: lightweight; optional USB floppy drive costs \$19 extra	Satisfactory/ 2:40	Average/ 7.1	Fair	Fair/ Fair	24/7, toll-free	3/3
Very good: multipurpose bay, 8X/4X/24X CD-RW drive, built-in modem, PC Card, Microsoft Works 2000	Very good: easy to upgrade; screen overlap when portable is closed could lead to damage	Satisfactory/ 2:58	Heavy/ 8.6	Fair	Good ⁴ / Poor	13/6, toll-free	3/3
Extra features: 5 percent	Design and ease of use: 10 percent	Battery life: 8 percent	Weight: 8 percent	Reliability: 20 percent	Support and warranty: 10 percent		
Good: multipurpose bay, 10X-24X CD-ROM drive, built-in modem and network interface	Very good: removable hard drive, handsome black-and-silver case, but wobbly keys	Good/ 3:07	Average/ 7.1	Fair	Fair/ Fair	24/7, toll-free	1/1
Good: multipurpose bay, 8X DVD-ROM drive, built-in modem	Very good: infrared for wireless mouse; extra buttons double as password security system	Satisfactory/ 2:47	Average/ 7.3	Fair	Poor/ Fair	24/7, toll-free	1/1
Good: multipurpose bay, 8X DVD-ROM drive, built-in modem and network interface, Microsoft Word 2000	Very good: slim and light with lots of shortcut buttons, distinctive case, and huge hard drive	Satisfactory/ 2:25	Average/ 7.4	Fair	Fair/ Fair	24/7, toll-free	1/1
Satisfactory: 8X DVD-ROM drive, built-in modem and network interface	Average: business laptop has improved CD player controls, cursor lock; Bluetooth ready	Good/ 3:26	Heavy/ 8.2	Good	Fair ⁴ / Fair	24/7, toll call	1/1
Very good: two multipurpose bays, 12X-24X CD-ROM drive, built-in modem and network interface, Works 2000	Excellent: holds up to three batteries at once; plain but comfy and shortcut-rich keyboard	Very good/ 3:59	Heavy/ 8.1	Fair	Fair/ Fair	24/7, toll-free	1/1
Extra features: 5 percent	Design and ease of use: 10 percent	Battery life: 8 percent	Weight: 8 percent	Reliability: 20 percent	Support and warranty: 10 percent		
Satisfactory: multipurpose bay, 10X-24X CD-ROM drive, Microsoft Works 2000	Excellent: thinish, flexible business laptop comes in different colors	Good/ 3:17	Heavy/ 8.3	Good	Good/ Fair	24/7, toll-free	1/1
Satisfactory: 12X-24X CD-ROM drive, built-in modem	Average: boxy, black all-in-one has Web- and mail-launch buttons but uses desktop CPU	Satisfactory/ 2:48	Average/ 7.7	Fair	Good ⁴ / Poor	13/6, toll-free	1/1
Satisfactory: multipurpose bay, 8X DVD-ROM drive, built-in modem, Microsoft Works 2000	Very good: boxy; lacks legacy ports; multi-media-rich with DVD-ROM drive	Satisfactory/ 2:17	Average/ 7.7	Fair	Poor/ Fair	24/7, toll-free	1/1
Satisfactory: 8X DVD-ROM drive, built-in modem and network interface, Lotus SmartSuite	Average: no docking connection; conveniently located CD player buttons, good stereo sound	Satisfactory/ 2:59	Heavy/ 8.5	Fair	Fair/ Good	24/7, toll-free	1/1
Good: two multipurpose bays, 6X DVD-ROM drive, built-in modem	Average: built-in tilt feet; too-small command keys mar keyboard	Satisfactory/ 2:27	Heavy/ 8.3	Fair	Fair ⁴ / Fair	24/7, toll-free	2/2
Extra features: 5 percent	Design and ease of use: 10 percent	Battery life: 8 percent	Weight: 8 percent	Reliability: 20 percent	Support and warranty: 10 percent		

⁴ Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.

⁵ Insufficient data to give a rating.

Three new notebooks debut this month. Micron's thin-and-light \$2986 TransPort LT snags fourth place on the power chart, with WinBook's \$3399 Z1 close on its

FULL REVIEWS ONLINE



FOR DETAILED write-ups of all the new notebooks that we tested this month, visit PCWorld.com (www.pcworld.com/t15notebooks).

heels. The Z1 line puts WinBook laptops on an equal configuration footing with competing power models by offering a 15-inch, high-resolution screen and a 30GB hard drive. Toshiba's \$1799 Satellite 2805-S202, fourth on our budget chart, would make a fine personal laptop.

Contributing Editor Carla Thornton covers notebooks for PC World.

TOSHIBA'S Satellite 2805-S202 sports convenient music CD buttons.



TOP 15 HOME PCs

POWER SYSTEM: \$2000 AND OVER		Month tested	★ Overall rating	Street price (2/2/01)	PC WorldBench 2000 performance score ¹	Faster	Base configuration ²
1	 Dell Dimension 8100 800/388-8542 www.dell.com	Mar 01	90	Expensive: \$3149	Good	157	Good: Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 40GB hard drive, midsize tower, 19-inch monitor, Windows Millennium
2	Gateway Select 1200 800/846-2000 www.gateway.com	Mar 01	85	Inexpensive: \$2244	Very good	169	Very good: Athlon-1200, 128MB of SDRAM, 256KB L2 cache, 60GB hard drive, midsize tower, 19-inch monitor, Windows Me
3	Gateway Performance 1500 800/846-2000 www.gateway.com	Apr 01	83	Very expensive: \$3413	Good	161	Very good: Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 60GB hard drive, midsize tower, 19-inch monitor, Windows Me
4	IBM NetVista A60i 684840U 800/426-4968 www.ibm.com/netvista	Apr 01	82	Expensive: \$3099	Good	155	Satisfactory: Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 75GB hard drive, midsize tower, 17-inch monitor, Windows Me
5	Compaq Presario 7000T 800/345-1518 www.compaq.com	Apr 01	80	Very expensive: \$3625	Good	157	Very good: Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 75GB hard drive, midsize tower, 19-inch monitor, Windows Me
MIDRANGE SYSTEM: \$1200 TO \$1999		Percent of overall rating ▶		Price: 10 percent	Performance: 20 percent		Base configuration: 10 percent
1	 Dell Dimension 4100/1GHz 800/388-8542 www.dell.com	(NEW)	95	Expensive: \$1828	Very good	159	Good: Pentium III-1000, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, midsize tower, 19-inch monitor, Windows Me
2	Tiny Computers T-Bird 1000 888/818-8469 www.tinydirect.com	Feb 01	89	Average: \$1549	Very good	160	Very good: Athlon-1000, 128MB of SDRAM, 256KB L2 cache, 40GB hard drive, minitower, 19-inch monitor, Windows Me
3	ABS Multimedia System 2 800/876-8088 www.abspc.com	Apr 01	87	Inexpensive: \$1329	Very good	161	Good: Athlon-1100, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, midsize tower, 19-inch monitor, Windows Me
4	IBM NetVista A40i 228455U 800/426-4968 www.ibm.com/netvista	Apr 01	85	Very expensive: \$1899	Very good	160	Satisfactory: Athlon-1000, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, minitower, 17-inch monitor, Windows Me
5	HP Pavilion 9720 800/752-0900 www.hp-at-home.com	(NEW)	82	Expensive: \$1800	Good	153	Good: Pentium III-1000, 128MB of SDRAM, 256KB L2 cache, 60GB hard drive, tower, 17-inch monitor, Windows Me
BUDGET SYSTEM: UNDER \$1200		Percent of overall rating ▶		Price: 15 percent	Performance: 15 percent		Base configuration: 10 percent
1	 Dell Dimension L866r 800/388-8542 www.dell.com	Feb 01	95	Inexpensive: \$829	Good	144	Good: Pentium III-866, 128MB of SDRAM, 256KB L2 cache, 10GB hard drive, minitower, 17-inch monitor, Windows Me
2	NuTrend Athlon Force 2 888/482-6678 www.nutrend.com	Feb 01	79	Average: \$1039	Outstanding	161	Very good: Athlon-900, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, midsize tower, 17-inch monitor, Windows Me
3	ABS Performance 3 800/876-8088 www.abspc.com	Jan 01	76	Expensive: \$1159	Very good	153	Very good: Pentium III-866, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, midsize tower, 17-inch monitor, Windows Me
4	HP Pavilion XT846 800/752-0900 www.hp-at-home.com	(NEW)	75	Average: \$999	Satisfactory	116	Good: Celeron-800, 128MB of SDRAM, 128KB L2 cache, 40GB hard drive, midsize tower, 17-inch monitor, Windows Me
5	Kaypro 4110 888/352-9776 www.kaypro.com	Mar 01	70	Expensive: \$1074	Good	145	Very good: Pentium III-800EB, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, minitower, 17-inch monitor, Windows Me
Best Buy		Percent of overall rating ▶		Price: 20 percent	Performance: 10 percent		Base configuration: 10 percent

¹ Performance word scores reflect comparisons of PCs in the same price category running the same operating system. For more details, see "Your Guide to the Top 100" on page 167.

² Vertical cases are towers (over 20 inches), midsize towers (15.5 to 20 inches), or minitowers (under 15.5 inches). Horizontal cases are desktops (5 inches or taller) or compacts (under 5 inches).



A WAVE OF NEW POWER HOME PCs—most of them with Pentium 4 processors—has created a trickle-down effect, as systems with formerly top-tier processors cut their prices and move headlong into the midrange and budget sectors.

Dell's Dimension 4100/1GHz enters the midrange chart as a new Best Buy. Its \$1828 price puts the 1-GHz unit just \$75 above last month's Dimension 4100/PIII-933. The unit's unusual combo DVD/CD-RW

drive will please users who want to conserve space, though some will find it awkward having only one drive to read and write data. But with four open bays, there's plenty of room for more hardware.

At the bottom of the midrange section is Hewlett-Packard's new \$1800 Pavilion 9720. Geared for small-business users, this package includes Microsoft 2000 Small Business Edition and a network

Extra features ¹	Setup/ ease of use	Graphics	Reliability/ support	Comments
Outstanding: NVIDIA GeForce2 Ultra graphics board (64MB DDR SDRAM), 12X DVD-ROM drive, 12X/8X/32X CD-RW drive, network adapter	Outstanding/ Good	Very good	Outstanding/ Outstanding	PRO: Loaded with extra features. CON: Disappointing PC WorldBench 2000 performance, given the expensive P4 processor.
Good: NVIDIA GeForce2 Ultra graphics board (64MB DDR SDRAM), 16X DVD-ROM drive	Good/ Good	Good	Fair/ Fair	PRO: \$365 price drop makes this PC with easy-to-access drive bays and excellent frame rates even more attractive. CON: No CD-RW drive or network card.
Outstanding: NVIDIA GeForce2 Ultra graphics board (64MB DDR SDRAM), 16X DVD-ROM drive, 12X/8X/32X CD-RW drive, network adapter	Outstanding/ Satisfactory	Good	Fair/ Fair	PRO: First-rate monitor; good graphics plus a TV-tuner card, three IEEE-1394 ports, and lots of storage. CON: Performance below that of Athlon-1200 PCs.
Outstanding: ATI All-in-Wonder Radeon graphics board (32MB SGRAM), 16X DVD-ROM drive, 8X/4X/32X CD-RW drive, network adapter	Good/ Satisfactory	Good	Good/ Fair	PRO: Enormous hard drive; superb graphics card displays high frame rates. CON: Small monitor given the price, slow for a P4-1500.
Outstanding: 3D Blaster Annihilator2 Ultra graphics board (64MB DDR SDRAM), 8X/4X/32X CD-RW drive, 2X/8X DVD-ROM drive, network adapter	Good/ Good	Very good	Poor/ Fair	PRO: Top-notch PC packages high-quality sound, graphics, and optical storage options. CON: Despite \$362 price drop, this unit is still costly.
Extra features: 10 percent	Setup/ease of use: 5 percent	Graphics: 15 percent	R & S: 30 percent	
Good: ATI Radeon graphics board (32MB DDR SGRAM), combo 8X/4X/32X CD-RW/8X DVD-ROM drive	Outstanding/ Good	Good	Outstanding/ Outstanding	PRO: Tops performance of some 1.5-GHz PCs. CON: Combo DVD/CD-RW drive saves space but is the only drive available for backups and CD writing/reading.
Outstanding: NVIDIA GeForce2 MX graphics board (32MB SDRAM), 8X DVD-ROM drive, 8X/4X/32X CD-RW drive, scanner, printer	Satisfactory/ Good	Good	*/Good *	PRO: Fast family PC with extra peripherals and software. CON: Dark DVD movie playback; limited expansion room; comes with low-end printer and scanner.
Good: Leadtek WinFast GeForce2 MX graphics board (32MB SDRAM), 16X DVD-ROM drive	Good/ Satisfactory	Good	*/Fair *	PRO: 19-inch monitor displays sharp text; nice-sounding speakers. CON: 3D games looked banded, and menu screens on DVD playback appeared blurry.
Good: NVIDIA GeForce2 GTS graphics board (32MB SGRAM), 8X/4X/32X CD-RW drive	Outstanding/ Satisfactory	Good	Good/ Fair	PRO: Sturdy multimedia keyboard with seven Internet buttons. CON: Free tech support limited to three years.
Very good: NVIDIA GeForce2 GTS graphics board (32MB DDR SGRAM), 16X DVD-ROM drive, 8X/4X/32X CD-RW drive, network adapter	Satisfactory/ Good	Good	Fair/ Fair	PRO: Sturdy tower comes with business software and a network adapter. CON: Free tech support limited to one year; sound system lacks depth.
Extra features: 10 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 30 percent	
Satisfactory: integrated Intel 810 graphics with UMA, 22X-48X CD-ROM drive, network adapter	Outstanding/ Good	Limited	Outstanding/ Outstanding	PRO: Rich display quality and sound. Dell's reliability and service marks outshine its peers'. CON: Noisy hard drive; design is anything but stylish.
Good: NVIDIA TNT2 M64 graphics board (32MB SDRAM), 12X DVD-ROM drive, network adapter	Satisfactory/ Satisfactory	Satisfactory	*/Fair *	PRO: PC's speed redefines budget performance; handsome multimedia keyboard. CON: Lackluster frame rates in our gaming tests.
Good: Leadtek WinFast GeForce2 MX graphics board (32MB SGRAM), 10X DVD-ROM drive, 8X/4X/32X CD-RW drive	Satisfactory/ Good	Good	*/Fair *	PRO: Fast budget PC includes cutting-edge technology in DVD and CD-RW drives. CON: Text display lacks sharpness; mediocre frame rates in 3D games tests.
Satisfactory: integrated Intel 810 graphics with UMA, 20X-48X CD-ROM drive, 4X/4X/24X CD-RW drive, network adapter	Good/ Good	Limited	Fair/ Fair	PRO: Handsome system includes network card and CD-RW drive. CON: Slow performance; integrated graphics doesn't support 32-bit color.
Good: NVIDIA Vanta graphics (16MB SDRAM), 22X-52X CD-ROM drive	Satisfactory/ Satisfactory	Satisfactory	*/Good *	PRO: Good PC WorldBench performance. CON: Poor gaming frame rates due to low-end graphics card; Daewoo monitor displays fuzzy text and faded colors.
Extra features: 10 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 30 percent	

¹ Unless otherwise noted, all home PCs come with a V.90 modem.

² Insufficient data to give a rating.

³ Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.

card, plus a whopping 60GB hard drive.

This month's budget chart lineup also has some changes. HP's \$999 XT846 package (reviewed in last month's *New*

FULL REVIEWS ONLINE



FOR WRITE-UPS on all the systems we reviewed this month, visit PCWorld.com (www.pcworld.com/reviews/topcharts).

Products) includes Intel's new Celeron-800 processor, a CD-RW drive, and a network card, but it doesn't offer much in the way of speed, posting a PC WorldBench score of just 116. The retirement of IBM's NetVista A20i and Tiny Computer's Value 900A allows for the return of the Kaypro 4110, which appears at the bottom of the budget chart. This Kaypro, another 800-MHz unit, has speed to spare. ▶



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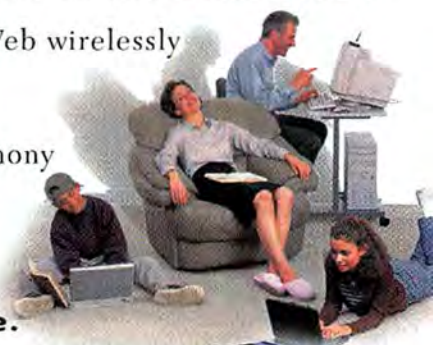
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TOP 10 PRINTERS

	COLOR LASER PRINTER	Street price (2/9/01)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/color graphics	Comments
1	 Minolta-QMS Magicolor 2200 GN 877/778-2687 www.minolta-qms.com	\$1895	87	9.8/1.3	Excellent/ Very good	FEATURES: Rated 20 ppm monochrome/5 ppm color. Standard 128MB of RAM, 1200-by-1200-dpi maximum resolution, 650 pages input, 500 output. SUMMARY: Fast text printing, great print quality, and lots of extra features keep the Magicolor 2200 GN in first place. A \$904 price drop makes it the least expensive on the chart. Graphics appear especially smooth and rich for a color laser.
2	 Lexmark C720N 888/539-6275 www.lexmark.com NEW	\$2399	86	12.0/2.0	Excellent/ Excellent	FEATURES: Rated 24 ppm monochrome/6 ppm color. Standard 64MB of RAM, 2400-by-1200-dpi maximum resolution, 250 pages input and output. SUMMARY: Lexmark's speedy new color laser creates beautiful images. Text appears sharp and fine, and color graphics show rich colors, shadings, and detail. The price is reasonable, but this model lacks the paper features of other color lasers.
3	Oki Data Okicolor C7200n 800/654-3282 www.okidata.com NEW	\$3222	86	11.9/2.3	Excellent/ Good	FEATURES: Rated 20 ppm monochrome/12 ppm color. Standard 64MB of RAM, 1200-by-600-dpi maximum resolution, 530 pages input, 500 output. SUMMARY: Oki Data's new model debuts with the second-fastest text and graphics speeds on the chart. Text quality is also impressive, with thick, dark letters, though colors appear too bright. Oki Data offers lots of extras with this model as well.
4	Minolta-QMS Magicolor 6100 DeskLaser 888/778-2687 www.minolta-qms.com	\$1995	83	5.6/0.9	Very good/ Good	FEATURES: Rated 24 ppm monochrome/6 ppm color. Standard 32MB of RAM, 1200-by-600-dpi maximum resolution, 250 pages input and output. SUMMARY: The entry-level version in Minolta-QMS's 6100 series drops more than \$800 in price, becoming one of the least-expensive lasers here. It has strong print quality, an intuitive design, and top-notch support, but it's too slow for busy offices.
5	Lexmark Optra C710N 888/539-6275 www.lexmark.com	\$2199	81	9.5/1.6	Very good/ Excellent	FEATURES: Rated 16 ppm monochrome/3 ppm color. Standard 32MB of RAM, 1200-by-1200-dpi maximum resolution, 300 pages input, 250 output. SUMMARY: The Optra C710N offers outstanding color quality and reasonably fast text and graphics printing speeds for a moderate price. It has an easy-to-understand control panel, but toner cartridges are a bit tricky to install—a minor quibble.
6	Brother HL-2400CeN 800/276-7746 www.brother.com	\$1999	81	9.4/1.1	Very good/ Good	FEATURES: Rated 16 ppm monochrome/4 ppm color. Standard 32MB of RAM, 2400-by-600-dpi maximum resolution, 250 pages input and output. SUMMARY: The HL-2400CeN produces fairly quick text speeds and creates crisp letters and rich, detailed graphics, all for a low price. Graphics churn out more slowly, however; the printer's biggest drawback is a confusing control panel.
7	Tektronix Phaser 750N by Xerox 877/362-6567 www.xerox.com/officeprinting	\$2295	79	7.3/1.4	Good/ Very good	FEATURES: Rated 16 ppm monochrome/5 ppm color. Standard 64MB of RAM, 1200-by-600-dpi maximum resolution, 350 pages input, 500 output. SUMMARY: The Phaser 750N offers middle-of-the-road text and graphics speeds and slightly jagged text, but it delivers strong color graphics. Added benefits include a user-friendly control panel and a comprehensive online manual.
8	Tektronix Phaser 850N by Xerox 877-362-6567 www.xerox.com/officeprinting	\$2495	76	6.8/2.4	Very good/ Adequate	FEATURES: Rated 8 ppm on both monochrome and color. Standard 32MB of RAM, 450-by-800-dpi maximum resolution, 200 pages input, 500 output. SUMMARY: Using heated wax instead of a laser, the Phaser 850N prints graphics more quickly than any other model here, though text speed is mediocre. Those fast-printing images are grainy, however, and lack detail.
9	HP Color LaserJet 4550dn 800/613-2222 www.hp.com	\$3769	75	8.1/1.6	Very good/ Good	FEATURES: Rated 16 ppm monochrome/4 ppm color. Standard 128MB of RAM, 2400-by-2400-dpi maximum resolution, 900 pages input, 250 output. SUMMARY: Strong print quality and reasonably fast speeds mark HP's expensive color laser. The high-end model we tested includes such extra features as an automatic duplex and extra RAM; the standard model costs \$1000 less.
10	Brother HL-3400CN 800/276-7746 www.brother.com	\$3499	75	10.4/1.1	Good/ Adequate	FEATURES: Rated 24 ppm monochrome/6 ppm color. Standard 64MB of RAM, 2400-by-600-dpi maximum resolution, 250 pages input and output. SUMMARY: We first reviewed Brother's tabloid-size 3400CN in October, and it makes its way onto the chart this month. Text prints quickly and looks presentable, but graphics aren't as fast and appear dark and grainy.



Best Buy

For reviews of printers we tested this month, visit www.pcworld.com/t10printers.

HOW WE TEST The overall rating for color laser printers is based on print quality (25 percent), price (25 percent), features (15 percent), ease of use (15 percent), speed (10 percent), and service and support (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

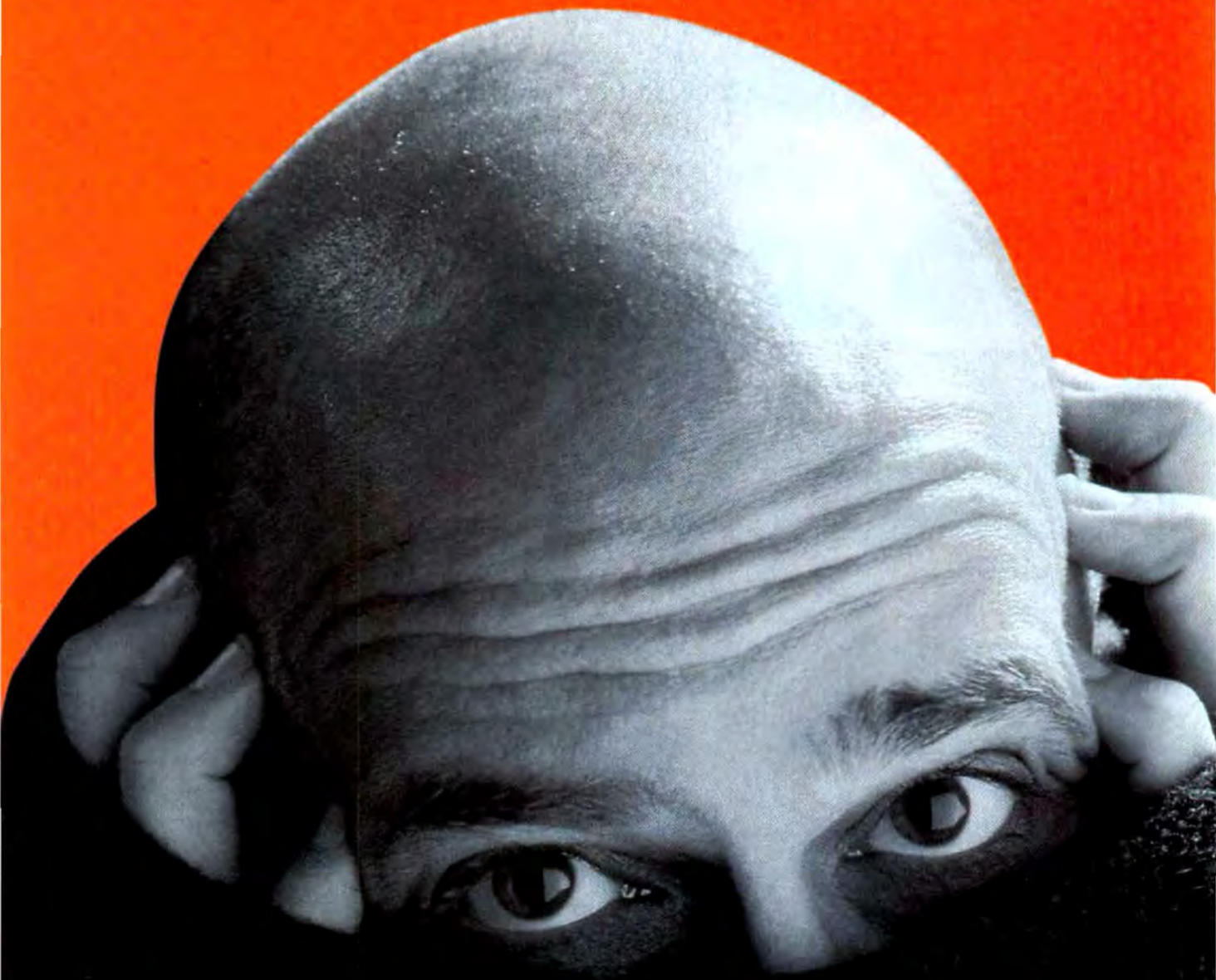
¹ All street prices include a network card.



TWO OF THE THREE new color lasers we tested this month make impressive debuts. Lexmark's \$2399 C720N captures the second-place Best Buy with blazingly quick text and graphics output and

smooth, rich print quality. Oki Data's \$3222 Okicolor C7200n debuts in third place, rivaling the Lexmark's impressive speeds and sharp text, but colors look off. The slow speeds of Minolta-QMS's new \$1299 Magicolor 2200 DeskLaser keep it off the chart. ►

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TOP 10 MONITORS

	19-INCH MONITOR	Month tested	Street price (2/14/01)	Overall rating	Quality of text/graphics	Comments
1	 Samsung SyncMaster 950p 800/726-7864 www.samsungmonitor.com	Mar 00	\$309	84	Very good/ Very good	FEATURES: 17.9-inch viewable area, .26mm dot pitch tube, up to 119-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Superb image quality for a reasonable price, plus easy-to-use on-screen controls. Dials on the front bezel allow you to adjust brightness and contrast. Bulky size may not suit cramped spaces.
2	 Dell M991 800/289-3355 www.dell.com	(NEW)	\$359	83	Very good/ Good	FEATURES: 18-inch viewable area, .26mm dot pitch tube, up to 110-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Impressive display of sharp text in word-processing documents and spreadsheets helps this model bolt almost to the top. Colors in photos also look rich.
3	ViewSonic GS790 800/888-8583 www.viewsonic.com	Aug 00	\$389	83	Good/ Very good	FEATURES: 18.1-inch viewable area, .26mm dot pitch tube, up to 116-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Vibrant colors in photos and on Web pages make this model a good choice for graphics pros. Around-the-clock tech support is useful for both business and SOHO users.
4	Optquest Q95 800/888-8583 www.viewsonic.com/optquest	Aug 00	\$279	81	Good/ Good	FEATURES: 18.2-inch viewable area, .27mm dot pitch tube, up to 107-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: No longer the least expensive on the chart, but still very cheap. A good choice for buyers willing to compromise on second-tier text and graphics quality to save money.
5	MGC Technologies 997SN 877/428-9642 www.mgcusa.com	Aug 00	\$369	81	Very good/ Very good	FEATURES: 18-inch viewable area, .25mm dot pitch tube, up to 120-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 12-hour weekday toll-free support. SUMMARY: Sharp text on spreadsheets, lively graphics, and a competitive price keep this model on the chart. Lacks weekend tech support, so it may be a better choice for business users.
6	Cornerstone Technology C910 800/562-2552 www.monitorsdirect.com	(NEW)	\$269	79	Good/ Good	FEATURES: 18-inch viewable area, .26mm dot pitch tube, up to 119-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour weekday toll-free support. SUMMARY: Rock-bottom price makes this model appealing to the cost-conscious. Text and colors are decent, but better image quality can be found for slightly more.
7	CTX International PR960F 800/888-2012 www.ctxintl.com	(NEW)	\$429	76	Very good/ Good	FEATURES: 18-inch viewable area, .24mm-.26mm varying stripe pitch, up to 136-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 12-hour weekday toll-free support. SUMMARY: Renders easy-to-read text, particularly at smaller font sizes. Colors lacked the vibrancy evident on other models. USB ports are useful for connecting peripherals such as scanners.
8	ADI MicroScan G910 800/228-0530 www.adiusa.com	Aug 00	\$418	75	Very good/ Good	FEATURES: 18-inch viewable area, .24mm-.26mm varying stripe pitch, up to 137-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 12-hour weekday toll-free support. SUMMARY: Produces dense, sharp text but pales on graphics, with washed-out colors. Good choice for people who work primarily on word-processing documents and spreadsheets.
9	NEC MultiSync FE950+ 888/632-6487 www.necmitsubishi.com	(NEW)	\$449	75	Good/ Very good	FEATURES: 18-inch viewable area, .25mm-.27mm varying stripe pitch, up to 116-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Luscious colors on Web pages and in photos make this model suitable for graphics pros. Text quality disappoints slightly—letters appear less dense than they do on some other models.
10	LG Flatron 915FT Plus 800/243-0000 www.lgeus.com	(NEW)	\$470	74	Good/ Very good	FEATURES: 18-inch viewable area, .24-.26mm varying stripe pitch, up to 110-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 12-hour toll-free support. SUMMARY: The most expensive model on the chart, but colors looked brilliant and rich, making this a good choice for graphics users willing to spend a little extra. Support hours could be more generous.



Best Buy

For expanded reviews of the monitors on this chart and for a list of models that didn't make the chart this month, visit www.pcworld.com/t10monitors.

TEST HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics quality (25 percent each), price (25 percent), features and ease of use (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by PC World Test Center. All rights reserved. ¹ Maximum refresh rate at 1024 by 768 resolution. ² Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play. ³ Uses an aperture grille in which parallel wires near the sides of the screen are strung farther apart than those at the middle.



FIVE NEW MONITORS make the cut this month, with Dell's M991 climbing the highest—into second place—thanks to solid text and graphics. Cornerstone's C910 lands at number six with

a bargain price; and CTX's PR960F, at number seven, offers razor-sharp text. NEC's MultiSync FE950+ and LG's Flatron 915FT Plus, in ninth and tenth spots, respectively, render handsome graphics. Next month we look at 21-inch displays. ▶

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TOP 10 GRAPHICS BOARDS

	AGP BOARD	Month tested	Street price (2/23/01)	Overall rating	Image quality	Overall speed	Features rating	Comments
1	 ATI All-in-Wonder Radeon 905/882-2600 www.ati.com	Feb 01	\$299	95	Very good	Good	Excellent	FEATURES: 4X AGP, ATI Radeon chip, 32MB of DDR SDRAM, 350-MHz RAMDAC; DVI-out, TV tuner, hardware DVD support, graphics editing software. SUMMARY: This card retains first place, thanks to DirectX 8 support and ATI's video features and bundled software. This is a great card for the video editing enthusiast.
2	 CardExpert GeForce2 MX 800/539-2273 www.gainward.com	Feb 01	\$119	93	Very good	Good	Very good	FEATURES: 4X AGP, NVIDIA GeForce2 MX chip, 32MB of SDRAM, 350-MHz RAMDAC; DVI-out, 3D games, DVD software. SUMMARY: This budget MX delivered respectable performance and includes a great software bundle and DVD software. The card also has DVI-out, a nice extra for those with most digital monitors.
3	Asus V7100 Deluxe Combo 510/739-3777 www.asus.com	NEW	\$185	91	Good	Good	Excellent	FEATURES: 4X AGP, NVIDIA GeForce2 MX chip, 32MB of SDRAM, 350-MHz RAMDAC; 3D glasses, AV adapter, S-Video-in and -out, TV tuner, coaxial output; color-calibration, DVD, and image editing software. SUMMARY: This board rivals our top card's features and costs less. Dim lighting in two test games held it back.
4	ATI Radeon 64MB DDR 905/882-2600 www.ati.com	Apr 01	\$229	91	Very good	Very good	Very good	FEATURES: 4X AGP, ATI Radeon Chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; DVI-out, hardware DVD support, graphics editing software. SUMMARY: Another ATI card receives high honors due to strong DirectX 8 support and solid performance at higher resolutions; 64MB of fast DDR SDRAM packs an extra punch.
5	Hercules 3D Prophet II MX 877/484-5536 www.hercules.com	Mar 01	\$150	91	Excellent	Good	Good	FEATURES: 4X AGP, NVIDIA GeForce2 MX chip, 32MB of SDRAM, 350-MHz RAMDAC; E-Color 3Deep color calibration utility, five game demos. SUMMARY: Lacks features and software bundles of the third- and fourth-place cards, but stellar image quality and performance help it take fifth place.
6	ATI Radeon 32MB SDR 905/882-2600 www.ati.com	Feb 01	\$99	90	Very good	Good	Good	FEATURES: 4X AGP, ATI Radeon chip, 32MB of SDRAM, 350-MHz RAMDAC; no bundled software or hardware. SUMMARY: This \$99 bargain board is available only at smaller shops and online. There is no bundled software, but the card is the least-expensive model on our chart to offer DirectX 8 support.
7	Hercules 3D Prophet II GTS Pro 877/484-5536 www.hercules.com	Mar 01	\$350	89	Very good	Very good	Good	FEATURES: 4X AGP, NVIDIA GeForce2 Pro chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; PowerDVD, Hercules 3D Tweaker, E-Color 3Deep color-calibration software. SUMMARY: This card generated impressive image quality in Quake III and Unreal Tournament and posted speed scores near those of GeForce2 Ultras.
8	ELSA Gladiac MX 800/272-3572 www.elsa.com	Apr 01	\$139	86	Very good	Good	Satisfactory	FEATURES: 4X AGP, NVIDIA GeForce2 MX chip, 32MB of SDRAM, 350-MHz RAMDAC; DVD software. SUMMARY: ELSA Gladiac MX turned in stellar speed scores for an MX board, but image quality lacked polish in two of our games. Buyers can add three popular PC games at discount prices from the shopelsa.com site.
9	ELSA Gladiac GeForce2 GTS 800/272-3572 www.elsa.com	Feb 01	\$229	86	Satisfactory	Very good	Good	FEATURES: 4X AGP, NVIDIA GeForce2 GTS chip, 32MB of DDR SDRAM, 350-MHz RAMDAC; TV-out, no applications. SUMMARY: Image quality pales in comparison with that provided by NVIDIA GeForce2 Ultra and Pro boards. There are no bundled games, but you can pick up three from shopelsa.com for just \$20.
10	Matrox Millennium G450 800/361-1408 www.matrox.com	Mar 01	139	85	Very good	Good	Satisfactory	FEATURES: 4X AGP, Matrox G450 chip, 32MB DDR of SDRAM, 360-MHz RAMDAC; dual-monitor support. SUMMARY: While the Matrox didn't exactly excel in 3D performance, it had terrific image quality in our tests. And unlike the other cards on our Top 10 chart, it offers dual-monitor support.



Best Buy

For reviews of other new graphics boards that we tested this month, visit www.pcworld.com/t10graphics.

TEST HOW WE TEST We test graphics boards under Windows Me. Our performance scores are based on tests that we evaluate on frame rate (50 percent) and image quality (50 percent). We use GT Interactive's Unreal Tournament, Id Software's Quake III Arena, Interplay's MDK2 Demo, Infogrames' Test Drive 6, and the Caligari TrueSpace 4.2 Benchmark for both performance and image-quality testing. We test graphics boards in a Dell Dimension 4100 Series with a PIII-933 CPU and 128MB of PC133 SDRAM. To test each board, we use drivers supplied by the vendor. Overall rating is based on performance (42.5 percent), features (27.5 percent), price (20 percent), and support policies (10 percent).



LET THE GAMES BEGIN: ATI's \$299 All-in-Wonder Radeon card proves once again that the company has the goods to stay in first place—not to mention fourth and sixth. But boards based on

chips from rival NVIDIA claim nearly all the remaining spots. At press time, the rivalry took an interesting turn as NVIDIA's latest graphics chip, the GeForce3, hit the market. We'll review boards with this chip in the coming months.



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TOP 10 SCANNERS

	SOHO SCANNER	Month tested	Street price (2/21/01)	Overall rating	Scan quality	Scan speed (seconds per page)		Comments
						Black-and-white	Color ¹	
1	 Epson Perfection 1240U Photo 800/463-7766 www.epson.com	Mar 01	\$299	93	Good	20 @ 300 dpi	226 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 10.6-by-17.1-by-3.7-inch case, ² 6.2 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no automatic document feeder option. SUMMARY: This hot successor to Epson's Perfection 1200S offers good performance and creates crisp, colorful images.
2	Microtek ScanMaker 4700 800/654-4160 www.microtek.com	Dec 00 ³	\$199	92	Good	29 @ 300 dpi	263 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 11.4-by-20-by-4.6-inch case, ² 8 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no optional ADF. SUMMARY: Has 42-bit color, high resolution, quick-start buttons, and lots of software; can work with transparencies right out of the box.
3	Visioneer OneTouch 8800 USB 888/229-4172 www.visioneer.com	(NEW)	\$180	90	Good	23 @ 300 dpi	199 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 10.5-by-16.7-by-3.7-inch case, ² 5.8 pounds, 8.5-by-11.7-inch scanning area; no transparency adapter or optional ADF. SUMMARY: Speedy, 42-bit color unit sports a panel with seven quick-start buttons. But live tech support is a toll call and lasts a paltry 9 hours daily.
4	Canon CanoScan N1220U 800/652-2666 www.ccsi.canon.com	Dec 00 ³	\$199	90	Good	37 @ 300 dpi	298 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 10.1-by-14.7-by-1.3-inch case, ² 3.3 pounds, 8.5-by-11.7-inch scanning area; no optional transparency adapter or ADF. SUMMARY: Ultrathin color-image sensor unit produces good-quality images and comes with a strong selection of software, including robust OCR.
5	HP ScanJet 5370Cse 800/722-6538 www.scanjet.hp.com	Oct 00 ³	\$299	89	Fair	37 @ 300 dpi	243 @ 1200 dpi	FEATURES: Parallel and USB, ⁴ 1200 by 2400 dpi, 11.9-by-19.9-by-4.1-inch case, ² 10.7 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; ADF optional. SUMMARY: Has good black-and-white speed, two interface options, and four quick-start buttons, but overall scan quality is less than stellar.
6	Agfa SnapScan E50 888/281-2302 www.agfahome.com	Oct 00 ³	\$179	88	Good	60 @ 300 dpi	416 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 13.3-by-19.7-by-3.7-inch case, ² 14.5 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no optional ADF. SUMMARY: With high resolution and four quick-start buttons, this flexible unit delivers good-looking reflective and transparent scans.
7	Microtek ScanMaker V6USL 800/654-4160 www.microtek.com	Oct 00 ³	\$129 ⁵	88	Good	50 @ 300 dpi	82 @ 600 dpi	FEATURES: USB and SCSI, ⁶ 600 by 1200 dpi, 11.8-by-21.5-by-3.2-inch case, ² 11.5 pounds, 8.5-by-14-inch scanning area; includes transparency adapter; no optional ADF. SUMMARY: Legal-document-capable model offers small transparency unit plus SCSI card/cable combo. The USB/parallel port unit has the same price.

CORPORATE SCANNER

1	 Microtek ScanMaker 8700 800/654-4160 www.microtek.com	Mar 01	\$1000 ⁵	94	Excellent	29 @ 300 dpi	83 @ 1200 dpi	FEATURES: IEEE 1394 and USB, ⁷ 1200 by 2400 dpi, 22.3-by-15.25-by-6.3-inch case, ² 25.5 pounds, 8.5-by-14-inch scanning area; built-in transparency adapter; ADF optional. SUMMARY: Costly, but offers great scan quality and blazing performance. This legal-size model also creates superior transparent scans.
2	Microtek ScanMaker 5700 800/654-4160 www.microtek.com	(NEW)	\$450 ⁵	93	Good	29 @ 300 dpi	88 @ 1200 dpi	FEATURES: IEEE 1394 and USB, ⁷ 1200 by 2400 dpi, 11.4-by-19.7-by-4.5-inch case, ² 10.4 pounds, 8.5-by-11-inch scanning area; built-in transparency adapter; ADF optional. SUMMARY: This affordable alternative to the higher-end ScanMaker 8700 is speedy, but scan quality falls a hair below the 8700's.
3	Epson Perfection 1640SU Office 800/463-7766 www.epson.com	Jan 01	\$499	92	Good	17 @ 300 dpi	423 @ 1600 dpi	FEATURES: USB and SCSI, ⁶ 1600 by 3200 dpi, 11.4-by-17.4-by-9.2-inch case, ² 14.8 pounds, 8.5-by-11-inch scanning area; includes ADF; transparency adapter optional. SUMMARY: 1600-dpi, 42-bit-color powerhouse is an all-around performer with sharp scan quality. A \$299 version omits the ADF.

For expanded reviews of this month's scanners, visit www.pcworld.com/t10scanners.

HOW WE TEST All scanners are tested with default settings under Windows 98 on a Gateway GPT-550 (Pentium III-550) PC with 128MB of RAM, using each unit's bundled software. Overall score is based on image quality (25 percent), speed (SOHO 22 percent; corporate 25 percent), ease of use (SOHO 17 percent; corporate 10 percent), features (SOHO 16 percent; corporate 20 percent), support (10 percent), and price (10 percent). Speeds are timed from start of scanning until cursor control is regained. Data based on tests designed and conducted by the PC World Test Center. ¹ At unit's maximum optical resolution. ² In order: width, depth, height. ³ Online-only chart. ⁴ Tested with USB interface. ⁵ Priced with SCSI or IEEE 1394 adapter. ⁶ Tested with SCSI interface. ⁷ Tested with IEEE 1394 interface.



TWO NEW SCANNERS join our mix of solid contenders. On the SOHO chart, the Visioneer OneTouch 8800 USB offers improved color scan quality over previously reviewed OneTouch scan-

ners, while maintaining the line's reputation for speedy scans. For corporate buyers who can't afford to spend \$1000 for the higher-quality Microtek ScanMaker 8700, the ScanMaker 5700 strikes a good balance between features and price. ▶



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TOP 10 DIGITAL CAMERAS

	CAMERA: \$500 AND OVER	Street price (2/16/01)	Overall rating	Image quality	Ease of use	Battery life/shots	Comments
1	 Epson PhotoPC 3000Z 800/463-7766 www.epson.com	\$899	89	Very good	Excellent	Excellent/ 299	FEATURES: 3.3-megapixel resolution, 16MB CompactFlash media, 34-102mm focal range; serial, USB, and video output; 16.1 ounces. SUMMARY: Easy to use, produces impressive images, has manual exposure controls, records video clips and audio, and holds second-longest battery life on the chart; 24/7 tech support.
2	Nikon Coolpix 880 800/645-6689 www.nikonusa.com	\$699	86	Very good	Adequate	Very good/ 227	FEATURES: 3.34-megapixel resolution, 8MB CompactFlash media, 38-95mm focal range; serial, USB, and video output; 11.2 ounces. SUMMARY: Small and light; many exposure and control options, but extensive menus can be confusing; good choice for a serious digital photographer who travels frequently.
3	Kodak DC4800 800/235-6325 www.kodak.com/go/dc4800	\$599	82	Very good	Adequate	Good/ 171	FEATURES: 3.1-megapixel resolution, 16MB CompactFlash media, 28-84mm focal range; serial, USB, and video output; 11.4 ounces. SUMMARY: Superlative images and versatile exposure settings, but no manual focus, audio recording, or video recording. Another \$100 price drop this month.
4	Sony Cyber-shot DSC-P1 800/222-7669 www.sony.com/di	\$799	82	Good	Excellent	Adequate/ 115	FEATURES: 3.34-megapixel resolution, 8MB Memory Stick media, 39-117mm focal range; USB and video output; 8.8 ounces. SUMMARY: Pocket-size, innovative design; easy-to-use controls and menus; creates MPEG movie clips; optional underwater case good down to 100 feet; ideal for trendy snapshooters.
5	Casio QV-2300UXplus 800/435-7732 www.casio.com	\$699	81	Good	Very good	Good/ 196	FEATURES: 2.1-megapixel resolution, 340MB Microdrive media, 41-123mm focal range; serial, USB, and video output; 12.1 ounces. SUMMARY: Huge photo capacity with a 340MB Microdrive; handy rotating lens, video mode, manual controls, and easy panorama shots, but lacks an optical viewfinder.
CAMERA: UNDER \$500							
1	 Fujifilm FinePix 1300 NEW 800/800-3854 www.fujifilm.com	\$234	81	Good	Good	Excellent/ 366	FEATURES: 1.31-megapixel resolution, 8MB SmartMedia card, 36mm focal length; USB output; 10 ounces. SUMMARY: With lowest price on the chart, model is a bargain for a 1.3-megapixel unit; boasts sharp images, outstanding battery life, and simple controls; support limited to 12 hours per day.
2	Kodak DC3400 NEW 800/235-6325 www.kodak.com/go/dc3400	\$389	79	Very good	Good	Good/ 172	FEATURES: 2.1-megapixel resolution, 8MB CompactFlash media, 38-76mm focal range; serial, USB, and video output; 15.7 ounces. SUMMARY: Best images we've seen from an under-\$500 camera, and a low price for a unit with zoom; great all-around point-and-shoot, but somewhat bulky; no tech support on weekends.
3	Olympus Camedia D-360L 888/553-4448 www.olympusamerica.com/digital	\$279	78	Adequate	Good	Limited/ 44	FEATURES: 1.3-megapixel resolution, 8MB SmartMedia card, 36mm focal length; serial and video output; 9.1 ounces. SUMMARY: Feature-rich for the price, with adjustable white balance, manual focus option, and panorama mode, but battery life is much too brief, and image-quality settings are confusing.
4	Fujifilm FinePix 2400 Zoom 800/800-3854 www.fujifilm.com	\$379	77	Good	Adequate	Very good/ 259	FEATURES: 2.1-megapixel resolution, 8MB SmartMedia card, 39-114mm focal range; USB output; 12.1 ounces. SUMMARY: Relatively inexpensive for a camera with zoom, compact point-and-shoot case, and above-average image quality; menu controls could be better; support limited to 12 hours per day.
5	HP PhotoSmart 618 800/752-0900 www.photosmart.com	\$499	77	Good	Good	Good/ 199	FEATURES: 2.1-megapixel resolution, 16MB CompactFlash media, 34-108mm focal range; USB, IRDA, and video output; 10.6 ounces. SUMMARY: \$100 price drop moves model to the sub-\$500 chart. Lets user add audio memos, has manual exposure controls, and can send images directly to some HP printers with infrared.
 Best Buy  For expanded reviews of this month's digital cameras, visit www.pcworld.com/t10cameras .							

HOW WE TEST Each camera's overall rating is based on price (30 percent), picture quality (20 percent), ease of use (15 percent), features (15 percent), battery life (10 percent), and support (10 percent). For all ratings, higher is better. To gauge picture quality, we take a series of shots, with and without flash, at 640 by 480 resolution and at the camera's highest resolution. We take pictures of a complex still life to see how well each camera captures color and image details, and of a mannequin to see how well it captures subtle coloring and skin tones. A panel of judges reviews the on-screen and printed photos and assigns image-quality scores; we then average the judges' scores. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. ¹35mm film equivalent.



IT'S THE ATTACK OF the point-and-shoots: New models from Fujifilm and Kodak take over the top of our sub-\$500 list. Fujifilm's FinePix 1300 is light and slim, and produces shots you'll

be happy to share. Kodak's chunky, simple-to-operate DC3400 beat all comers in image quality among cameras under \$500. Another Kodak, the pocket-size DC3800, missed the chart (too pricey), as did Ricoh's RDC-6000 (subpar images).



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"Customer care is the focus here at C I Host, and that means that we are constantly seeking to provide the best service and programs, as soon as new technology becomes available," notes Christopher Faulkner, CEO and founder of C I Host, headquartered in Bedford, Texas.

Outstanding customer care has propelled C I Host from its roots in 1995 as a bootstrapped, college-dorm-room start-up providing local hosting in the Dallas-Fort Worth area, to the Tier 1 host it is today. C I Host owns and operates three telco-grade data centers across the United States, offering its customers robust security, reliability, and availability. In addition to Web hosting, C I Host continues to expand its services to keep pace with the needs of its customers and the information economy, offering e-business solutions, managed dedicated servers, integrated co-location, application hosting, advanced hosting, dedicated Internet connectivity, custom Web development, professional services, and domain registration.

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C I Host is dedicated to providing its customers everything they need, when they need it, for the best price. For e-businesses, C I Host offers the E-Business Starter Kit, providing everything you need "in a box"—a custom-designed Web site and shopping cart, 12 months of hosting, credit-card transactions conducted



in C I Host's secure environment, domain name registration, and more—all for a one-time fee of \$299. And you own the design after the initial 12 months.

A big part of giving customers everything they need is giving them access to the people they need, around the clock. C I Host's Monster Chat, for example, lets you chat in real time with both support technicians and sales reps. So whether you need experienced technical help or want to sign up for a C I Host service, you can get it anytime, anywhere. And because C I Host is dedicated to staying at the cutting edge of technical advancements, access is not just limited to your computer's browser. As one of the first Web hosters to support Virtual Markup Language, C I Host's sites can all be accessed through Wireless Application Protocol (WAP) devices such as cell phones and PDAs.

"Pairing our experienced staff with exclusive online tools gives unrivaled power to our customers," says Faulkner.

That power translates to competitive advantage for C I Host's customers, giving them better tools to run their e-businesses. Perhaps that's why C I Host has the lowest "churn rate" in the industry—once you're a customer you tend to stay—or why C I Host for the past 33 months has consistently ranked among the top five Web hosting companies out of 16,000 around the globe by CNET's Ultimate Web Host List, HostIndex.com, and Web Host Directory.

Or perhaps it's because if you're a C I Host customer, whether a Web novice or an expert, you know that C I Host will be there for you whenever you need it.





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If extra-terrestrials looking for high-performance PCs approach you with the order, "Take me to your leader," you'd do well to guide them to Alienware Corporation. Just look at some of the comments customers have posted on Alienware's web site:

"I just want to thank you for such a well-built product," says Marty. "My new Area 51 computer is truly 'all that and a bag of chips'... I will be referring your excellent company to my friends who are looking for a computer system that is a cut above the rest."

Another user, David Shor, writes, "Thank you, guys, for building the best system money can buy! There are no false claims about performance level. The machine I got from you just smokes."

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"Alienware, you are supreme," gushes Jack Powell. "I am now on my second Alienware system.... I fell in love with the first and am now in love with this one. There is no better-built computer on the market, and the components are absolutely cutting-edge.... I wouldn't consider buying a computer system from someone else."

"I have never had the pleasure of using a machine that was built to such perfection," Mario Viscardi adds. "The speed of the machine is amazing!"

Users aren't the only ones enthusiastic about Alienware's computer systems. "Alienware's top-of-the-line system packs a lot of brand-name punch into a reasonably priced package," writes *PC Gamer*, which has given Alienware its Editor's Choice award every year for the past three years. Alienware also won *Maximum PC*'s "Kick-Ass Award" and was described by that magazine as "the fastest PC we've ever seen, bar none!"



Alienware's success is due in part to its vision of building high-performance computer systems that go beyond word-processing and net-surfing capabilities to include full-blown multimedia options. The company strives to use the latest 3D accelerators and the best hardware possible, allowing users to custom-configure their systems by choosing the best brand-name components.

The South-Florida-based company, which was recently named a Microsoft System Builder Gold Member, prides itself on its customer service and support, which is also praised by its customers.

"The minute I began talking to your service reps, I knew I was in good hands," explains Michael Cooke. "They made me feel confident in the product I was purchasing, offered suggestions, and gave their input on the hardware.... Keep up the good work and keep setting the standards for what should be expected from any company."

Abraham Egnor says, "I love you guys. I sent you a message about losing the Software DVD player. I expected to get a reply sometime this week, maybe asking me for more info. Instead I got a reply the next day, with the software attached. Two words: jaw droppage. And it works. I'm not used to things going this well, especially where computer problems are concerned."

High performance, service, and support. It's no wonder many consider Alienware "out of this world."



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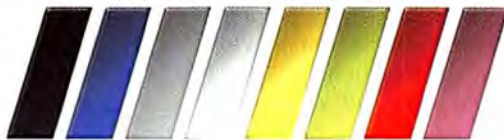
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PC AMERICA: INVENTORY MANAGEMENT AT POINT OF SALE

www.pcamerica.com

While many motorists in Dimondale, Mich. say the family-owned Windmill Truck Stop is a home away from home, its controller, Kevin Edelmann, says it's been more like a house of accounting horrors. Besides monitoring retail fuel sales in the truck stop's "truckers only" area, he also has to keep an eye on commuters' and travelers' purchases in the king-sized complex's convenience store, family restaurant, motel, and auto service center. "Keeping track of all of that inventory has been a nightmare," Edelmann says.

The Point of Sale (POS) system that the Windmill had been using since 1982 did a fine job of ringing up sales, but it couldn't tell store managers anything about what was on the shelf. "The system only broke sales down by department," Edelmann says. "So it couldn't tell the difference between a tube of toothpaste and a bottle of shampoo."

Edelmann found only a few POS solutions that were easy to use, Microsoft Windows-based, and able to support multiple input devices. And none of them could manage the 20,000-plus items in the Windmill's convenience store and restaurant. "We desperately needed a solution that could bring all of these components of our business together," he says.



PC AMERICA

Things finally turned around at the Windmill once Edelmann deployed PC America's Cash Register Express (CRE 2000), a Windows-based POS program that works with ordinary PCs and peripherals, as well as barcode scanners, receipt printers, and pole displays (which show charges at the checkout counter). Now all of the Windmill's cashiers can use touch screens and barcode scanners to enter orders and update inventory. And setting up CRE 2000 could not be easier, says Edelmann. "PC America did



The home page for PC America speeds you to the point-of-sale products you need.

an excellent job pulling all of the hardware together initially. But the great thing about their software is that I can grab any component I want off the shelf and throw it together in no time. This is one slick program."

The Windmill has processed more than half a million transactions with CRE 2000 and PC America's Restaurant Pro Express (RPE 2000) since October 1999. And Edelmann predicts that PC America will continue to develop the software he needs to keep things running smoothly. "PC America is constantly improving upon their products," he says.

Now PC America is helping retailers like the Windmill to move beyond the sale itself to increase revenues. A new feature in CRE 2000 gives businesses the ability to print coupons on the bottom of sales receipts on an Epson TM-T88II receipt printer. They can use the coupons to advertise specials on slow business days (e.g., "10 Percent Off All Purchases Every Tuesday"), or to give their customers discounts on overstock items (e.g., "Get a Free Six-Pack of Pepsi on Your Next Visit").

CRE 2000's couponing feature promises retailers an excellent route to a crucial dimension in retail sales. "Repeat business is the most important aspect of any business," says PC America's president, Howard Gosman. "With this addition to our POS package, we are giving our customers a quick and easy-to-use method for creating it."



Cash Register Express Software for Windows...\$495

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All PC America Software requires Microsoft Windows. The software was written in Visual Basic using Microsoft Access Files. The source code is available.

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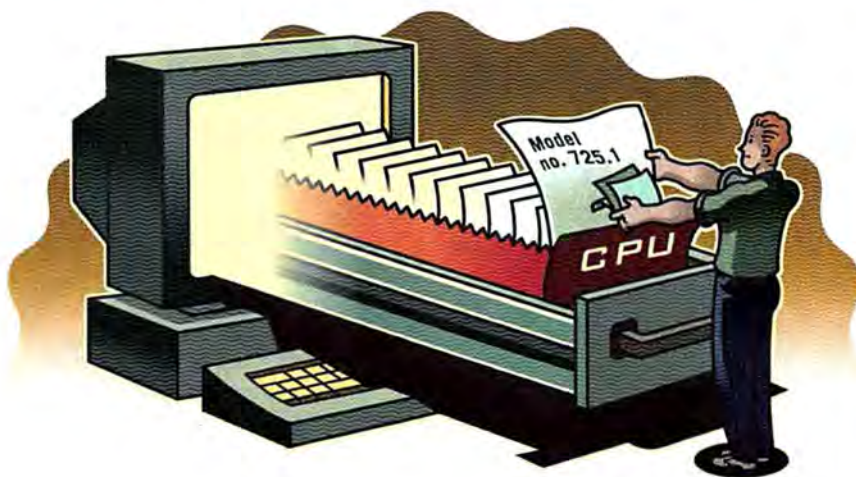
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HERE'S HOW



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That's why you keep all your serial numbers, customer numbers, technical support ID, and vendor Web addresses and phone numbers handy, right? Windows provides a convenient place to stash this information

for quick reference—My Computer's Properties sheet (aka System Properties). Thanks to Virgil Wall of Los Angeles for telling us how to customize the sheet to add the information we need most.

Start by opening the oeminfo.ini file in Windows' System folder (or System32 for Windows NT). You may someday want to

revert to the current settings, so copy this file to another folder to keep as a backup. If you don't see oeminfo.ini, don't worry; you can make your own. Double-click the file to open it in Notepad or your default text editor. (If the file's not there, just open a new file in your text editor.) All .ini files, including oeminfo.ini, put the sec-

tion heading names in brackets [like this].

Customize your Properties text: The first section to edit is the one with the [General] heading. If you are starting out from scratch, type [General] and press <Enter>. On the new line type Manufacturer=, and on another new line type Model=. These lines were intended to display information about your computer and who manufactured it, but you can use them to hold any information that you are likely to need. You have room for only a short phrase, though, so choose carefully. For example, you could put your computer's serial number on the first line and the vendor's tech-support number on the second. (This and other points about entering support information are illustrated in FIGURE 1.)

Customize your Support Information: Now type [Support Information] on a new line (or replace the third line in the preexisting oeminfo.ini file with this exact text). Begin the next line under the new heading with Line1=, the second with Line2=, and so on. Following the equal sign on any of these lines, add other pertinent system information, such as invoice numbers, dates of purchase, and length and conditions of warranties. Keep each line short enough to avoid having to use the dialog box's horizontal scroll bars. To add a space between lines, type a line number, but keep the area to the right of the equal sign empty. You can create an indent by enclosing everything after the equal sign in quotation marks and then adding spaces inside the quote marks to move text to the right.

Add a graphic: By adding a graphic with useful information to the System Properties sheet, you can avoid having to open the Support Information dialog box. First, make sure you have an oeminfo.ini file as explained above. Next, use Microsoft Paint or another bitmap-editing program to create a picture measuring about 172 by 172 pixels. (Your mileage may vary; on one

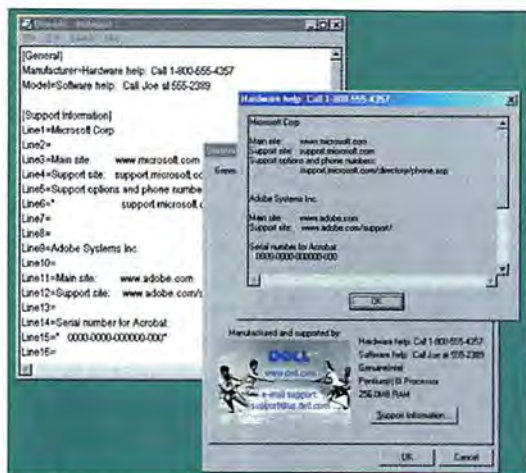


FIGURE 1: KEEP YOUR SYSTEM INFORMATION HANDY by storing it in Windows' convenient System Properties sheet.

Dell system I tested, the largest available size was 169 by 112 pixels.) This graphic adds pizzazz, but to make it really useful, type in some information you may need to refer to—such as vendor contact numbers or product IDs. Save the graphic as a 256-color bitmap (.bmp) file with the name *oemlogo.bmp* in Windows' System folder (or System32 for Win NT or 2000).

Take a peek: When you're done, you'll see your changes immediately: Right-click *My Computer* and choose *Properties*. The Manufacturer= and Model= information you just added should be listed. Windows 9x/Me users will see a new graphic and a button named *Support Information*. Click it to see the information you typed under the [Support Information] heading.

Troubleshoot: If you don't see your picture, your custom text, or the *Support Information* button, retrace your steps. The button that opens the *Support Information* dialog box will not appear in the System Properties sheet unless your *oeminfo.ini* file has both the [General] and [Support Information] section headings. And the picture won't appear unless you have an *oeminfo.ini* file with at least the [General] section. Also check the numbering of your Line#= lines under the [Support Information] heading; they need to be in sequence, beginning with Line1=.

Be creative: System and support information may be the most logical text to insert in these areas, but you can stash the birthdays of your favorite professional wrest-

lers there if you want. More practically, you can stash clues to those passwords you keep forgetting. For best security, don't store the passwords themselves here, just hints that will jog your memory.

SEE YOUR DESKTOP FILES IN A FOLDER WINDOW



IF YOU WANT to see the files on your Windows desktop in a folder window, you could create a shortcut to the Desktop folder, but if you need only an occasional peek at them, there's a better way. Choose *Start>Run*, type a period in the Open box, and then press <Enter>

(see **FIGURE 2**). To do this with your keyboard, press <Ctrl>-<Esc>, type R, press <Enter>, type a period, and press <Enter> again. (Note: If other entries on your Start menu begin with the letter R, keep pressing R until Run is highlighted.) If your keyboard has a <Windows> key, just press <Windows>-R, type a period, and press <Enter>. The window this opens doesn't show Windows' special desktop icons (such as My Computer, Network Neighborhood, and Recycle Bin), but it does show all the shortcuts, files, and folders you placed there yourself.

Here's another quick tip: If you want a fast way to open the Windows folder, select *Start>Run* and type .. (two periods). (If the folder is set to be viewed as a Web page, you may have to click *Show Files* before you can see the folder contents. To fix this, see "Unhide Files in the Windows Folder," www.pcworld.com/heres_how/unhide.) **Note:** If you follow the preceding steps in Windows NT and 2000, your screen will display the root of your hard drive rather than a window to the Desktop or Windows folders.



FIGURE 2: ONE OR TWO PERIODS in the Run box will open your Desktop or Windows folder.

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ANSWER LINE

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UPGRADE GUIDE

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IS YOUR PRIVACY AT RISK on the Internet? Find out how to protect yourself at www.pcworld.com/may2001/threats.

ADD EDITABLE TEXT TO YOUR BITMAP IMAGES



DO YOU SOMETIMES receive faxes on your computer or photos via e-mail that you need to comment on and return, or forward to someone else? Or perhaps you've created a simple slide show, as explained in last month's column (www.pcworld.com/april2001/slides), and now you want to add text to serve as titles or to provide promotional or instructional information. If you don't have a graphics program with capable text or annotation features, you can use the annotation tools in Windows' Imaging program. Its tools are far superior to Microsoft Paint's for editing text and other graphic objects without damaging the underlying bitmap image.

To launch Imaging, choose *Start>Programs>Accessories>Imaging*. If you don't see Imaging on the menu, you can install the program: Choose *Start>Settings>Control Panel*, double-click *Add/Remove Programs*, and click the *Windows Setup* tab. Select *Accessories* and click *Details*. Check the box next to *Imaging*, click *OK*, and follow the prompts on screen. If you use Windows 95, you may have to download Imaging from Microsoft (unfortunately, this ►

version is not as functional as the version for later flavors of the OS). Go to www.microsoft.com/downloads/search.asp and search for **Imaging** using the Keyword Search feature. Be sure to specify Windows 95 as the operating system.

Choose **File•Open** to add text to an existing image; or choose **File•New**, and on the New Blank Document dialog box's **File Type** tab, select **TIFF Document (TIFF)**. Click the **Color** tab and select **256 Colors** or **True Color (24 bit)**. Next, click the **Size** tab, choose **Custom** from the bottom of the Size drop-down list, and select **Pixels** from the Units drop-down list. For Width and Height, specify a size that matches your screen resolution. (If you're not sure what that is, right-click the desktop and choose **Properties**. Click the **Settings** tab and look for the dimensions of your screen area in pixels; 800 by 600 and 1024 by 768 are common examples.) Now click **OK**. Choose **File•Save As**, and make sure **TIFF Document (*.tif)** is selected in the 'Save as type' drop-down list. Saving in the TIFF format lets you edit the text and graphics you add without ruining the underlying image. It also enables the annotation tools you'll need for adding text.

Now use the annotation toolbar to add text to your image. If you don't see it, choose **View•Toolbars**, check **Annotation**, and click **OK**. (For older versions of Imaging, try **Annotation•Show Annotation Toolbox**.) Set the properties of the drawing and text controls to the font and color of your choosing: Right-click any button, choose **Properties**, adjust the settings, and click **OK**. Select the text tool, drag to create a



FIGURE 3: WINDOWS' IMAGING UTILITY lets you add editable text to any bitmap image.

box that's large enough for one or more lines of text, and then begin typing. You can use the other tools to add boxes, lines, and free-hand shapes. The Annotation Selection tool (the plain pointer) moves, resizes, and deletes objects (see **FIGURE 3**). Newer versions of Imaging let you edit text added previously by double-clicking it, which returns you to text-editing mode. In older versions, you must select the text box, delete it, and then create the desired text.

The editable text saved with images in the TIFF format may not show in the preview area of Explorer folders (depending on your version of Windows) or in Windows Me's slide-show mode. You have to "burn" the text and other objects onto the image. Save the editable TIFF file in a separate folder for future updates, then choose **Annotation•Make Annotations Permanent** to burn the text in. Now choose **File•Save As** and save this burned-in version with your other slides. The TIFF format is preferable to the BMP format because it's more compressed. Use the fax format (AWD) only if you're merely marking up a black-and-white image; AWD doesn't preserve color and doesn't work with Windows Me's slide-show mode.

DELETE WINDOWS INSTALL FILES

I NOTICED THAT my Windows 98 installation includes two copies of ScanDisk—one under Windows\Options\Cabs, and one under Windows\Command. Why the duplication?

Sam Prater, Rockport, Texas
PROBABLY BECAUSE your version of Windows was preinstalled by the computer maker or reseller. As a result, it's not uncommon to see all the installation

WINDOWS TOOLBOX

Get Total Control of Your Monitor

DO YOU FREQUENTLY run to your Desktop's Properties sheet to change screen resolution or tweak your monitor's color and brightness controls? Would you like to



activate your screen saver via a keyboard shortcut or toolbar? If so, you'll be interested in EnTech Taiwan's PowerStrip for Windows. This utility provides a floating toolbar for adjusting many basic monitor functions, but it also allows you to access these features via your keyboard or a pop-up menu from the system tray (the taskbar area with the clock). PowerStrip offers one-stop control for all graphics-adaptor and monitor functions, plus a few others (such as speeding up your mouse's refresh rate). Registration is \$30. PowerStrip is available from PCWorld.com's Downloads or from the developer's site at www.entechtaiwan.com/ps.htm.

files for Windows sitting on your hard disk, doing very little unless you frequently install or uninstall Windows components. If you have a Windows installation CD-ROM, these files are wasting 200MB or more of hard disk space.

So what should you do? First, make sure that you have a CD-ROM containing your current version of Windows. If you do, you may safely proceed to delete everything in the Windows\Options folder, including the Cabs folder. The next time that you need to install a Windows component, Windows will prompt you for the location. At that point, you can type in the path to the appropriate folder on your CD-ROM drive (or you can click **Browse** and navigate to the folder). Your hard disk will breathe a lot easier!



Find files in this article at www.pcworld.com/downloads, and find more tips at www.pcworld.com/heres_how. Windows Tips pays \$50 for published tips and questions. Scott Dunn is a contributing editor for PC World. ■

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YOUR QUESTIONS ON: Cleaning up the Registry ♦ Printing file associations

Move Your Old Drivers to a New Computer

Easier Multiple Associations

AFTER READING "One File Type, Two Associations" (*Answer Line*, December 2000), Jonathan Schwartz of Burlington, Connecticut, sent us another way to launch one type of file with more than one application: the SendTo folder. Put shortcuts to alternate programs into your C:\Windows\SendTo folder (copy them from the Start menu). The file will still load with the application associated with its file type when you double-click it, but now you can right-click it and select *Send To* to open it with some other program.



I WANT TO upgrade my computer but keep my old monitor, modem, and sound card. I don't have the disks that came with these. Where I can find the drivers for these peripherals?

Wilber Hernandez

West New York, New Jersey

YOU'LL FIND THE files you need in your C:\Windows\System, C:\Windows\Inf, and C:\Windows\Help folders. Unfortunately, separating these files from the rest of those folders' content is a long, boring, and near-impossible procedure.

So don't do it. Instead, copy the complete contents of these folders (probably about 100MB) from your old computer to a single folder on your new computer. Call the new folder **C:\drivers**. And don't worry about wasting space—you won't have to keep that folder for long.

Once you've transferred the old files and hooked up the old peripherals to your new computer, get your system running, right-click *My Documents*, and select *Properties*. Click the *Device Manager* tab. Now examine the listing for each type of device you've retained from the old computer. If the device does not have the correct name—for instance, if your display adapter is identified as 'VGA Monitor'—or if it has a yellow question mark/exclamation point icon (see **FIGURE 1**), then you will need to install the old driver.

Double-click the device's listing to bring up the device's properties. Then click the *Driver* tab, followed by the *Update Driver* button. The resulting wizard will ask, "What do you want Windows to do?" Select *Search for a better driver*. When the wizard asks where to search, check *Specify a location*, then uncheck any other checked options, and enter **c:\drivers** in the location field. Follow the rest of the wizard, answering each question according to your

best judgment.

Once you have the drivers for your old devices in place, you can delete the C:\drivers folder.



REMOVE UNINSTALLED APPS FROM WINDOWS' REGISTRY



MY WINDOWS REGISTRY contains several references to programs that were uninstalled long ago. How do I clean the Registry of this leftover garbage?

William G. Ingersoll, Shalimar, Florida

WHEN UNINSTALL routines remove a program, they leave a lot of junk behind—much of it in Windows' Registry. The programs appear to be written by programmers who believe that no one would really want to remove their program.

Several utilities—some commercial, some shareware, and some free—purport to clean the Registry, but I have yet to find one that is able to remove every reference to an uninstalled program.

Before you remove anything from your

Registry, back it up. See my May 2000 column, "Protect Yourself Against Catastrophic Installs" (www.pcworld.com/may00/al), for step-by-step instructions.

In my experience, no third-party Registry cleaner gets out as many references to uninstalled programs as Microsoft's own free RegClean does. You can get RegClean from PCWorld.com's Downloads. The program is simple, but it does the job. Launch it, and it checks the Registry; click a button, and it fixes any errors it finds.

Of course, you could always choose to clean the Registry manually. This is a lot of work, however, and it could also be very dangerous—which is all the more reason to back up your Registry. If you'd like to try the manual approach, select *Start>Run*, type **regedit**, and press **<Enter>**. With the Registry Editor open, press **<F3>**; enter the name of an uninstalled program; and be sure that *Keys*, *Values*, and *Data* are all checked. Next, press **<Enter>**, and when the search stops at a listing, press **<Delete>**. You'll have to select *Yes* to verify that deleting the entry is okay. Then press **<F3>** again to find the next listing.

Once you've completed your spring cleaning, you may be surprised to discover that the two files that make up the Registry, *system.dat* and *user.dat*, are exactly the same size they were before. To shrink the files, you have to optimize the Registry. The best way to accomplish this varies depending on the version of Windows that's running on your machine.

Windows 95: Begin by launching Notepad



FIGURE 1: NEW PC, OLD PERIPHERALS: System Properties shows the drivers you must reinstall.

A new IE title bar ♦ Disconnect dialogs, take two ♦ An alternative media player

Hunt Down Those Hackers and...Ignore Them?

Synchronize Those Bookmarks

NOW YOU CAN COMBINE your Netscape Navigator Bookmarks and Internet Explorer Favorites. The free BookmarkSync service automatically synchronizes your bookmarks and favorites—even those you store on a Macintosh or Palm PC. You can edit your single, synchronized list online and also share your lists and files with friends. Download the 365KB client from PCWorld.com's Downloads or from www.bookmarksync.com and install it on each computer whose bookmarks you want to get a handle on.



I USE ZONE LABS' ZoneAlarm firewall freeware on my PC. Occasionally ZoneAlarm sends a message saying it blocked a remote computer from accessing my PC. It then lists an IP address and a TCP port, followed by four digits. Is there a way to find out to whom the IP address refers?

Jack Lozano, Tigard, Oregon
SOMETIMES IT'S worthwhile to track down miscreants who probe your computer from afar, but most of these "attacks" are benign. Running firewall software such as Network ICE's BlackICE Defender, ZoneAlarm, or Symantec's Norton Internet Security is almost always sufficient protection—although it's not as safe as disconnecting your computer from the Internet and switching off the power.

I'm not joking. If you want to ensure that crackers—Internet break-in artists—can't probe your PC's ports, you have to either physically disconnect the phone or network line running into the PC, or shut off the computer's power. (You also have to make sure that the computer's Wake-on-LAN BIOS setting, if any, is disabled.)

There's nothing illegal about people scanning your computer's ports, and not every scan is evidence of a cracker at work. Many of the most common port scans are routine checks for server software that doesn't even exist on most Windows computers. For example, your ISP may routinely scan your system to make sure you're not running servers that are disallowed under the company's terms of service. Other scans may be completely innocent as well, like the cable-modem user next door trying to install remote-control software such as PCAnywhere, or a scan by another

computer on your local network. It could even be coming from your own system. **FIGURE 1** shows BlackICE's list of port scan source addresses.

The domain names or IP addresses your firewall displays as the source of the remote scan may also be forged (or *spoofed*, in network parlance). Though you can report the probe to the administrator of the domain listed, it's very possible that the scan originated elsewhere. It could also be that the source address listed is genuine, but the machine doing the scanning has been taken over by a Trojan horse program implanted by a cracker.

In most cases, your PC is just one of thousands of machines the person at the remote address (spoofed or not) is scanning using an automated tool. The scanner is rarely looking for a PC running Windows, because such systems aren't that interesting to crackers. They're more interested in exploiting buggy server software to download a vulnerable trove of



passwords or steal credit card numbers.

If you run Windows versions of server software for the FTP, POP3 (the most common e-mail server), IMAP4 (another e-mail server type), NNTP (network news transport protocol), RPC (remote procedure call), or other protocols, you have to guard against hack attacks. Turn off your computer and read *Administering Web Servers, Security & Maintenance* by Eric Larson and Brian Stephens (Prentice Hall PTR, 2000, \$42), which is one of several good books on Internet server security. In fact, you can get a lot out of the book even if you don't run those server types.

If you are the target of prolonged attacks against TCP or other services running on your computer, notify the administrator of the offending domain. You can read more about TCP port probes on Network ICE's Web site at advice.networkice.com/advice/intrusions/2003102. You could also try sending a brief e-mail to abuse@domain or security@domain, where *domain* is the domain name used by the attacker. For example, if you get repeated TCP probes from a computer identified as crackerbox.crackerdomain.com, you might want to send out a quick heads-up to abuse@crackerdomain.com. Even if the source address turns out to be spoofed, the administrator at crackerdomain.com will likely want to know that someone is using the domain without authorization. ▶

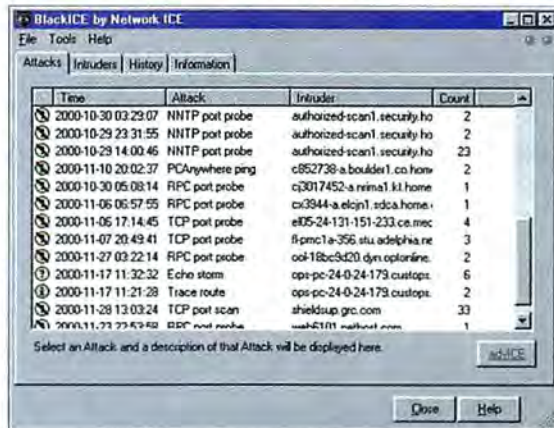


FIGURE 1: SORT SERIOUS FIREWALL attacks from the not so serious by noting the type of attack and the source address.

Aaaahhhh!

[This is what you sigh after
you designed your web pages
faster, easier, and for less\$ by
going to **ulead.com** first]



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CREATIVE INTELLIGENCE

DE-BRAND, RE-BRAND INTERNET EXPLORER

TIRED OF HAVING your browser window running an animated logo of an ISP you bailed out of last year? Wish your browser's title bar didn't reveal that you are—gasp!—an AOL user? It's easy to return Internet Explorer to its native, nonbranded state. All you do is choose *Start•Run*, type `rundll32.exe iedkcs32.dll,clear` in the Open field, and press **<Enter>**.

But how about creating your own personal browser branding? Doing so entails editing the Registry, so be sure to make a Registry backup beforehand. For instructions on backing up the Registry, see the May 2000 *Answer Line*, "Protect Yourself Against Catastrophic Installs" (www.pcworld.com/mayoo/al).

Once you have your Registry backed up, select *Start•Run*, type `regedit` in the Open field, and press **<Enter>** to launch the Registry editor. Press **<Ctrl>+F**, type **BrandBitmap** in the 'Find what' field, and press **<Enter>**. The search should land on the key `HKEY_CURRENT_USER\Software\Microsoft\Internet Explorer\Toolbar\BrandBitmap`. Double-click the key in the pane on the right to open the Edit String dialog box. Edit the path in the Value Data field so that it points to the bitmap image of your choice. Click **OK**, and repeat the steps for the `SmBrandBitmap` and `BackBitmap` keys. If the keys don't exist, you'll need to create them by navigating to the `HKEY_CURRENT_USER\Software\Microsoft\Internet Explorer\Toolbar` key, right-clicking in the right-hand pane, and choosing *New•String Value*. Create a 38-by-22-pixel, 11-frame animated .bmp file for the `BrandBitmap` key; a 22-by-22-pixel, 31-frame image for the `SmBrandBitmap` key; and any small, low-contrast image for the `BackBitmap` key. To customize Internet

Explorer's window title text, navigate to or create the key `HKEY_CURRENT_USER\Software\Microsoft\Internet Explorer\Main\Window Title`, double-click it, and retitle as you wish.

SAY GOOD-BYE (REALLY) TO DISCONNECT DIALOGS

IN JANUARY'S "SAY GOOD-BYE TO Disconnect Dialogs," I advised Matt Zentgraf on how to disable a dialog box that nagged him to close his Internet connection. The tip worked great for Matt, but other readers wrote to report that unchecking the *Disconnect when connection may no longer be needed* setting didn't stop the irritating box from popping up whenever they closed Internet Explorer.

A little digging revealed a Microsoft Knowledge Base article (support.microsoft.com/support/kb/articles/Q2560/85.asp) that describes a conflict in Windows 98 and 98 SE between the IE 5.x setting and the Encompass Internet account registration software. Encompass comes preinstalled on many Compaq, Dell, HP, Toshiba, and other computers, and it is used by AT&T WorldNet and other ISPs. You have to disable the software, which loads at start-up from a command deep in the Windows Registry. Be forewarned, however, that your network connection may depend on Encompass, so disabling it could block you from dialing in at all.

To prevent Encompass from loading at start-up, select *Start•Programs•Accessories•System Tools•System Information*, and choose *Tools•System Configuration Utility*. Alternatively, you could click *Start•Run* and type `msconfig` in the Run

box to bring up the same window. Then click the *Startup* tab and uncheck *Encompass_ENCOMNTR* in the list of items in your start-up menu. Click **OK** and reboot your system.

You'll find more thorough removal instructions at Dell's Web site. Check

DOWNLOAD OF THE MONTH

Winamp: A Music Player That Beats the Band

MICROSOFT'S Windows Media Player 7 may receive the plaudits as the most improved media player around, but if you're concerned mainly with playing and managing MP3 files, check out Nullsoft's Winamp, a relative old-timer.

Like Netscape, Nullsoft's parent company is America Online, but Winamp's developers have still managed to create one of the most powerful, compact, configurable,



and cool players around. The most recent version, 2.72, weighs in at a mere 2.2MB. A lite version, which forgoes the music-driven graphics module and support for the WMA and M-Juice audio formats, is a slim 481KB. Both let you choose from among thousands of interface "skins," and both offer over 100 plug-ins for audio effects and music visualization. To try a new skin, just click its download link in the Winamp site, and boom! It's installed and running.

My favorite Winamp-related feature is Shoutcast, a streaming MP3 portal that makes me feel like I'm finally getting my money's worth from my cable-modem connection. All of these Winamp versions are available for free from PCWorld.com's Downloads, as well as from the vendor's Web site at www.winamp.com.

out support.dell.com/us/en/kb/document.asp?DN=TT1012188.



Find files from this article at www.pcworld.com/downloads. Send your questions and tips to nettips@spanbauer.com. We pay \$50 for published items. Scott Spanbauer is a contributing editor for PC World.



FIGURE 2: TAKE CONTROL OF IE by putting your own message in the browser's title bar via a simple change to a Registry key.

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Create Your Own Emergency Boot Disk

POP QUIZ: Windows won't start. Do you: A. Panic; B. Take a siesta; C. Calmly smile as you pull out your customized emergency boot disk, use it to start your computer, and proceed to fix your system?

If you answered C, I commend you. If you chose B, I envy you. But if you picked A, I can help. It's time for you to make an emergency boot disk that does the standard Windows version one better.

Every version of Windows 9x lets you make an emergency boot floppy disk. When you boot from the floppy, Windows takes you to a DOS prompt where you can run DOS utility programs to evaluate and repair your hard disk, fix Windows, copy critical data to a safe location, or (in the worst case) reinstall Windows.

Creating a boot floppy is the same in all versions of Windows 9x and in Me: Select *Start>Settings>Control Panel*, open the *Add/Remove* applet, select the *Startup Disk* tab, and click *Create Disk*. (You'll need a blank, formatted floppy disk.)

If Windows is already misbehaving and you can't make a boot floppy, insert your Windows 98 or Windows Me CD-ROM and reboot. Check the boot options section of your system's CMOS setup program to find out whether your PC supports CD-ROM boot-up. To open your CMOS setup program, restart your computer and press **<Delete>**, **<F1>**, **<F8>**, or whatever key your PC tells you to press to enter setup. If your system can boot from its CD-ROM, you'll see the same DOS prompt brought up by the boot floppy; the CD-ROM lacks many of the floppy's DOS utilities, however.

Windows boot floppies contain useful DOS troubleshooting utilities, but they lack some of the key files you'll need to get

your system up and running (see **FIGURE 1**).

CD-ROM drive.

You need special DOS drivers for your PC's CD-ROM drive to run under DOS. Windows 98 and Me boot disks automatically install generic DOS drivers that work with many, if not most, CD-ROM drives.

To see if you're in the driver's seat, use your boot floppy to get a DOS prompt, place a CD in the CD-ROM drive, and type **dir n:** (where *n* is the letter assigned



Supplement Your Windows Boot Floppy

	Windows 95	Windows 98	Windows Me
On boot floppy	DOS CD-ROM drivers	DOS CD-ROM drivers (if generic CD-ROM drivers on floppy don't work)	DOS CD-ROM drivers (if generic CD-ROM drivers on floppy don't work)
	Other DOS drivers: SCSI, mouse, etc.	Other DOS drivers: SCSI, mouse, etc.	Other DOS drivers: SCSI, mouse, etc.
Elsewhere	Autoexec.bat	Autoexec.bat	Autoexec.bat
	Config.sys	Config.sys	Config.sys
	Win.ini	Win.ini	Win.ini
	System.ini	System.ini	System.ini

¹ Copy these files from your hard disk to a second folder.

FIGURE 1: IF YOU ADD THESE FILES to your boot disks for Windows 95, 98, and Me, you'll find you can recover more easily from PC disasters.

to your CD-ROM drive). If you see a list of the files on the CD, the DOS driver works. If you don't see a list of the CD's files, make sure you're looking under the right drive letter. The boot floppy creates a temporary RAM drive to store compressed utilities, and this RAM drive usually takes the drive letter previously assigned to the CD-ROM, pushing the CD-ROM's drive letter one notch farther down the alphabet—from D: to E:, for example.

Autoexec.bat, config.sys, win.ini, and system.ini. Copy these configuration files from your hard disk to a folder on the boot

Whose Modem Is It, Anyway?

ARE YOU STUCK with a mysterious piece of ancient hardware, such as an unmarked modem or video card? It may look like something extremely useful, but unless you can determine the make and model, you can't find the right drivers for it, so you might as well throw it away, right? Not so fast. Most computer hardware has an FCC identification number. Go to the FCC Web site's database at www.fcc.gov/oet/fccid, and you may be able to match that number to a name, rescuing the device from the scrap heap.

disk (if there's room) or to another floppy. Their useful driver and initialization data could be lost on a failed hard drive.

Registry backup. Have a copy of the DOS version of the backup utility scanreg.exe (not the scanregw.exe Windows version) handy when troubleshooting Windows start-up problems. Also, if you back up

nothing else, at least be sure to back up your Registry files (user.dat and system.dat) from the Windows folder.

You may not have to use multiple floppy disks, however. If your PC's BIOS supports booting from a CD-ROM or Zip drive, you can fit everything you need onto a single removable disk. Norton Zip Rescue uses a Zip disk to launch a bare-bones version of Windows that you can use to troubleshoot your PC in a familiar environment instead of in crusty old DOS. It's part

of the \$50 Norton Utilities package, but you can download it at no cost from PCWorld.com's Downloads or directly from Iomega at www.iomega.com.

When making your own Zip or CD-ROM boot disk, don't forget to use the DOS utility sys.com to transfer the operating system and make the disk bootable.



Find the file in this article at www.pcworld.com/downloads, and find other hardware tips at www.pcworld.com/heres_how. Kirk Steers is a PC World contributing editor.

Revamp Your PC's Sound System

IF YOUR PC has a basic sound card that's a couple of years old and produces only standard, two-channel stereo, it may be time to expand your audio dimensions. Today's sound cards not only deliver ultra-high fidelity, but they also offer a raft of features, including 3D sound. Using a technique called psychoacoustics, most of today's cards can fool your ears with a realistic illusion of Surround Sound—even if you're using just two speakers.

The latest cards include Dolby 5.1 processing, which will give you true digital surround if you invest in a good PC surround speaker set or hook up your computer to your home theater system. That's especially useful if your PC has a DVD drive. The cards also synthesize 3D sound from standard stereo material (such as .mp3 files or tracks on an audio CD).

Even today's basic sound cards (\$50 to \$75) include some surround capabilities. If you're willing to invest a bit more, about \$100 will buy a card with true surround that's optimized for serious game playing or for ripping audio CDs to MP3 or WMA format. Game-focused cards include support for 3D sound effects, which offer a

THE TOP DOWN

Benefits: Add high-fidelity Dolby Digital 5.1 sound for DVD playback, use 3D sound for compatible games, rip audio CDs to MP3 format, interface with portable digital players and stereo components.

Costs: Sound card \$50 to \$200, speakers \$100 to \$250

Expertise level: Beginner to intermediate

Time required: 45 to 60 minutes

Tools required: Phillips screwdriver, anti-static wrist strap (recommended)

Vendors: Sound cards: Creative Labs (www.soundblaster.com), Hercules (www.hercules.com), Philips (www.philips.com), Turtle Beach (www.tbeach.com)
Speakers: Altec Lansing (www.alteclansing.com), Cambridge SoundWorks (www.cambridgesoundworks.com), Klipsch (www.klipsch.com), Labtec (www.labtech.com), Sonigistix (www.sonigistix.com)



new level of realism. And MP3 cards come with extras that make creating MP3s or audio compilation CDs a breeze.

If you want all the extras, consider a card like the Sound Blaster Live Platinum 5.1 shown here (about \$200), which

includes all the latest Dolby 5.1, game, and MP3 features. The card also comes with a central connection box (called LiveDrive) that installs in a free external drive bay to provide advanced digital and analog audio connections and extra MIDI ports.

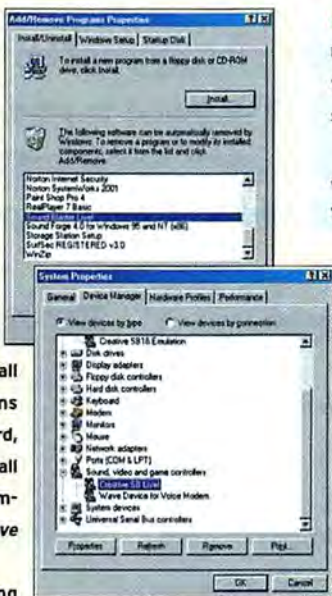
But a new sound card can be a waste unless you also upgrade your speakers. Most off-the-shelf PCs come with speakers that produce tinny, AM radio-like sound. Figure on spending \$100 to \$200 for a good-quality set of speakers; the higher-priced systems include rear speakers and even a center-channel "dialog" speaker for true 3D sound. Of course, you can spend more for audiophile favorites like the Klipsch ProMedia (\$250), or hook up your PC to your home theater system.

And if your PC doesn't have a DVD drive, adding one when you upgrade your sound system is a logical step. (See April's *Upgrade Guide* at www.pcworld.com/april2001/upgrade for details.)

As always, perform a full backup of your PC before you do a major system upgrade.

Stan Miastkowski is a PC World contributing editor.

1 Uninstall existing audio software. It's essential to wipe out every trace of your PC's existing sound software first. Go to **Start>Settings>Control Panel**, and choose **Add/Remove Programs**. Highlight the entry for the existing sound card software (if any) and click **Add/Remove**. Most sound card software will uninstall all files, drivers, and applications that relate to the sound card, but you might need to uninstall several different software components from the **Add/Remove Programs** list.

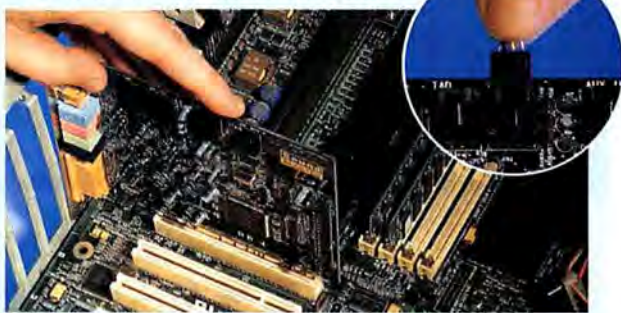


If you can't find anything that relates to the sound card in the **Add/Remove Programs** list, check for uninstall options in the sound card software.

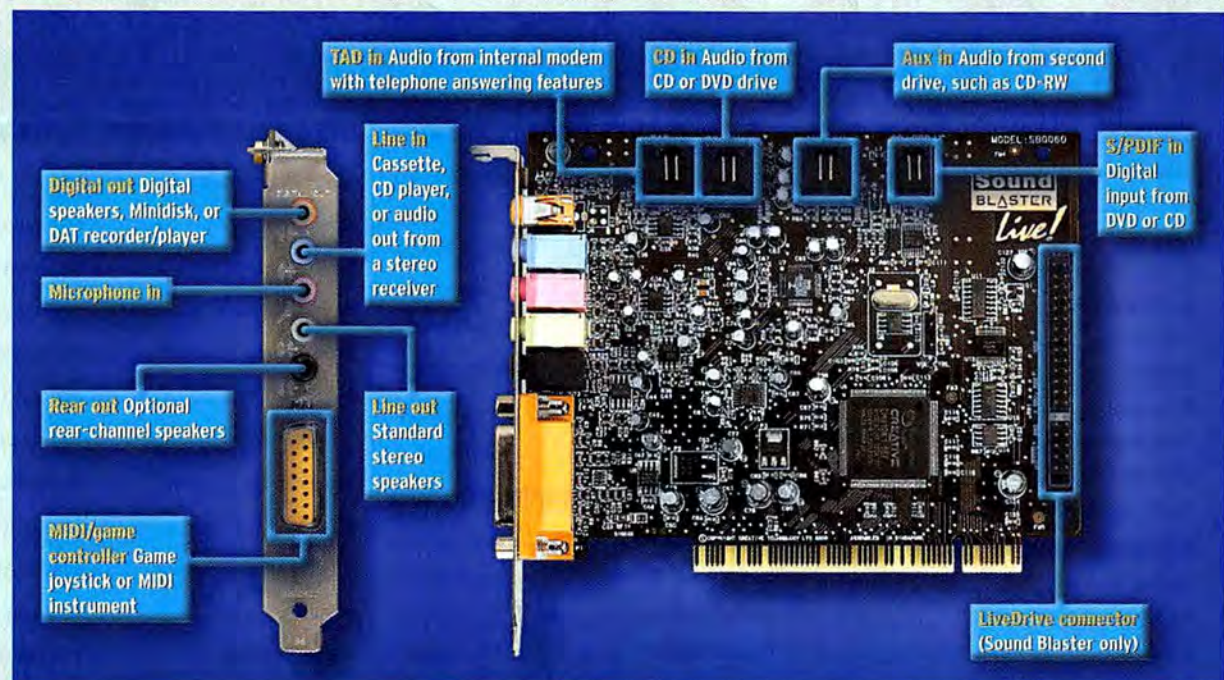
2 Change the sound card. If your PC has its sound support built into the motherboard, you'll need to disable that sound support before you can install your new card. This is usually done through your PC's setup program or by setting a jumper on the motherboard. (Procedures vary; see your manual.)

Power down your PC, unplug it from the wall, and remove the cover. Don an antistatic wrist strap and clip it to a grounded metal surface. Make sure you disconnect all cables connected to the sound card, both internal and external. (Keep track of which cable goes where.)

Remove the screw holding the sound card, and remove the card. Locate a free PCI slot, carefully insert the new sound card, and fasten it down with a screw.



3 Hook up the equipment. Now's the time to hook up the internal and external cables and peripherals to your new card. Shown here are typical connections for the Sound Blaster Live Platinum 5.1 card we installed. Other cards vary. Of course, your connections may be simple, such as just a speaker and microphone. Internal audio inputs are interchangeable; the TAD input, for example, can take sound from your TV tuner card.



4 Install the software. Power up your PC. Windows should automatically detect the new card and ask for the driver software, which is usually included on a CD-ROM shipped with your sound card. Since the installation details vary by manufacturer, refer to the instructions that came with your card.

Once you're done, if your computer doesn't detect a sound card or if you don't hear anything from the speakers (make sure the volume is turned up), power down your system, recheck all your connections, and make sure the card is seated firmly in its slot.

If it still doesn't work when you power up your PC again, it's time to pick up your phone and call tech support.

5 Set up your speakers. Speaker placement is both an art and a science, so the more effort you put into placing your speakers, the better and more realistic your sound experience will be.



Experiment with speaker position by rotating the front speakers inward toward the listener. Move the front speakers farther apart if you can, or bring the rear speakers closer or farther away. Try to find a setup that offers the best compromise between sounds that are clearly located at specific points and sound that spans a wide area to either side of you.



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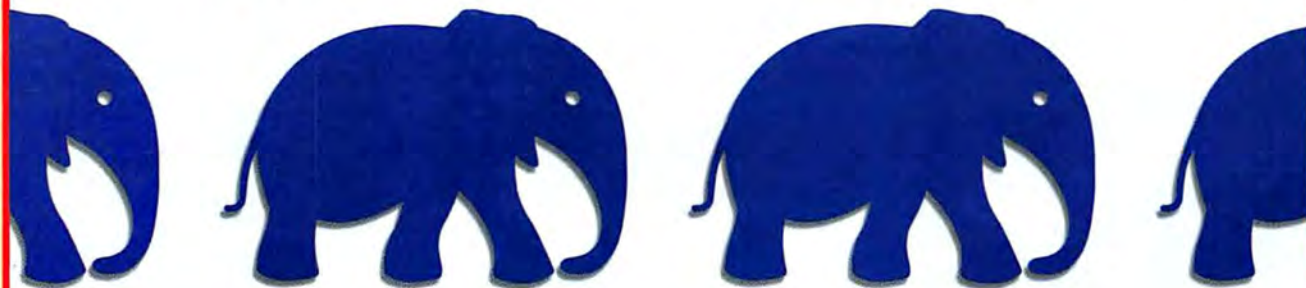
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Base Monthly Server Cost	\$18.95	\$59.95	\$89.95	\$149.95	\$199.95	\$18.95	\$89.95
Max. per domain cost @ \$2.00/domain/mo	N/A	\$50.00	\$50.00	\$150.00	\$150.00	N/A	\$125.00*
Max. possible cost to you/ month	\$18.95	\$109.95	\$139.95	\$299.95	\$349.95	\$18.95	\$214.95
Your monthly gross profit @ \$19.95 domain	N/A	\$498.75	\$498.75	\$1,496.25	\$1,496.25	N/A	\$548.75**
Your monthly net profit	N/A	\$388.80	\$358.80	\$1,196.30	\$1,296.30	N/A	\$333.80

*Additional domains for Windows2000 Reseller Hosting Solution - \$5.00/month

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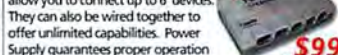
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Web Shopping: Point, Click, Hope

I FELL IN LOVE WITH Sony's little DCR-PC5 digital camcorder when I tried it out, so I ordered one over the Web last Christmas. Sure, the unit arrived without a warranty card—but it had very clear instructions for getting service in Singapore. Sure, the cord on the battery charger had two round prongs—but I did discover a flat-prong adapter for U.S. electrical outlets in the box.

Welcome to the gray market. The retailer itself had evidently imported the product rather than getting it through standard channels. There is apparently nothing illegal about this if the retailer discloses it. But this retailer didn't. I decided to keep the unit after I discovered I could register it on Sony's Web site, but the whole experience left me reeling—particularly since I'd done plenty of homework.

BEWARE OF BOTS

I USED SHOPPING BOTS like PriceScan and MySimon to find the best price, although I know that price can't be your only criterion. The sites I found offering the cheapest prices were sloppily put together, and the vendors were pushing package deals featuring dubious tripods from companies that I'd never heard of and extra tapes at triple the normal price. Eventually I stumbled on a New York outfit called Etronics, the only place I managed to find all of the official Sony accessories I was looking for. The prices quoted on the site were decent, even figuring in the exorbitant "shipping" charges of \$56 for UPS ground delivery.

There were a few complaints about the company at the merchant-rating Web sites that I checked, but overall Etronics came up with decent marks. Still, I wasn't entirely convinced that every obscure item I wanted was actually in stock, as the site claimed, so I clicked for online chat with a sales rep. "We do not lie," typed a person who went by the handle of Doug; "99 percent of the time if it says in stock it is." We went through the items one by



The sites with the
cheapest prices
pushed **dubious**
tripods and extra
tapes at **triple the**
normal price.

one, and Doug assured me they were all in stock. The rest of our chat, strictly verbatim:

Steve: When will it ship?

Doug: It will ship tomorrow or the next day and you will get it, depending on what you pick with UPS....

Steve: All this stuff comes with Sony's US warranty, right?

Doug: Yes and you can even add on a 5 year warranty, i think.

Well, not exactly. Sony will apparently honor the warranty, but I never did get a U.S. warranty card even though I asked. The camera and some add-ons did ship two days later, but five more days went by before Etronics sent most of the rest. And the final item went out nearly a month after my order. At least my credit card wasn't charged until each item left the dock. Will I buy from Etronics again? Probably not.

Lesson? Shopping on the Web can be immensely more complicated than you might imagine. Bots are...well, robotic, and they don't report every price—particularly in the case of authorized vendors who carry products at a discount but post list prices on the Web and invite you to phone in. And many other prices on the Web and in print ads are artificially high. That's because many vendors list "minimum advertised prices" to get perks from manufacturers.

That's easy enough to fight if you're a decent negotiator willing to deal with a real human instead of a digital shopping cart. Call in, mutter "I just saw a better deal on Reallycheap.com," and ask if the vendor will match it. Many reputable vendors will do just that, or at least come close, and they may well throw in better service and cheaper delivery charges.

A friend with a severe case of camcorder envy ordered a unit like mine from J&R, an authorized Sony retailer whose site quoted list prices but encouraged phoning for a better deal. (Full Disclosure: J&R sponsors my TV show, *Digital Duo*.) A call got the price down to about what I'd paid, but with reasonable charges for two-day delivery. His camcorder arrived as promised, complete with a warranty card.

But I'll bet he won't be able to use his battery charger in Singapore without a special adapter.

PC World Contributing Editor Stephen Manes is a cohost of *Digital Duo*, a series appearing on public television stations nationwide. For program information, see www.digitalduo.com.



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- Internal 56K Capable Mini-PCI Modem
- 8MB ATI® Mobility™-M4 3D* Video, 4X AGP
- 59Whr Li-Ion Battery w/ExpressCharge™ Technology
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- MS® Windows® Me
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- 48X Max CD-ROM Drive
- Altec Lansing³ ACS-340™ Speakers with Subwoofer
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- Internal 3Com³ Ethernet 10/100 Network Adapter
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- 32MB ATI Mobility™ M4 3D² 4X AGP Video
- Internal 56K Capable⁴ FaxModem
- 59Whr Li-Ion Battery ■ harman/kardon³ Audio
- MS⁵ Works Suite 2001 ■ MS⁵ Windows⁶ Me
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PC World's #1 Best Buy Award
Top 10 Midrange PCs
— April 2001

There are plenty of average "good buys" out there. Only one, however, earned *PC World's* #1 Best Buy Award in the category of Top 10 Midrange PCs. It's the Dell™ Dimension™ 4100, of course. The reason for all this excitement? It's because of 128MB of SDRAM, an SB Live! Value Digital Sound Card and a PCI Telephony modem included on a machine that's powered by an Intel® Pentium® III processor at an impressive 1.0GHz. We could go on and on about what makes the Dimension 4100 a best buy, but thanks to *PC World*, we don't have to.

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Advanced Business Desktop

- Intel® Pentium® III Processor at 1.0GHz
- 128MB SDRAM (up to 512MB)
- 20GB¹ (7200 RPM) Ultra ATA/100 HD (up to 80GB¹)
- 17" (16.0" vis) E770 Monitor
- 16MB ATI® Rage™ Pro Graphics
- 48X Max CD-ROM ■ SB Live! Value Digital Sound
- harman/kardon® Speakers
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