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The golden age in desktop software

If we had run this month's cover three or four years ago, it would have contained a different set of articles. Last year, we were still talking comparatively about Product A versus Product B. But even then, it was quite evident that for the 90 percent of the functions most people wanted to use in any piece of personal computer software, competing products were about the same.

Personally, for example, I switch regularly between Microsoft Word and Corel WordPerfect, and could easily survive with just one, my productivity intact. It's the same case with Adobe Photoshop and Corel PhotoPaint or L&H VoiceXpress and IBM ViaVoice, or Microsoft Excel and Lotus 1-2-3. These have become parity goods, like Ford and Chevy or Pepsi and Coke.

These software packages are not identical, and there are some features that are clearly superior in specific environments—which explains Photoshop's continued stranglehold on the professional graphic arts market, for example. But for an individual or small business wanting a good tool kit, the feature list is just part of the story. Many of the key factors that go into a buying decision reside beyond the feature set of the product itself.

Market shares and workflows

The desktop software wars are largely over, at least for now. While the winners claim technological superiority, the more salient factors are market share and mind share dominance. These create what political theorists call hegemony—when in Rome...

Market share dominance takes on a life of its own, doling out rewards for buying in and imposing penalties for not. And eventually, we reach a phase—we're in one now—where

We hope your everyday work is easier, faster and a lot more fun.

—message on Sun StarOffice 5.2 installation screen

it no longer matters how good the other products are. They are judged by how good they mimic the leader. Thus, for office suites, WordPerfect Office and Lotus SmartSuite have to trumpet their compatibility with Microsoft Office, whereas Microsoft Office needn't waste breath talking about its compatibility with the other two.

As we were finalizing this issue, we received a copy of PaintShop Pro 7 from Jasc software and StarOffice 5.2 from Sun Microsystems. These two products represent the churn that is beginning to upset this present status quo. The PaintShop Pro story is a kind of software developer's American Dream. It began as shareware, built in the image of Adobe Photoshop but without the high-end features or the high price tag. Its core features were good enough to attract budget-conscious digital artists, and the product has evolved into a successful retail product in its own right. If you poke around some shareware sites, you'll discover hundreds of others that are hoping to follow Jasc into the commercial mainstream.

StarOffice, on the other hand, is a completely different gambit: good software that doesn't cost you a thing. While shareware might be thought of as the loyal opposition, hoping to some day grasp the reigns of power in the commercial software kingdom, freeware spells a burn down the castle kind of revolution.

If you are working in relative isolation, or can manage external demands for specific types of file formats, why not use StarOffice? If all you want to do is figure out what your loan payment will be, why not use any one of the free loan calculators available on finance Web sites? Why not use Linux instead of Windows? People are

beginning to realize they can do all of these things and more, without ending up as dysfunctional outcasts. For example, the Internet café on the first floor of the building where I work has its PCs running Linux. People seem to be happily working away on those machines.

But surely there must be some cost, you might wonder—after all, nothing is ever really free. At this point, the cost is convenience. A Corel representative told me, a few months after the company made WordPerfect 8 for Linux available for free download, that it had also generated a few million dollars in sales of a packaged retail version. People apparently were willing to pay for the convenience of having a CD and manuals. The tale is repeated for the various Linux distributions—freely available, but nicely packaged for a fee.

Then there's the rise of adware. This is a variation where the cost of using the software is giving audience to various advertisements that might pop up somewhere in the product's interface. The latest versions of Eudora email reader and LapLink FTP client are both available as adware. Like the TV model, the programming is free, but you have to sit through the ads.

Software is an industry worth billions to the world economy, and we're not likely to see programming divorced from its commercial underpinnings. This freeware skirmish is a small part of what's happening with software development, but it's one that has a visible impact on how we buy and use software. It is another instance of how the Net is changing everything. In this case, the Net is transforming the personal computer from a technology that hosts tools to a technology that delivers services. The developments in software will continue to reflect this new focus on services.

Interesting times ahead,
David Tanaka, Editor



FROM THE EDITOR



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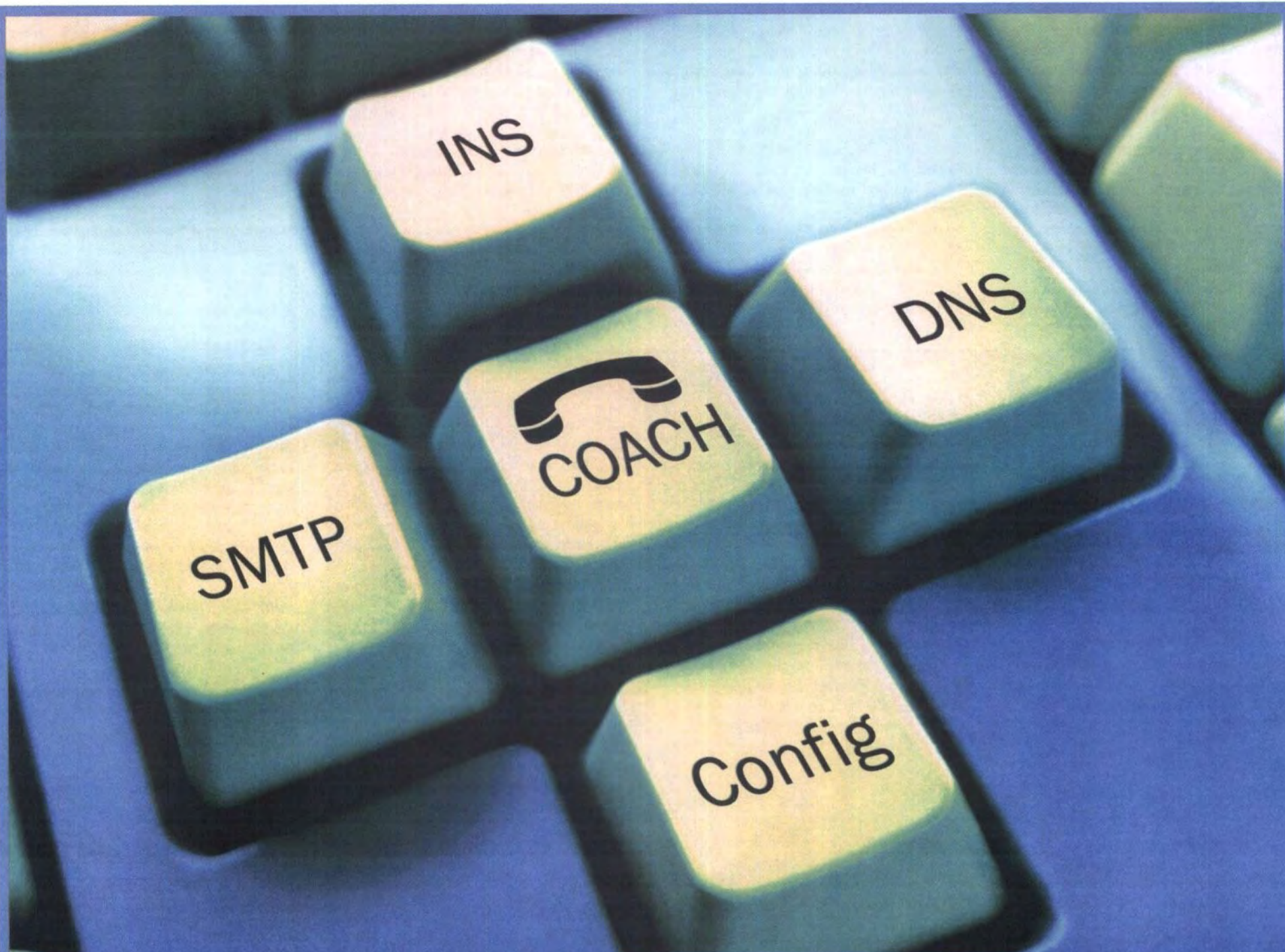
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Noteworthy notation software

When you published your evaluation of music notation software [see "Like music to your ears, Part 2" in the September issue], I wonder why you did not include Noteworthy Composer. Its cost is far less than any other you mentioned, at US\$39.

I have been using it for several years now, and it does everything (almost) that I want it to do, like easy entry, playback, MIDI, transposition, classy printout, etc. (but never having used any other, I cannot say how it compares).

Also, I have found the support excellent, and have downloaded several upgrades over

the years at no extra charge. I have the impression that it is a hobby of authors Eric and Beth Heile; still, it looks very professional to me. Their Web site is <http://www.ntworthy.com>.

Alan Craig

Faster, BX, faster

I just finished reading your article on the latest video cards and the latest motherboards in your September issue. You included a 440BX motherboard for comparison. Is it possible to run the 440BX overclocked to 133 [MHz] FSB [front-side bus] and set the AGP multiplier to 1:1? Would this allow one

to run the newer 4X APG cards on this board at their full speed? I ask this for personal reasons as I have an old Abit BH6 motherboard and a Geforce 256DDR video card. If this is possible I would be interested in knowing how the 3D benchmark scores of a 440BX motherboard compare to those achieved using the CULS2 motherboard.

Thanks and keep up the good work.

Ross Macrae

Sean Carruthers replies: On most of the older BX boards, there wasn't a way to set a ratio of FSB-to-AGP (your board may be different, and if there is a way, there's probably a BIOS

setting for it), so you're pretty much limited to an AGP bus running at two-thirds the speed of your front-side bus. If you're running your BX board up to 133 MHz to match up with the newer Intel processors, that means 89 MHz on the AGP side. There may be a BIOS flash update that would add the ratio, but I have not heard that such a thing is available—yet.

Wants to end file processing drudgery

Hi there—here is a scenario:

1. Take 40-50 high-res shots on a digital camera.
2. Download them via USB to your computer
3. Now, if you want to send them to anyone, you have to compress them, one by one, which takes a long time.

Do you know of software that allows you to take a bunch of images at once and compress them to a set compression ratio, thus doing away with the tedious task of compressing each one individually?

Graham Robins Jr.

Jacques Surveyer replies: This one is easy in either Corel PhotoPaint or Adobe Photoshop. If you know Visual Basic for Applications (VBA) it will be a bit easier in Corel PhotoPaint because you can set up a script to run the job in batch mode. The macro facility in Photoshop will also get the job done, though. I think Canto Cumulus and ACDSee can also run batch jobs—but check with the vendors.

Nuts to nutshell review

I have come to expect TCP to be a thinly veiled apologia for the Windows platform and so I was justifiably surprised and yet thrilled to see a review written by Jacques Surveyer of the O'Reilly publication, *Webmastering in a Nutshell, Second Edition*. Imagine my chagrin when the typical characteristics of an O'Reilly book—the focus on open source software and real-life solutions—was pilloried by Mr. Surveyer as the book's main flaws. I reread the review once again to fix the tone of the review in my mind and immediately came to my conclusion: Mr. Surveyer completely misses the point of the book.

O'Reilly publishes the vast majority of its books on the software tools surrounding the open source movement and has come, over time, to be seen as an authoritative voice on open source software. In addition, Tim O'Reilly himself is a stalwart personal supporter of open source software and is considered by many to be one of the spiritual leaders of the "revolution."

For Mr. Surveyer to expect a company that makes almost all of its income supplying information to the open source movement to include chapters on the various types of proprietary Web servers or dynamic content software packages out on the market is very naive—tantamount to expecting a Microsoft publication to give equal shrift to Linux. Rather than a flaw, this open source focus is a definite strength; the book is clearly aimed at O'Reilly's core customers.

The proprietary solutions Mr. Surveyer obviously feels are short-changed in coverage are very expensive—generally too expensive for most small businesses to swallow. Training in said tools is also expensive, meaning that any consultant or Webmaster offering skills in these areas is likely to be out of the price range for many of these

Continued on page 10



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IBM ends 40-year Olympic run

As with all good things, IBM's partnership with Olympics has come to an end now that the Sydney 2000 games have closed.

"IBM concluded that the sizable investment could not be justified any longer by the marketing return we were getting," said Mike Quinn, a spokesperson with IBM Canada Ltd. in Markham, Ont.

IBM first became involved with the Olympics with the 1960 Olympic Winter Games held in Squaw Valley, Calif. At those

games IBM provided various technologies. In 1984, Big Blue moved on to become an official sponsor of the games. By 1993, IBM was one of 11 TOPP members (the Olympic Partner Program), providing technology and expertise to help organize and run the games smoothly.

Certainly providing the technology and infrastructure needed to run something of the size and complexity of the summer Olympics is both daunting and expensive. Quinn likens it to running an e-business for a

very large, multi-national company

As a TOPP participant, IBM's role was to provide the necessary range of IT services needed to run the Sydney games.

That included providing hardware, software, networking, consulting, and system integration. The payoff for IBM was that it could use the Olympics logo in all of its marketing, including print and television advertising.

For the Sydney games, IBM provided some 750 PCs, more than 540 Netfinity servers, 50

RS/6000 and three RS/6000 ASP systems, 720 monitors, 1,650 printers, 1,000 touch-screen monitors, nearly 900 network switches, and software including DB2, Tivoli Enterprise solutions, and Lotus Notes Domino.

During the games, the technologies were used to keep journalists, athletes, and Olympic officials up-to-date on what was happening, and to provide event results as rapidly as possible.

For Olympic fans, IBM set up a fan mail site where they could email wishes and congratulations to their favourite Olympic competitors or teams.

A Surf Shack was set up in the Olympic Village so athletes could go and check their email, fan mail, or simply surf the Web.

— Tom Venetis



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Letters

Continued from page 8
smaller employers.

So, I must take issue with Mr. Surveyer's review—and not because I love open source, either. Ten minutes on the Web would have told him all about O'Reilly's catalogue, Tim O'Reilly's publicly stated politics, and thus the core customers that both hope to serve. Armed with that knowledge, he could have assessed the book from the perspective of its intended audience, thereby helping those readers to see if the book is worthwhile to them.

As it sits now, all they know is that the book isn't worthwhile to Mr. Surveyer—a mostly useless fact given his obvious bias.

Matthew Yeo

Jacques Surveyer replies: Mr. Yeo unfortunately missed the whole point of the review. As I state in my review's summary line: "In sum, it may be a case of misnomer: as 'Open Source Webmaster in a Nutshell' the book rates a 4.2 out of 5; as Webmaster in a Nutshell it's a 3.3 out of 5."

If O'Reilly had not mis-named the book, perhaps there would be no disagreement. And no one can say that reading O'Reilly automatically means open source as witnessed by the publisher's many tomes about proprietary Microsoft, and to a lesser extent, Oracle and IBM software.

Corrections

- In last month's issue on portable computers, we listed the price of the Toshiba Portege 7220CTe at \$6,794; this is actually the full list price of the unit, which should be available at retail for substantially less. This price also includes the docking station.
- In last month's review of Lexmark's Optra T614 laser printer, we incorrectly stated that it was the first black and white laser printer rated at 25 pages per minute. Though other printers have previously reached that mark, the T614 is the first printer at that speed to come in at under \$1,800.
- In the October Test Lab, we listed the warranty period for Sceptre's DragonEye D98A as three years, which is the warranty period for the D98AB. The D98A we reviewed actually has a full five-year warranty. □

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WHAT'S NEW

VAIO PictureBook Crusoe-powered



Sony Electronics (<http://www.sony.com>) has announced that its new VAIO PictureBook C1VN notebook computer will feature the Crusoe processor, whose energy-saving capabilities should substantially enhance the notebook PC's battery life. With the new C1VN model expected to ship this fall, Sony will be the first to bring the benefits of the Crusoe processor to North American consumers.

"At just 2.2 lb. [about 1 kg], the PictureBook is lightweight," said Mark Hanson, vice-president and general manager for VAIO PC products at Sony Electronics. "Couple that with the enhanced battery life Sony is experiencing with Crusoe and consumers get more productive mobile time and greater flexibility in how they use their notebooks."

In addition to improved battery life, the new PictureBook features a built-in progressive scan camera for digital still and video images, and a full complement of digital video-editing software.

The PictureBook runs Microsoft Windows Millennium Edition (Me) operating system, and its software bundle includes Sony's MovieShaker editing software, Intuit Quicken 2000, Apple QuickTime, Microsoft Word 2000, and Adobe Photo Deluxe Business Edition. Also featured are additional Sony applications, including DVgate and PictureGear, which allow users to capture full-motion digital video and still images for multimedia presentations and even video email.

The PictureBooks is powered by a 600 MHz Crusoe processor, and has a 12 GB hard drive, 128 MB of SDRAM, and a dedicated MagicGate Memory Stick removable media slot for storing downloaded music files, high-resolution images, and other data. It has suggested retail price of US\$2,299.

—TCP Staff

Corel launches CorelDraw 10

Corel Corp. has unveiled CorelDraw 10 Graphics Suite, billing it as the only graphics creation tool that offers vector animation, page layout, Web publishing, bitmap editing, and Web animation in one box.

"CorelDraw 10 Graphics Suite is far and away our biggest upgrade ever," said Ian LeGrow, vice-

president, creative products at Corel. "We are launching our new Creative Product line, which will bring cutting edge power and creativity to all our users. Across the board, users will see changes ranging from a dramatic new look for our box to support for advanced emerging technologies such as SVG and PDF/X."

The suite, which will be released Nov. 10, introduces a new application: CorelRAVE (Real Animated Vector Effects). According to Corel, the new application uses the familiar CorelDraw interface for creating Macromedia Flash SWF animation. CorelRAVE allows users to tween live effects over time, generate a timeline of edited work, and create animated roll-over graphics.

Other new features in the suite include a new colour management interface, presets for hundreds of effects and features, In-RIP trapping and separations options, and a customizable workspace. In addition to the drawing and animation applications, the suite includes Corel PhotoPaint 10.

The suite has a suggested retail price of US\$569, or US\$249 for an upgrade version.

—TCP Staff

E-Book intros FlipBrowser technology

SANTA CLARA, Calif.—E-Book Systems has launched a new e-book PC application called FlipBrowser. Currently in extended beta test, the FlipBrowser is billed as a regular Web browser that doubles up as an e-book viewer.

The firm says the software allows users to view their favourite Web pages in a book-like format, with 3D pages.

As an Internet browser, FlipBrowser 1.0 Beta automatically organizes all of a user's viewed Web pages into a book-like form with pages that can be navigated through like a book. Users can add bookmarks that appear at the side of an e-book's pages.

Seng-Beng-Ho, E-Book Systems' president, says e-book readers are looking for the experience of turning pages instead of scrolling them. "With FlipBrowser they can finally have it," he said.

E-Book is partnering with Club Photo, Photo.net, and ChinaOnline, to integrate the FlipBrowser technology within their Web sites.

FlipBrowser 1.0 Beta is billed as multimedia-enabled for audio and video. It supports page printing and is compatible with all Internet Explorer 5.01 plug-ins. Its minimum software requirements are a 166 MHz Pentium PC, Internet Explorer 5.01, 32 MB RAM, 9 MB hard disk space, and Microsoft Windows 95, 98, 2000 or NT 4.0.

Currently, FlipBrowser can be downloaded for free from E-Book Systems Web site (<http://www.flipbrowser.com>). A Gold version, planned for release later in the year, will be US\$19.95.

—Newsbytes

Nokia intros home Internet device

HELSINKI, Finland—Nokia Corp. (<http://www.nokia.com>) has introduced its new Media Terminal, an open standards-based device that will provide Internet access and push-button online services over broadcast networks.

Nokia said the terminal, which is scheduled



for availability next spring, is based on open source technologies, including the Linux operating system and the Mozilla Web browser.

"So far," said Nokia Ventures communications manager, Jyrki Rosenberg, "digital set-top boxes have been proprietary. Now that we're offering open standards we believe application developers can develop services that you can interact with programs in various different ways."

Nokia's new device provides full Internet access, split screen TV/Internet, pause/replay of live broadcasts, digital TV recording to hard disk, video on demand, audio player, email, 3D games, digital TV/radio, and access to printers, digital cameras and other peripherals.

"We believe it's for the home of the future," said Rosenberg. "The PC will remain in the home but it won't be the only way to access the Internet."

Media Terminal users will be able to control TV broadcasts and the Internet using the same remote device, allowing them to choose from TV, the Net, email, home shopping and other applications.

The company has not set a retail price for the terminal, but Rosenberg said pricing will be similar to that of a "high-end VCR." He could not say whether the device will be available worldwide or in certain areas when it hits the retail market by the end of the second quarter 2001.

—Newsbytes

PaintShop Pro 7 offers more power

It's safe to say that many fans of Jasc Software Inc.'s digital imaging products are novice users—but a fair number are professionals, too. And with its latest release, PaintShop Pro 7.0, Jasc is hoping to please both.

The new release includes simple tools aimed at novices, such as auto-saturate, auto-scratch and auto-redeye reduction. Though the company was worried that advanced users would be put off by these one-button solutions, Jasc's chief executive officer, Chris Tufto says that, during beta testing of PaintShop Pro 7, "We found the opposite."

Apparently Jasc's testers—novices and pros alike—liked the simplified approach to digital picture fixes. While the newbies didn't know any better, professionals with a heavy workload wanted to be able to tackle a bunch of problem pics and improve them easily.

PaintShop Pro 7 comes with 18 new filters, colour balance presets, and an auto redeye reduction function that lets you choose between human or animal orbs. Jasc says that what's often attained through careful manipulation of colour balance, contrast and background noise, you can do with the click of a mouse.

New Web tools mean an easy way to prepare pictures for online displays. While Pro 6 offered GIF and JPEG optimization, version 7 adds PNG optimization.

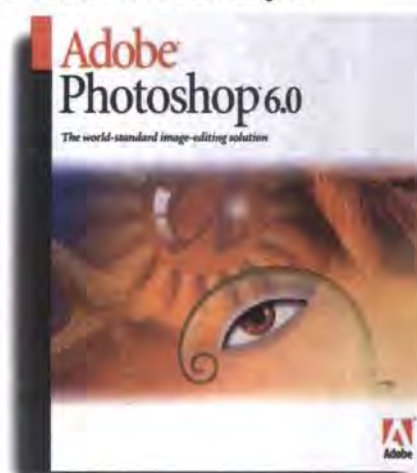
Take note: Paint Shop Pro is not an end-to-end professional program, so it sticks to on-screen colours, like red, green and blue (RGB). If you're looking for pre-press quality, find an application capable of cyan, magenta, yellow and black (CMYK) manipulation.

PaintShop Pro 7.0's minimum system requirements include a 133 MHz processor, 73 MB of hard drive space, and 32 MB of RAM. It has a suggested price of \$150, or \$60 to upgrade from

PaintShop Pro 6.0 users.

—CanadaComputes.com

Adobe unveils Photoshop 6.0



Adobe Systems has announced the release of Adobe Photoshop 6.0, a major upgrade to its leading professional image editing software. According to the company, the release delivers dozens of powerful new features including integrated vector functionality, improved Web workflow, and a streamlined interface to improve efficiency.

New features announced in Photoshop 6.0 include: vector shape drawing with resolution-independent output; tighter integration with ImageReady 3.0; on-canvas text entry and advanced formatting; layer styles and new effects; image warping and distortion; interface enhancements including a new context-sensitive tool options bar and preset manager; extensive PDF workflow including shared PDF annotations; consistent colour management with Adobe Illustrator; and streamlined Web workflow with Adobe GoLive.

Adobe says the combination of new vector drawing tools with powerful rollover styles allows for quick creation of buttons and other Web graphics.

The new vector functionality in Photoshop 6.0 has equally powerful applications for print designers, according to Adobe. By applying vector clipping paths to each layer in a photo composition, designers can combine crisp resolution-independent text and graphics with soft-edged photos in ways that were previously possible only with more expensive, high-end systems. In addition, users can format and output these images as PDF files or directly to PostScript printers while maintaining the text as crisp, vector type.

Adobe Photoshop 6.0 is expected to ship for in Canada this month. It has an estimated street price of US\$609 for all platforms (for Macintosh OS 8.5 and up, and Windows 98, Me, NT4, and 2000), or US\$199 to upgrade from an earlier version.

—TCP Staff

Sony starts eMarker free Net service

SAN FRANCISCO—eMarker.com LLC, a subsidiary of Sony Electronics Inc., has launched its free Internet service at <http://www.eMarker.com>.

eMarker.com says the online service puts an end to the most frustrating part of hearing a song on the radio—not knowing the title of a

Continued on page 21



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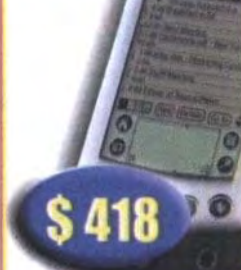
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Pentium III ~ MediaMax

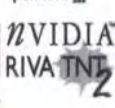
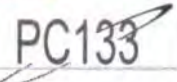
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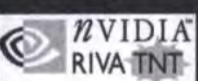
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On Board 10/100BaseT LAN Card
52x Speed UDMA CD-ROM, Speakers
15" Non-Int Low Rad. SVGA Monitor
AOpen H300C Slim Desktop/Tower Case
107-keys Win98 Keyboard, PS/2 Mouse
1 Year Parts & Service Warranty



CELERON	
566MHz w/128KB L2	\$ 8 2 5
600MHz w/128KB L2	\$ 8 3 5
633MHz w/128KB L2	\$ 8 5 5
667MHz w/128KB L2	\$ 8 8 0
700MHz w/128KB L2	\$ 9 3 0

AMD SuperStation

MicroStar K7T Pro Athlon/Duron VIA 133 Main Board
128MB 168 Pin High Performance SDRAM (PC100MHz)
1.44MB Floppy Drive
15GB Ultra DMA-66 7200RMP Hard Drive
Ultra DMA-66 IDE Controller
2 x 16550 Serial, 1 Parallel & 2xUSB Port
AGP TNT Vanta 3D Card w/16MB
On Board AC-97 2.0 3D Audio Sound
52x Speed UDMA CD-ROM, Speakers
Proview 17" .27mmDP NI SVGA Monitor
ATX Mid-Tower Case with CSA Power Supply
107-keys Win98 Keyboard, PS/2 Mouse
1 Year Parts & Service Warranty



AMD Duron	
Duron - 600MHz	\$1,055
Duron - 650MHz	\$1,085
Duron - 700MHz	\$1,120
Duron - 750MHz	\$1,205

Video Graphics Adapters

ATI All-in-Wonder 128 Pro AGP Card 16MB/32MB	\$210/278
ATI Xpert 98 8MB/Xpert 2000 32MB AGP Card	\$50/107
ATI Rage Fury Pro (VIVO) 32MB/Fury Maxx 64MB AGP	\$156/180
ATI Radeon AGP 32MB/64MB DDR	\$365/440
ATI Radeon All-in-Wonder AGP Card 32MB	\$425.00
ATI TV Wonder VE NTSC/TV Wonder Card (NTSC)	\$67/95
ASUS V6800 nVIDIA GeForce 256 Pure/Deluxe 32MB	\$247/300
ASUS V6800 nVIDIA GeForce 256 Pure/Deluxe DDR	\$294/350
ASUS V6800 nVIDIA GeForce 256 64MB DDR Pure	\$420.00
ASUS V7100 nVIDIA GeForce 2 MX AGP 32MB Pure	\$220.00
ASUS V7700 nVIDIA GeForce 2 GTS 32/64MB DDR Pure	\$410/534
ASUS V7700 nVIDIA GeForce 2 32MB DDR Deluxe	\$465.00
Guillemot Maxi Gamer Xentor AGP 32MB (\$30 rebate)	\$310.00
Guillemot Maxi Gamer 3D Prophet 32MB DDR	\$490.00
Matrox Millennium G400 AGP 16/32MB SGRAM	\$140/173
Matrox Millennium G400 AGP 16/32MB Dual Display	\$170/223
Matrox Millennium G450 16/32MB DDR Dual Display	\$156/204
nVIDIA TNT Vanta 16MB/TNT2 M64 32MB AGP Card	\$73/96
nVIDIA TNT2 Pro 32MB/GeForce 2 MX 32MB TV-Out	\$118/188

Monitors

Envision S1995 19" N/L/R (1600x1200, 26mmDP)	\$375.00
Mag 786FD 17" 24mmDP/800V 19" 26mmDP	\$505/605
NEC AS50/AS70 15"/17" 28mmDP DotTrio	\$225/310
NEC FE700/700M 17" 25mmDP Flat Display	\$395/455
Panasonic E701 17" (1280x1024, 27mmDP)	\$328.00
Panasonic S50/SL75 15"/17" (1280x1024, 27mmDP)	\$270/355
Panasonic PF90 19" (1800x1200, 25mmDP) FD	\$700.00
Panasonic L5-120 120MB Floppy Drive	\$1170.00
Proview PX769 17" N/L/R (1280x1024, 27mmDP)	\$235.00
Sony E100 15" N/L/R (1280x1024, 24mmDP) FD	\$305.00

HD/FD Controllers

ISA IDE HD/FD Controller with I/O UART 16550	\$20.00
Adaptec 1505/2906 SCSI CD-ROM Controller	\$67/73
Adaptec 2910C/2930U PCI SCSI Controller	\$115/133
Adaptec 29160/39160 PCI Ultra 160 SCSI	\$340/530
Adaptec 2100S/3200S RAID Ultra 160 SCSI	\$668/1100
Promise Ultra66/Fasttrak 66 PCI Controller	\$32/90
Promise Ultra100/Ultra100 RAID PCI Controller	\$47/140
Promise Ultra66 RAID 5 - 4 channel Controller	\$535.00

Keyboards & Cases

Fujitsu 4725/8725 Enhanced 104 Keys	\$57/116
Monitex Windows 98/Internet Keyboard	\$10/16
Logitech Deluxe/Internet Keyboard	\$20/32
Logitech Cordless iTouch Keyboard	\$73.00
Logitech Cordless iTouch/Desktop Pro Keyboard	\$120/155
Microsoft Natural Elite/Internet Keyboard	\$30/28
17/19" ATX Mid Size Tower w/ CSA Power Supply	\$40/45
25" ATX Tower with 250W CSA Power Supply	\$85.00

Floppy & Hard Drives

Panasonic 1.44MB Floppy Drive	\$16.00
Panasonic LS-120 120MB Floppy Drive	\$88.00
30GB/40GB/61GB/81GB/5400RPM HDD	\$184/245/396/500
15GB/20GB/30GB/40GB/7200RPM HDD	\$152/183/240/315

Motherboards

Intel L440GXG Pentium II / III Server Board	\$750.00
Abit SE6 i815E Socket 370 Board ATA100	\$223.00
Abit KA7-100 KX133 ATA-100 Athlon Board	\$256.00
Abit KT7/KT7-RAID KT133 Socket A Board	\$227/257
Abit VL6 VIA Apollo Pro 133 Pentium III Board w/Sound	\$138.00
AOpen AX3S i815E Socket 370 Board w/Sound	\$225.00
AOpen MX3WP-E i810E MicroATX w/Sound & Video	\$147.00
AOpen AX6BC 440BX Pentium III Board	\$132.00
AOpen AX34 VIA 694X 133 Pentium III Board	\$141.00
AOpen MK33 VIA KT133 Socket A Board w/Sound	\$171.00
ASUS CUSL2 i815E Socket 370 Board ATA100	\$236.00
ASUS P2BDS 440BX, Dual CPU, Ultra2 SCSI Board	\$676.00
ASUS P3V4X/4V4X VIA Apollo Pro 133 Board	\$166/169
ASUS A7V VIA KT133 Socket A Athlon/Duron Board	\$234.00
ASUS K7M/K7V Slot A Athlon Board	\$170/184
MicroStar MS-6309 VIA 133 Pentium III Board	\$142.00
MicroStar MS-694D Pro Dual Socket 370 Board	\$250.00
MicroStar K7T Pro VIA KT133 Socket A/ATA100 Board	\$182/206

MultiMedia

Creative Labs Sound Blaster Ensoniq PCI/PCI 128	\$29/46
Creative Labs SB Live! MP3+ 5.1/X-Gamer 5.1	\$139.00
Creative Labs SB Live! Platinum 5.1/Live Value	\$272/68
AOpen 52X/Creative Labs 52X IDE CD-ROM Drive	\$54/57
Panasonic 8x4x32 Int IDE CDRW	\$218.00
Panasonic 8xPioneer 16x Int IDE DVD Drive	\$146/174
Plextor 8x4x32/12x10x32 Int IDE CDRW	\$320/435
Plextor 12x4x32 Int/Ext SCSI CDRW	\$525/650
Sony 12x8x32 Int IDE CDRW	\$410.00
Toshiba 40X SCSI CD-ROM Drive	\$112.00
Yamaha 6824 Int IDE/SCSI CDRW	\$248/285

Modem & Mice

AOpen 56K v.90 ISA/PCI Fax Modem	\$70/30
Genius NetMouse with Magic-Button	\$12.00
Logitech FirstMouse+ OEM/Cordless Wheel	\$13/51
Logitech Wheel Mouse/MouseMan Optical	\$40/64
Logitech Cordless Wheel Mouse Special ED	\$50.00
Logitech TrackMan Marble Wheel/Marble FXS	\$53/77
Logitech TrackMan Live Cordless	\$172.00
Microsoft Basic Mouse/Cordless Wheel Mice	\$17/50
Microsoft Trekker Mouse/IntelliMouse	\$14/20
Microsoft WheelMouse/IntelliMouse Optical	\$36/67
Microsoft Compatible Mouse PS/2	\$6.00
US Robotics 56K v.90 Int/Ext Fax Modem	\$47/176
US Robotics 56K v.90 USB Pro Ext Modem	\$205.00
Zoltrix 56K v.90 External Fax Modem	\$78.00

Printers

Canon BJC-1000SE/2100 Color Inkjet	\$80/99
Canon BJC-3000/6100 Color Inkjet	\$179/199
Canon BJC-8200 Color Inkjet	\$498.00
Epson Stylus 580/670 Color Inkjet	\$99/130
Epson Stylus 870/875DC Inkjet 1440dpi	\$420/540
Epson Stylus 900/900N Color Inkjet 1440dpi	\$360/660
Epson Stylus 1160 13"x44" Color Inkjet	\$440.00
HP 640C/840C Deskjet Color Printer	\$183/234
HP 930C/950C Deskjet Color Printer	\$305/380
HP 970Cse/990Cse Deskjet Color Printer	\$445/595
HP P1000/P1100 PhotoSmart Color Printer	\$430/725
HP 1220CXi/2000C Deskjet Color Printer	\$700/700
HP 2200 Business Inkjet Printer	\$715.00
HP 2250/2250TN Business Inkjet Printer	\$1000/1430
HP 1100/1100A Laserjet, 600 dpi 8 ppm	\$575/715
HP 2100/2100M Laserjet, 1200 dpi 10 ppm	\$1020/1170

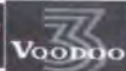


SONY MicroConcept
102 - 1245 West Broadway
Vancouver, B.C. V6H 1G7

Pentium III-Game Blaster

Intel Pentium III Processor/133MHz Bus
 Asus P3V4X/4V4X VIA Apollo Pro 133A ATX Board
 128MB 168 Pin SDRAM (PC133MHz)
 1.44MB Floppy Drive
 20GB Ultra DMA-66 5400RPM IDE Hard Drive
 Ultra DMA66 Cont. w/2x16550 Serial,1xBi-Direc
 tional Parallel,2xUSB Port
 AGP 3dfx Voodoo 3000 Graphics Card with 16MB
 Creative Labs Live! Value Card-Environmental Audio
 52x Speed UDMA CD-ROM
 ML4-480 Sub-woofer Speaker
 Samsung 750S 17" .27mm DP NI SVGA Monitor
 ATX Mid-Tower Case with CSA Power Supply
 107-keys Windows 98 Keyboard,PS/2 Mouse
 2 Year Parts & Service Warranty

PIII 533MHz 256KB L2 ... \$1,355
PIII 733MHz 256KB L2 ... \$1,465
PIII 800MHz 256KB L2 ... \$1,560
PIII 866MHz 256KB L2 ... \$1,730
PIII 933MHz 256KB L2 ... \$1,965



3dfx

ULTRA
ATA/66

4X
AGP



Sound
BLASTER

Live! VALUE

Ultimate Power Station

Intel Pentium III Processor/133MHz Bus
 Asus CUV4X VIA Apollo Pro 133A ATX Board
 128MB 168 Pin SDRAM (PC133MHz)
 1.44MB Floppy Drive
 20GB Ultra DMA-66 7200RPM IDE Hard Drive
 Ultra DMA66 Cont. w/2x16550 Serial,1xBi-Direc
 tional Parallel,4xUSB Port
 AGP nVidia GeForce 2 MX w/32MB TV Out
 Creative Labs Live! Value Card-Environmental Audio
 52x Speed UDMA CD-ROM
 Altec Lansing 45.2 Sub-woofer Speaker
 Samsung 753DF 17" .20mmDP DynalFlat Monitor
 ATX Mid-Tower Case with CSA Power Supply
 107-keys Windows 98 Keyboard,PS/2 Mouse
 2 Year Parts & Service Warranty

PIII 733MHz 256KB L2...\$1,670
PIII 800MHz 256KB L2...\$1,765
PIII 866MHz 256KB L2...\$1,935
PIII 933MHz 256KB L2...\$2,170
PIII 1GHz 256KB L2 ... \$2,510



PC133
pentium III
ULTRA
ATA/66

nVIDIA
GeForce 2 MX



MEMORY SALE! LIFETIME WARRANTY

16MB 60ns 72-Pin EDO SIMM \$ 57.00
 32MB 60ns 72-Pin EDO SIMM \$114.00
 32MB SDRAM PC-100 compliant \$ 47.00
 64MB SDRAM PC-100 compliant \$ 83.00
 128MB SDRAM PC-100 compliant \$169.00
 256MB SDRAM PC-100 compliant \$398.00
 128MB SDRAM PC-133 compliant \$169.00
 256MB SDRAM PC-133 compliant \$405.00
 128MB ECC SDRAM PC-100 compliant \$228.00
 256MB ECC SDRAM PC-100 compliant \$488.00
 128MB ECC SDRAM PC-133 compliant \$240.00
 256MB ECC SDRAM PC-133 compliant \$495.00
 128MB RAMBUS 800MHz \$475.00

BASF/Verbatim/Sony CDR

BASF CDR - \$0.94
 SONY CDR - \$1.35
 BASF 80min CDR - \$1.28
 BASF CDRW - \$2.60

Iomega Zip 56K Modem

100MB Zip Disk \$12.00
 V.90 Internal Fax Voice Modem \$21.00

MICROCONCEPT NETWORK PRODUCTS FOR LESS !!

Novell NetWare

NetWare v3.2
 NetWare v3.2 5/10 User \$1450/3030
 NetWare v3.2 25/50 User \$5270/8080
 NetWare v3.2 Enhancement Pack \$500
IntraNetWare v5.1
 NetWare 5.1 Server Plus 5 User Lic. \$1205
 NetWare 5.1 5/10 Additive Lic. Only \$1205/1740
 NetWare 5.1 25/50 Additive Lic. Only \$3330/5000
Netware Small Business Suite v5
 Netware Small Business v5 Server w/5 user \$1560
 Netware Small Business v5 Connection Lic \$ 85

Microsoft Server

Windows NT Server v4.0 CD 5 Client/10Client... \$1095/1540
 Windows NT v4.0 Client Access Lic. \$ 48
 Windows NT Workstation 4.0 CD \$430
 Windows 2000 Server 5 Clients/10 Clients Lic. \$1360/1615
 Windows 2000 Professional \$430
 BackOffice Small Business Server v4.5 w/5 Clients \$2075
 BackOffice Small Business Server v4.5 w/5 Clients \$4300
 Microsoft Exchange 2000 Server w/5 Clients Lic. \$1815
 Microsoft Site Server V.3.0 w/5 Clients Lic. \$1715
 Microsoft SMS version 2.0 w/10 Clients Lic. \$1555
 Microsoft SQL Server 2000 w/5 Clients Lic. \$2075
 Microsoft Windows 2000 Terminal Server w/5 Clients \$1025

Network Printers

Optra M410 LEXMARK
 1200dpi Image Quality
\$1020.00
 HP 4050 Laserjet, 1200dpi, 17ppm \$1695
 HP 4050N Laserjet, 1200dpi, 17ppm, 16MB Network \$2190
 HP 4050TN Laserjet, 1200 dpi, 17ppm, 16MB Network \$2385
 HP 5000 Laserjet, 1200dpi, 16ppm, 11x17" \$2230
 HP 5000N Laserjet, 1200dpi, 16ppm, 11x17" Network \$3150
 HP 5000GN Laserjet, 1200dpi, Graphics intensive \$3980
 HP 8100 Laserjet, 1200dpi, 32ppm \$3995
 HP 8100N Laserjet, 1200dpi, 32ppm, Network \$4450
 HP 8100DN Laserjet, 1200dpi, 32ppm, Duplexer \$5170
 HP 4500 Color Laserjet, 600dpi, 32MB \$3780
 HP 4500N Color Laserjet, 600dpi, 64MB Network \$4430
 HP 8550 Color Laserjet, 600dpi, 12x18" 32MB \$7040
 HP8550N Color Laserjet, 600dpi, 32MB Network \$8600
 Lexmark Optra E312L, 10ppm, 2MB \$472
 Lexmark Optra E312, 10ppm, 4MB, USB \$585
 Lexmark Optra M410n, 12ppm, 4MB, USB \$1250
 Lexmark Optra M412, 17ppm, 4MB, USB \$1165
 Lexmark Optra M412n, 17ppm, 8MB, 10/100BaseTx \$1575
 Lexmark Optra T610, 15ppm, 4MB, Parallel \$1465
 Lexmark Optra T610n, 15ppm, 8MB, 10/100BaseTx \$1930
 Lexmark Optra T612, 20ppm, 8MB, Parallel & Serial \$1580
 Lexmark Optra T612n, 20ppm, 16MB, 10/100BaseTx \$2030
 Lexmark Optra T614, 25ppm, 8MB, Parallel \$1700
 Lexmark Optra T614n, 25ppm, 16MB, 10/100BaseTx \$2580
 Lexmark Optra T616, 35ppm, 16MB, Parallel \$2850
 Lexmark Optra T616n, 35ppm, 16MB, 10/100BaseTx \$3330
 Lexmark Optra W810, 35ppm, 16MB, 11x17", Parallel \$3840
 Lexmark Optra W810n, 35ppm, 16MB, 11x17", Network \$4080
 Lexmark Optra C710, 3ppm, 32MB, 1200dpi \$2915
 Lexmark Optra C710N, 3ppm, 32MB, 1200dpi, Network \$3310
 Lexmark Optra Color 1200, 12ppm, 1200dpi, 11x17" \$5350
 Lexmark Optra Color 1200N, 12ppm, 1200dpi, 11x17" \$6450

Tape / CD ROM Drive

HP Colorado 8GB Int/Ext Backup Drive (no media) \$280/340
 HP Colorado 14GB Int/Ext Backup Drive (no media) \$338/405
 HP Colorado 20GB Int/Ext Travan Drive (no media) \$380/445
 Hewlett Packard SureStore 8GB Int/Ext DAT Drive \$930/1105
 Hewlett Packard SureStore 24GB Int/Ext DAT Drive \$1220/1395
 Hewlett Packard SureStore 40GB Int/Ext DDS-4 DAT \$1630/1890
 Hewlett Packard SureStore DLT 40/6 SCSi Drive \$2610/2900
 Hewlett Packard SureStore DLT 80/16 SCSi Drive \$6135/6390
 Onstream 30GB IDE/SCSi Int. Drive Echo SW Incl. \$425/705
 Onstream 50GB SCSi Int. Drive Echo SW Incl. \$ 99 00
 Quantum DLT4000 40GB Int/Ext SCSi Drive \$2170/2660
 Quantum DLT8000 80GB Int/Ext SCSi Drive \$6320/6720
 Seagate Scorpion 8GB DAT Int/Ext Drive \$770/945
 Seagate Scorpion 24GB DAT Int/Ext Drive \$1040/1215
 Seagate Scorpion 96GB DAT Int/Ext Drive \$2495/2820
 Seagate Scorpion 240GB DAT Internal SCSi Drive \$ 349 00
 Seagate 8GB TR-4 IDE/SCSi Tape Backup Drive \$288/310
 Seagate TapeStore 20GB IDE/SCSi Drive \$385/450
 Sony SuperStation 10GB Ext Drive \$260 00
 Sony SDT-7000 Int/Ext. 4-8GB DAT \$825/1000
 Sony SDT-9000 Int/Ext. 24GB DAT \$1060/1290
 Sony SDT-11000 Int/Ext 40GB DDS-4 DAT SCSi \$1395/1725
 Sony AIT 200GB Int/Ext Autoloader \$5350/5950
 Sony AIT 400GB Ext Autoloader \$7910 00

Power Protection

APC BackUPS 300
\$126.00
American Power
 BackUPS 300/500M/650M \$126/180/250
 BackUPS Pro 280S/350/420S \$180/210/288
 BackUPS Pro 500/650S \$235/385
 BackUPS Pro 1000/1400 \$550/705
 SmartUPS SU420/SU620NET \$318/410
 SmartUPS SU700/SU1000/SU1400NET \$499/730/930
 SmartUPS SU2200/SU3000/5000NET \$1350/2060/3590
 Back UPS Office BF350/BF500 \$116/145
 Matrix 3000VA/5000VA (Modular UPS) \$3600/6140
 SmartCELL for Matrix 3000/5000 \$ 70 00
 Line Conditioner LR600/LR1250 \$128/173
 Personal SurgeArrest 7/7 Outlets with Tel \$ 25 / 33
 Professional SurgeArrest 7/7 Outlets with Tel \$ 40 / 52
 Professional SurgeArrest 8/8 Outlets with Tel \$ 45 / 58
 Network SurgeArrest 7/7 Outlets with Tel \$ 48 / 62
 Notebook Surge Protector \$ 1 73
 Battery for Compaq/IBM/Toshiba Notebook (NiMH/LiIon) C a l l

Cables & Jacks

Cable Tester
\$80.00
Twisted Pair
 Assembly, Cat 5 10/100BaseT Cable 10/15/25 ft \$8/10/12
 Assembly, Cat 5 10/100BaseT Cable 50/75/100 ft \$20/27/35
 Cable, Cat 5 10/100BaseT Cable, per ft \$0.25
 Cable, Cat 5 10/100BaseT Cable, per 1000 ft \$160
 Connector RJ45M \$ 2 58
 Tool, RJ45 Crimping \$ 8 00
 Multi-Network Cable Tester \$ 8 00
Coaxial
 Assembly, RG58/AU Thin Coax 25/50/100 ft \$15/22/35
 Cable, RG58/AU Bulk per ft \$0.25
 Cable, RG58/AU Bulk per 1000 ft \$180
 Connector, BNC "T" Terminator 52 ohm \$2.50
 Tool BNC Crimping \$ 3 00

10BaseT/2 Adapters

3Com 3C19250 10BaseT USB Network Interface \$ 89
 AOpen PCI Ethernet Combo \$ 1 55
 D-Link DE-220PCT ISA/DE-528CT+ PCI Combo \$23/25
 Intel PCA8210B ISA EtherExpress Pro 10+ Combo \$ 96
 SMC 1208BT PCI EzCard Combo \$ 3 4
 SMC 8416BT ISA/8432BT PCI EtherEZ Combo \$60/60
Print Servers/USB Hub
 D-Link DP-300 10/100BT Print Server RJ45, 2P1S \$220
 HP JetDirect J3258B 170X 10BaseT Ext Print Server \$205
 HP JetDirect J4100A 400N 10/100BaseT Print Server \$580
 HP JetDirect J3263A 300X 10/100BaseT Ext Print Server \$360
 HP JetDirect J3265A 500X 10/100BaseT Ext Print Server \$480
 HP JetDirect J3110A 600N RJ45 10BaseT \$360
 HP JetDirect J3113A 600N 10/100BaseT \$460
 HP JetDirect J4135A USB Connectivity Card \$158
 Intel NetPortExpress Pro Ext. Printer Server PCA2151B \$368
 Intel NetPortExpress 10/100 Ext. Printer Server 1 Port \$310
 Intel NetPortExpress 10/100 Ext. Printer Server 3 Port \$445
 Intel InBusiness Print Station SPS110TX2US \$235
 Netgear PS110 10/100BT Print Server \$163
 Linksys USBHUB04/SOHO USB Hub 4 Port \$47/38
 Xircor Portgear USB Hub 4 Port/7 Port \$75/93

PCMCIA Adapters

D-Link DE-660CT PCMCIA Combo NE2000 Compatible \$ 77
 Xircor Realport 10/100 Ethernet + 56K v.90 Modem \$380
 Xircor Realport RM56V1 56K v.90 Modem \$182
 Xircor Realport 2 R2BM56V WinShift 56K Modem \$196
 Xircor Realport 2 R2BM56V WinShift 56K Modem \$205
 Xircor Realport 2 R2BM56V WinShift 56K Modem \$225
 Xircor Realport 2 R2BM-100BTX 10/100 Ethernet \$218

10 BaseT Hubs

3Com 3C16440 SuperStack II Entry Hub 12 Port \$205
 3Com 3C16441 SuperStack II Entry Hub 24 Port \$305
 3Com 3C16405 SuperStack II PSH Hub 40 12 Port \$710
 3Com 3C16406 SuperStack II PSH Hub 40 24 Port \$1250
 3Com 3C16450 SuperStack II PSH Hub 50 24 Port \$1350
 3Com 3C16670A SuperStack II Hub 10 12 Port \$745
 3Com 3C16671A SuperStack II Hub 10 24 Port \$1300
 3Com 3C16610 SuperStack II Dual Speed Hub 12 Port \$950
 3Com 3C16611 SuperStack II Dual Speed Hub 24 Port \$1320
 3Com 3C16700A OfficeConnect 8/TPO \$ 89
 3Com 3C16701A OfficeConnect 8/TPO \$148
 3Com 3C16702A OfficeConnect 16/TPO \$190
 3Com 3C16704A OfficeConnect 4/TPO \$ 59
 3Com 3C16710 OfficeConnect 8/TPO \$490
 AOpen SOHO-5+ 5 Port/528 8 Port Hub \$33/48
 D-Link DE-805 TPC 5 Port Hub \$ 53
 D-Link DE-809TC 8 Port/DE-812TP+ 12 Port Hub \$66/203
 D-Link DE-816TP 16 Port/DE-824TP 24 Port Hub \$180/294
 Intel InBusiness SH10T5 5 Port/SH10T8 8 Port Hub \$64/77
 Intel InBusiness SH10T8 8 Port Hub (with coax) \$114
 Intel InBusiness SR10TPSUS Internet Station \$186
 Netgear EN104TPNA/EN104NA 4 Port Hub \$41/53
 Netgear EN106TP 6 Port Hub \$ 52
 Netgear EN108TPNA/EN108NA 8 Port Hub \$63/74
 Netgear EN116NA 16 Port Hub \$127
 SMC 3605T-EZ 5 Port/SMC 3608T-EZ 8 Port Hub \$53/80
 SMC 3616TC-EZ 16 Port Hub (with coax) \$194

Home Network

3Com 3C410-Kit HomeConnect 10X PCI PhoneLine Kit \$190
 3Com 3CP4130 HomeConnect ADSL Ext Modem USB 10BT \$393
 3Com 3CR2920 HomeConnect Ext Cable Modem \$348
 D-Link DHN-910 10MB Home PhoneLine Network Kit \$173
 Intel AnyPoint Home Network PCI Card \$ 64
 Intel AnyPoint USB Network Card w/AnyPoint Connect \$ 80

Switches

3Com 3C16733 OfficeConnect Switch 10/100BT 4 Port \$150
 3Com 3C16734 OfficeConnect Switch 10/100BT 8 Port \$212
 3Com 3C16951 SuperStack II 10 Switch 1100 12 Port \$965
 3Com 3C16950 SuperStack II 10 Switch 1100 24 Port \$1370
 3Com 3C16981 SuperStack II 100 Switch 3300 12 Port \$1700
 3Com 3C16980 SuperStack II 100 Switch 3300 24 Port \$2620
 3Com 3C39024 SuperStack II 100 Switch 3900 24 Port \$4110
 CISCO Catalyst 2912-XL-A 10/100 Switch 12 Port \$1680
 CISCO Catalyst 2924-XL-A 10/100 Switch 24 Port \$2235
 D-Link DSS-5+ 10/100 5 NWay Desktop Switch \$120
 D-Link DSS-8+ 10/100 8 NWay Desktop Switch \$132
 D-Link DSS-16+ 10/100 16 NWay Rackmount Switch \$465
 D-Link DSS-24 10/100 24 Port Switch \$1055
 HP J4120A ProCurve 1600M 16 Port 10/100 Switch \$1540
 HP J4121A ProCurve 4000M 40 Port 10/100 Switch \$3175
 Intel InBusiness SS101TX8 Port/SS101TX16 Port Switch \$203/530
 Intel Express 410T 10/100 Standalone Switch 16 Port \$ 880
 Intel Express 410T 10/100 Standalone Switch 24 Port \$1150
 Intel Express 460T 10/100 Standalone Switch 16 Port \$1350
 Intel Express 460T 10/100 Standalone Switch 24 Port \$1650
 Intel Express 520T 10/100 Scalable Switch 12 Port \$1915
 Intel NetStructure 470T Switch 6 1000BaseT Port \$4140
 Intel NetStructure 480T Routing Switch 12 1000BaseT Ports \$10800
 Netgear FS105 5 10/100BaseT Port Switch (Slimline) \$126
 Netgear FS108NA 8 10/100BaseT Port Switch \$180

100/1000 Mbps Systems

3Com 3C905B TX PCI
\$62.00
 3Com 3C905C-TX-M FastEtherLink PC Management \$122
 3Com 3C905B-COMBO FastEtherLink 10/100 Combo \$200
 3Com 3C990-TX-95 EtherLink 3XP 56 Bit Encryption \$143
 3Com 3C990-TX-97 EtherLink 3XP 168 Bit Encryption \$143
 3Com 3C980C-TX Fast EtherLink Server Card \$139
 3Com 3C985B-SX Gigabit EtherLink Server Card \$1045
 3Com 3C16722 OfficeConnectFastEthernet 8 Port Hub \$230
 3Com 3C16721 OfficeConnectFastEthernet 12 Port Hub \$395
 3Com 3C16750B OfficeConnect 10/100 8 Port Hub \$166
 3Com 3C16751B OfficeConnect 10/100 16 Port Hub \$315
 D-Link DFE-530TX 10/100 PCI FastEthernet Adapter \$ 22
 D-Link DFE-570TX 10/100 4 Port PCI Server Adapter \$380
 D-Link DFE-904 10/100 Dual Speed 4 Port Hub \$118
 D-Link DFE-908DX 10/100 8 Port NWay Hub \$245
 D-Link DFE-2624i Dual Speed 10/100 24 Port Hub \$1245
 D-Link DSH-5 Dual Speed 10/100 5 Port Hub w/Switch \$ 97
 D-Link DSH-8 Dual Speed 10/100 8 Port Hub w/Switch \$150
 D-Link DSH-16 Dual Speed 10/100 16 Port Hub w/Switch \$284
 HP J3294A ProCurve 10/100BaseT 12 Port Hub \$485
 Intel P1A8460 Pro 100+ PCI Fast Ethernet Adapter \$ 60
 Intel P1A8470 EtherExpress Pro/100+ Server Adapter \$135
 Intel P1A8472 Pro 100+ Dual Port Server Adapter \$359
 Intel P1A8474B Pro/100 S Adapter (DES) \$168
 Intel P1A8474BUS Pro/100 S Adapter (3DES) \$168
 Intel P1A8480 Pro/100 Intelligent Server Adapter \$480
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15"



	Model	Dot Pitch	Max Res.	Viewable	H-Scan	Price
OPTIQUEST.	Q51	0.28mm	1024x768	13.7"	30-50KHz	\$ 220
OPTIQUEST.	Q55	0.28mm	1280x1024	13.8"	30-70KHz	\$ 238
ViewSonic	M50	0.27mm	1280x1024	13.8"	30-70KHz	\$ 254
ViewSonic	G655	0.27mm	1280x1024	14.0"	30-70KHz	\$ 265

17"



OPTIQUEST.	Q71	0.27mm	1280x1024	16.0"	30-70KHz	\$ 308
OPTIQUEST.	Q75	0.23mm	1600x1200	16.0"	30-85KHz	\$ 400
ViewSonic	E771	0.27mm	1280x1024	16.0"	30-70KHz	\$ 330
ViewSonic	E773	0.25mm	1280x1024	16.0"	30-70KHz	\$ 380
ViewSonic	G773	0.26mm	1280x1024	16.0"	30-70KHz	\$ 405
ViewSonic	GS771	0.27mm	1280x1024	16.0"	30-70KHz	\$ 450
ViewSonic	PS775	0.25mm	1600x1200	16.0"	30-95KHz	\$ 485
ViewSonic	M70	0.27mm	1280x1024	16.0"	30-70KHz	\$ 375
ViewSonic	EF70	0.25mm	1280x1024	16.0"	30-70KHz	\$ 410
ViewSonic	PF775	0.25mm	1600x1200	16.0"	30-97KHz	\$ 500
ViewSonic	PF77	0.25mm	1600x1200	16.0"	30-97KHz	\$ 555

19"



OPTIQUEST.	Q95	0.23mm	1600x1200	18.0"	30-86KHz	\$ 490
ViewSonic	E790	0.26mm	1600x1280	18.0"	30-95KHz	\$ 530
ViewSonic	E790B	0.26mm	1600x1280	18.0"	30-95KHz	\$ 585
ViewSonic	GS790	0.26mm	1600x1280	18.0"	30-95KHz	\$ 620
ViewSonic	PS790	0.25mm	1600x1280	18.0"	30-95KHz	\$ 755
ViewSonic	PF790	0.25mm	1600x1200	18.0"	30-97KHz	\$ 705
ViewSonic	PF795	0.25mm	1920x1440	18.0"	30-110KHz	\$ 840

21"



OPTIQUEST.	Q115	0.26mm	1600x1280	19.6"	30-95KHz	\$1,025
ViewSonic	G810	0.25mm	1600x1200	20.0"	30-89KHz	\$1,175
ViewSonic	P810	0.25mm	1600x1200	20.0"	30-95KHz	\$1,210
ViewSonic	PF815	0.25mm	1920x1440	20.0"	30-117KHz	\$1,340
ViewSonic	P817	0.26mm	2048x1536	20.0"	30-137KHz	\$2,190

LCD Panel



ViewSonic	VE150	0.30mm	1024x768	15.0"	30-62KHz	\$1,340
ViewSonic	VG150	0.30mm	1024x768	15.0"	30-62KHz	\$1,345
ViewSonic	VPD150	0.30mm	1024x768	15.0"	48-62KHz	\$1,545
ViewSonic	VP150	0.30mm	1024x768	15.0"	30-62KHz	\$1,510
ViewSonic	VP151	0.30mm	1280x1024	15.0"	30-95KHz	\$2,000
ViewSonic	VP181	0.30mm	1600x1200	18.1"	30-107KHz	\$4,390



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New inkjets from HP, Lexmark

By Sean Carruthers

Hewlett-Packard DeskJet 990Cxi

From: Hewlett-Packard Company
Tel: 800-387-3867 <http://www.hp.com>
Estimated street price: \$599.99

Hewlett-Packard's DeskJet line is one of the most respected in the inkjet printer category and the 990Cxi, an update to the award-winning DeskJet 970Cse, is bound to get the same respect. It's a professional-level inkjet that will also appeal to the demanding home user, especially anyone interested in photo-quality output.

This model looks like the 970Cse, but with some improvements under the hood. First is an automatic paper sensor to determine the grade of paper being used. In the past, when you changed between plain and photo paper, you had to go into the printer control panel, and make a number of changes for paper type and quality. With the 990Cxi, a blue light shines on the paper after it loads, which sends information back for

optimization of the image. You can still override this if you choose, but it's a nice time-saver.

Secondly, the printer partially fixes up a problem with the previous version, in the dots per inch (dpi) settings. With the 970Cse, you had the choice of printing in Photo REt III (600 dpi with dot-placement accuracy enhancements) or 2,400x1,200 dpi mode when using photo paper. However, switching to the 2,400x1,200 resolution required quite a few steps, some of which weren't totally obvious. The printer control software for the 990Cxi fixes that up, giving the user an obvious choice between the two on the first page of the printer setting dialogue box. Unfortunately, switching to the 2,400x1,200 dpi mode still creates a massive image file on your hard disk, and uses a ton of system resources. Some users have reported system crashes when trying to print images in this mode, and this is still likely to be the case.

Thirdly, the 990Cxi has a built-in infrared

sensor, allowing you to send files to the printer without cables. Now, users with notebooks can just walk up to the printer, aim, and print. Of course, this would require the right software to be installed on the notebook computer ahead of time. Other handheld devices, such as Palm and Windows CE machines, can also use this feature if set up properly.

The printer still comes with both parallel and USB interfaces, but driver support this time out is expanded, offering drivers for Windows 9x, 2000, and Me, as well as support for Macintosh computers (System 8.1 and above) with USB.

The printer has some of the standard features that made the previous model an excellent choice, including a standard duplexing unit (perfect for creating brochures or home-made greeting cards), an adjustable paper input tray, and a print cancel button on the front of the machine that sends a cancel command back to the PC.

The DeskJet 990Cxi has a print speed rated

at up to 17 pages per minute (ppm). While it's true that print speeds are often somewhat inflated, based on a non-existent document that has almost nothing on it, the 990Cxi actually makes a valiant effort. During a test run with a 17-page text document (how's that for convenient?), the 990Cxi managed to spit out a draft-mode copy in just over a minute and a half, in perfectly legible quality (in fact, the quality is actually every bit as good in draft mode as most printers were capable of in highest-quality mode just a couple of years ago). Even better, the time to print first page has been substantially reduced, with our first sheet hitting the output tray in under 10 seconds from the time of confirming the print on the PC. Of course, photographs will take substantially longer, as will text in best-quality mode.

Overall, the DeskJet 990Cxi makes an excellent choice for those looking for both quality and speed, who don't want have to choose between the two.

Continued on page 22

What's New

Continued from page 12

song or the artist's name. By pressing the button on the eMarker device, people can "eMark" songs they hear on the radio and locate the song titles and artist information through eMarker.com.

The device easily links to a key chain and fits in a pocket or purse. To eMark a song, the user presses the button on the device, then connects the eMarker to a PC through a simple USB connection. This launches EMarker.com through a Web browser, and displays the selected songs by matching the time the song was played to the radio station, based on information provided when the user sets up their account.

The eMarker.com site offers 30-second audio samples, storage of favourite song titles, allows users to locate artist and album information, and connects to various music retailer Web sites.

EMarker.com is concentrating its launch marketing campaign in the top 11 market areas in the U.S.

—TCP Staff

Studio Artist enhancements demo'd

Synthetik Software (<http://www.synthetik.com>) demonstrated several new enhancements to its award-winning Studio Artist at the San Francisco Seybold Exposition, recently. Studio Artist 1.5 includes editable keyframe timeline animation for all of the different features available in Studio Artist. This greatly expands the range of potential visual effects for movie processing as well as creates new expressive capabilities for interactive 2D painting, according to a recent Synthetik press release.

Paint Synthesizer enhancements include new 3D paint lighting and materials modeling controls, colourization and dynamic brush texture options, movie brush capabilities, intelligent auto-regionization, full support for pen-tilt recording in paint action sequences, and new gradient effects.

Additional new features include a resolution-independent core effects processing module called the Texture Synthesizer and improved image and movie morphing capabilities. Studio Artist 1.5 is available immediately and is a free email update to registered Studio Artist users.

Studio Artist is billed as the first commercial program for computer artists that incorporates research results from cognitive neuroscience

investigations into the nature of visual perception in the brain. The program uses human visual modeling to construct an internal representation from a source image that is used to direct smart assisted painting and drawing.

Studio Artist's suggested retail price is US\$329.

—TCP Staff

Dictionary goes interactive on U.K. TV

LONDON, England—NTL has contracted with Xrefer.com, the Web reference engine, to offer the Oxford English Reference Dictionary (OERD) through its Interactive Knowledge channel. This is the first time a dictionary will be accessible through interactive TV, XRefer claims.

To offer the service via NTL's cable modem set-top box (STB), Xrefer.com says it has designed an "intuitive interface" through which the viewer can explore Oxford University Press' OERD via the TV screen.

The OERD is billed as the leading single encyclopedic dictionary from the world's largest university press and will provide viewers of the U.K.'s Knowledge Channel with searchable access to more than 190,000 definitions and 245,000 encyclopedic facts.

NTL's Knowledge Channel, meanwhile, is billed as a gateway to interactive learning at home that "provides an educational resource for the whole family."

NTL says it plans for the channel to become an everyday educational tool that will be especially useful for those families without PCs at home.

Michele Seisun, NTL Interactive's Knowledge Channel manager, said that, thanks to the partnership with Xrefer.com, the carrier is able to fulfill its objective of furthering of learning and culture via diverse media.

Xrefer's main claim to fame in the PC online stakes is a downloadable applet called Xrefer it. The applet, when downloaded to a user's Web browser, allows Web users to add the Xrefer.com reference engine to the toolbar of their browsers.

The firm says the free-to-download button can be installed on a PC in a matter of seconds and will work on Internet Explorer 4.0 and Netscape Navigator or Communicator 4.0 or

higher running under Linux.

The new Xrefer it button, which is available at <http://www.xrefer.com/xreferit.jsp>, is billed as giving users easy one-click access to xrefer.com's growing range of aggregated and integrated reference content.

—Newsbytes

A WAP search engine that works

LONDON, England—Mobile Lifestreams MobileWAP service (<http://www.mobilewap.com>) is a WAP search engine with two main channels that allow visitors the option of limiting searches to sites that are selected and reviewed by the team at Mobile Lifestreams or from the complete list of sites picked up by the firm's electronic agent. The search engine offers a WAP phone simulator that allows users to preview pages to see how they appear on small phone screens. The site can also be accessed via a WAP phone.

—Newsbytes

Connect to FileMaker data wirelessly

LONDON, England—Workgroups and individuals who want wireless access from Palm OS handhelds to all kinds of FileMaker Pro database files can learn how to do it by pointing their browsers at the FileMaker Web site (<http://www.filemaker.com>). The site provides a free step-by-step tutorial along with code required for wireless connection to existing and new FileMaker databases.

—Newsbytes

Tucows to register .ca domain names

The newly formed Canadian Internet Registration Authority (CIRA) will be responsible for the domain name registration process as of Nov. 11, and will allow holders of existing .ca names to pre-register those names for renewal. All Canadian citizens and organizations may pre-register new names.

Registrants in the .ca namespace risk losing their names after Dec. 1 if they do not pre-register. Pre-registration officially began Sept. 18.

Tucows is operating strictly as a wholesale registrar. For an easy transition, a list of their approved retail partners is available at <http://www.tucows.ca>. This way customers can continue to use their existing domain name service providers.

Tucows resellers are also accepting requests for advance registration of new .ca domain names.

Under the existing rules, .ca registrants are only allowed one registration per individual per organization.

Applicants are required to have an incorporated company, a trademark, or offices in more than one province.

However, as of Nov. 11, any Canadian citizen, permanent Canadian resident or legal representative of Canadian corporations, trusts, partnerships and associations can register an unlimited number of .ca names with CIRA.

—CanadaComputes.com

New service to "accelerate" your PC

On Sept. 22, MadOnion.com unveiled its PC XL-R8R (pronounced "accelerator"), which is designed to help computer experts and newbies alike eke the most out of their boxes.

XL-R8R is perhaps most useful for those who have purchased a computer in the last six to 12 months and would like to upgrade those systems for an enhanced gaming experience.

XL-R8R learns your system and decides which components you should upgrade for maximum performance.

It gathers "performance indicators," deciphers the hardware configuration, dips into MadOnion's "performance database" and recommends tailored upgrades.

If you want to compare notes on your PC with others, XL-R8R will give you a system score as well as a detailed and summarized system report.

MadOnion says its service goes beyond the home-user market. You can also use this report to communicate hardware issues with technical support departments.

To use XL-R8R, you need the following minimum system: 300 MHz Intel Celeron or comparable processor; 64 MB of memory; 50 MB of free hard disk space; Microsoft Windows 95, 98 Millennium Edition (Me), or 2000 Pro; Microsoft DirectX 7; a 3D accelerator similar to ATI's Rage128, nVidia's RivaTNT or 3Dfx's Voodoo3, and; a desktop (screen) resolution of 640x480 with 16-bit colour.

XL-R8R is available now as a free shareware download at MadOnion's Web site (<http://www.madonion.com>).

—CanadaComputes.com



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< NEW & NOTABLE >

MediaDepot offers secure storage for digital creations online

By Chris Keam

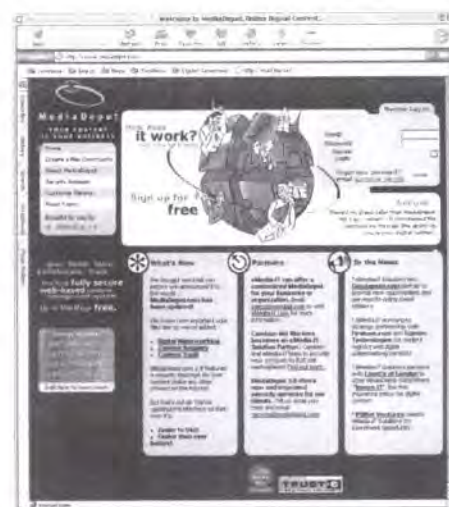
The Web has become a popular meeting place for creative professionals and their clients. Online proofing is just one example of the ways in which handling content digitally can save time and money—bypassing the hard copy and couriers, delivering images right to the client's desktop. However, this enhanced access also opens the door to security issues. A study conducted by PricewaterhouseCoopers and the American Society for Industrial Security stated that Fortune 1000 companies lost more than US\$45 billion from the theft of proprietary information in 1999.

Studies and statistics being what they are, all those zeros should be taken with a grain of salt. But content security is a hot button, and a valid concern, in an overwhelmingly digital media environment. It's not so hard to imagine how an unscrupulous approach to ad creation might include the occasional surf through other designers' portfolio sites for a carefully blurred background image now and again. It is harder, however, to imagine the Napsterization of the stock image/footage industry as a good thing for the (mostly) individuals who create many of our culture's visual images.

eMedia-IT Solutions believes it has the solution to digi-plagiarism with the release of Version 2.8 of its Web-based content security suite MediaDepot.com.

In June, 1999, eMedia-IT launched its first product, an online content management service known as MediaDepot (<http://www.MediaDepot.com>). The service provides a secure environment where professionals can store and safely share content with colleagues and clients. Individual sign-ups get 30 MB of space for free. Creating a "community" of five individuals who use the site will net 100 MB for the user.

According to eMedia-IT's Shelley Campbell, MediaDepot is well positioned for the incoming tide of digital content. "Our current system is more multimedia oriented than traditional document management systems. And we are working



on methods of security for streaming and multimedia content and watermarking for audio."

In addition to providing a secure environment for file storage, MediaDepot.com also features an audit trail, file permissions, sign-in/sign-out, and, with the latest release, watermarking and a content registry. The MediaDepot application integrates solutions from Firstuse and Signum. Firstuse's technology offers time stamping, digital fingerprinting, and registered authentication of digital content to the MediaDepot Web application. Signum Technologies handles the digital watermarking.

"This package provides a valuable niche service to the online community. Time stamping, digital fingerprinting and registered authentication enhances an already robust content management service," says Cliff Michaels, co-founder and co-chief executive officer of Firstuse.com.

MediaDepot.com also plans to offer customization options that allow companies to make the MediaDepot solution an in-house system or to utilize the customer's own branding to create a customized community on the site.

Chris Keam is a Vancouver-based writer and video editor. He can be reached at ckeam@direct.ca.

New inkjets from HP, Lexmark

Continued from page 21

Lexmark Z42 Color Jetprinter

From: Lexmark Canada

Tel: 800-539-6275 <http://www.lexmark.com/canada/>
Estimated street price: \$229

If the HP 990Cxi is a sequel, you might want to think of Lexmark's Z42 as a prequel of sorts. The Z52, released earlier, represented the top end of Lexmark's Z series of printers, which also includes the budget-oriented Z12 and the mid-range Z32. Now, the Z42 fills in a gap between mid and high-end, giving users a high-quality choice at a slightly lower price.

The Z42 has many of the same features as the Z52, including a print engine capable of delivering 2,400x1,200 dpi output on plain and photo paper, both USB and parallel interfaces, and Lexmark's special Accu-Feed paper handling system, which cuts down drastically on paper jams. Also, the Z42 supports Macintosh via the USB interface, which is something Lexmark's inkjet printers have not done until very recently.

Where the compromise occurs is with the print speed, with a rating of 10 ppm in draft mode, as opposed to the faster 15 ppm rating of the Z52. This doesn't affect the quality of the images or text, however, which appear

crisp and detailed at the highest settings. As with other recent inkjet models, even draft mode output is completely legible and comparable to top-quality output of the printers of yesteryear.

The printer ships with all components attached: the paper output tray slides out from under the printer, and the paper input support folds up when needed, doubling as a dustcover for the paper input tray when the machine is not in use. Setup is quick and easy with the software as well, which steps you through cartridge setup.

One feature of Lexmark's printer drivers that continues to be handy, even for the experienced printer user, are audio cues: when paper is out, or the cable is detached, you hear a voice telling you that something needs your attention.

Although the printer ships with a minimal software bundle, the box contains a special brochure with a list of software titles. Users can get two of these titles for US\$10.99 (basically the price of shipping and handling), and get a special price on two further titles, if desired. Titles include assorted software from Corel (CorelDraw Select or WordPerfect Office 2000), a selection of games and some educational software. □

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ECC PC100 SDRAM			\$176	\$240	\$499	
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INTEL PENTIUM III - FC-PGA	\$210		\$364		\$301		\$353	\$309	\$311	\$299	\$419	\$404	\$754	\$851		\$1,152		
INTEL PENTIUM III - SLOT-1			\$229		\$328		\$333	\$308	\$362			\$501	\$936	\$799				
AMD K7 ATHLON			\$150		\$264		\$176		\$252		\$271	\$377	\$427				\$990	\$1,373
AMD DURON					\$108		\$144		\$163									
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ABIT	BE6	I440BX	233-500	P III SLOT-1	\$200
ABIT	BP6	I440BX	233-500	SOCKET 370	\$204
ABIT	BE6-2	I440BX	233-500	P III SLOT-1	\$193
ABIT	KA7	VIA KT133	550-1000	ATHLON SLOT-A	\$221
ABIT	KA7-100	VIA KT133	550-1000	ATHLON SLOT-A	\$260
ABIT	KT7	VIA KT133	500-1000	ATHLON SLOT-A	\$243/\$258
ABIT	V16X4	VIA KT133	300-750	P III SLOT-1	\$145
ACER	AK72	VIA KT133	500-1000	ATHLON SLOT-A	\$213
ACER	AX64	VIA KT133	233-933	P III SLOT-1	\$143
ACER	AX68C (GOLD)	I440BX	233-933	P III SLOT-1	\$227
ASUS	CUSL-2	I815E	450-933	SOCKET 370	\$240
ASUS	CUA	ALADDIN TNT2	450-933	SOCKET 370	\$233
ASUS	CUV4X	VIA 694X	300-800	P III - FC PGA	\$174
ASUS	CUBX	I440BX	300-800	P III - FC PGA	\$199
ASUS	K7V	VIA KT133	550-1000	ATHLON SLOT-A	\$220
ASUS	A7V w/sound	KT133	500-1000	SOCKET A	\$252
ASUS	P3V4X	VIA KT133	233-733	P III SLOT-1	\$169
ASUS	P3V	VIA KT133	300-733	P III SLOT-1	\$139
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Elitegroup	P68ET-ML	SS 620/5595	233-600	SLOT-1 + FCPGA	\$129
FIIC	SD11	AMD 751	500-1000	ATHLON SLOT-A	\$246
Gigabyte	GA-72X	KT133	500-1000	SOCKET A	\$194
Gigabyte	6VX7-4X	VIA 133A	300-750	P III - FC PGA	\$139
Gigabyte	6VX-4X	VIA 133A	300-750	P III - FC PGA	\$141
Gigabyte	60MM7E	I815	333-933	P III - FC PGA	\$242
Microstar	MS-6163PRO	I440BX	233-933	P III SLOT-1	\$153
Microstar	MS-6321	VIA 694X	300-800 + DUAL FC-PGA		\$264
Microstar	MS-6182	Intel 810	350-667	P III - FC PGA	\$165
Microstar	K71 PRO	KT133	500-1000	SOCKET A	

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IBM	75.0GB	8.5ms	7200	2MB	UDMA100 \$830
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MAXTOR	15.0GB	9ms	7200	2MB	UDMA66 \$150
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MAXTOR	20.0GB	9.5ms	7200	2MB	UDMA66 \$196
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MAXTOR	40.0GB		5400	2MB	UDMA66 \$315
MAXTOR	61.0GB		5400	2MB	UDMA66 \$421
MAXTOR	81.9GB	9ms	5400	2MB	UDMA100 \$500
QUANTUM	6.4GB	9ms	5400	512K	UDMA66 \$158
QUANTUM	10.2GB	8.5ms	7200	2MB	UDMA66 \$149
QUANTUM	15.0GB	8.5ms	7200	2MB	UDMA66 \$167
QUANTUM	20.0GB	8.5ms	7200	2MB	UDMA66 \$170
QUANTUM	30.0GB	8.5ms	7200	2MB	UDMA66 \$271
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ADAPTEC 2940UW ULTRA WIDE SCSI KIT PCI	\$302
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ARTEC	1236USB	36-BIT	600X1200	\$105
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CANON	630U	36-BIT	600X1200	\$138
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Metamail offers formatted email

Email may be the most popular feature of the Internet, but it hasn't changed much since it was introduced.

"Email has no differentiation, other than email text attachments," says Scott Rankine, president and chief executive officer for Metamail Inc. (<http://www.metamail.com>) in Richmond Hill, Ont. He says today, one person's email messages look like everyone else's.

While HTML can be used to jazz up a message, not every email solution can read HTML coding properly, and the popular Adobe Acrobat Portable Document Format (PDF), while allowing text layout to be preserved, is still an attachment.

"I can send you an Adobe attachment with some kind of text header," Rankine adds. "But it is still an attachment. It is not the same as being able to open up a message and see on screen an actual document. Instead, you have to go through a process of clicking on the Adobe attachment, opening it up and then zooming around. What it is, is an document output publishing technology."

What Metamail wants to do instead is offer email users a way to transmit actual documents over email.

ments over email.

This should not be confused with an attachment, or simply placing text in the body of an email message.

The Metamail email would preserve not only the actual text layout of a document, but also the look and feel of paper documents, including letterheads, signatures and paper texture.

Instead, Metamail would produce an email in which the document received would appear the same as if it were mailed and delivered to the recipient's desk.

The Metamail email would preserve not only the actual text layout of a document, but

also the look and feel of paper documents, including letterheads, signatures, and paper texture.

"So what we did was come up with an idea that we like to call Email Publishing," Rankine says. "We did a ground-up redesign of email so we could achieve a document metaphor."

Metamail works as an add-on for Microsoft's Outlook and can be downloaded for free from Metamail. The add-on will then automatically open Metamail email that has been sent from the Metamail Enterprise Server. The server is meant to integrate with a company's existing customer relations software. Metamail hopes the server will be popular with Internet marketers, public relations companies, and companies in general who are looking to transmit important documents to clients.

Metamail also comes with a content creation tool, including page layout controls for creating columns, adding inline graphics, signatures, and attached files. It also comes with standard stationary templates, InstantView Attachments and Reader Response Cards.

Currently, Metamail is being made avail-



able to large corporations, marketing and public relations agencies.

Rankine expects that by fall 2001, a consumer version of Metamail with improved security features and the ability to attach video clips will be made available.

—Tom Venetis

Intel expects to ride out recall of 1.13 GHz Pentium III processors

Intel does not expect that the late August recall of its Pentium III 1.13 GHz chip will affect its fortunes or reputation.

The 1.13 GHz Pentium III was found to have a flaw that caused system errors when running certain programs at a certain temperature.

The applications affected by the flaw were a Linux recompile and a benchmark test.

"Since we launched it on July 31, and the number of units shipped out to customers was very small, so we decided not to take any chances and pulled it back," says George Alfs, spokesman for Intel Corp. in Santa Clara, Calif.

Alfs downplayed suggestions that the flaw was the result of Intel trying to stay ahead of its competitor Advanced Micro Devices (AMD), which recently released its own 1.1 GHz Athlon chip.

"It seems pretty clear that Intel was really pushing their processes, driven by competition, which was something they are not used to," says John Greenagle, director of strategic communications for AMD in Sunnyvale, Calif. "For years, Intel had the luxury of a monopoly where they could introduce a product and then not really push technology improvements and lower price until it has been convenient to do so. I think Intel was stunned when AMD went to market with a GHz-speed processor."

This recent recall comes at a particularly bad time for Intel, as it has had to deal with several production problems throughout this year.

In February, Intel discovered a bug that affected some servers and workstations using Intel's 840 and 820 chipsets. In April, it reported that had it underestimat-

ed PC demands for the first half of this year and would have problems meeting them.

In May, it recalled more than one million motherboards using the 820 chipset after the memory transfer hub chip was found to have a flaw.

"This is definitely not a good thing for Intel right now," says Josephine Mong, research analysts for International Data Corp. in Mountain View, Calif. "But while this is not good for them, I don't think it will hurt them all that much."

The is because the 1 GHz-plus chips are aimed at enthusiasts instead of corporate customers, and enthusiasts have been less than enthusiastic about purchasing the new chips because of their price—hence the minimal impact of the recall on Intel.

Certainly among suppliers of systems for the corporate market there does not seem to be too much worry over Intel recall.

"We don't see any impact on our customers because we don't carry the [1.13 GHz] product," says John Challinor, manager for corporate and public relations for Compaq Canada Inc. in Richmond Hill, Ont. "Our roadmap really gives us time for Intel to make whatever corrections need to be done to that processor."

Still, Intel is not slowing down the pace of its efforts to introduce 1 GHz-plus chips to the market.

Alfs says the company will reintroduce the 1.13 GHz Pentium III when the flaw is fixed.

At August's Intel Developer Forum, Intel showed off its 2 GHz Pentium IV chips, which are expected to debut by the end of the year.

—Tom Venetis

Handspring jumps into cellphone PDA device market

MOUNTAIN VIEW, Calif.—Handspring (<http://www.handspring.com>) has unveiled a that turns a personal digital assistant (cellular phone). The company compared the introduction of the debut tone telephone in the 1960s.

The VisorPhone Springboard expansion snaps onto the back of any Visor handheld puter, enabling users to make and receive calls. Handspring says it will be available in the U.S. by the end of the year. (Note A Handspring representative told TCP that the company expects the device will be available in Canada at about the same time.)

The VisorPhone, which operates on GSM (global system for mobile communications) networks, enables speed dialing, conference calling, caller ID, programmed and other features of cellular phone. VisorPhone also performs various data functions, including text messaging, wireless synchronization with a desktop computer, wireless Internet access and email.

"The fundamental idea behind the development of VisorPhone was to re-invent the experience for voice calling," Handspring marketing vice president, Ed Colligan, says in a release. "The last major milestone in the history of the telephone was in the late 1960s when touch-tone replaced rotary dial phones. We felt it make it easier for people to use all the services available."

Priced at US\$299 with the purchase of a VisorPhone will initially be available at a site. The company said it expects to sell physical distribution channels in the U.S. and to deliver a European version of VisorPhone early next year.

A week earlier, Palm Inc. announced that in early 2001, it will begin selling a snap-on attachment made by Hong Kong-based RealVision that will transform its handhelds into cellphones.

—Newsbytes



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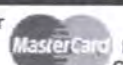
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NOTEBOOK SPECIALS

The changing nature of PC software

By Jacques Surveyer

Software is a *mishomonmer*, which, like my made up word, is a homonym that has gone awry. The homonym "software" implies a gentle, natural fit like a cotton shirt that hugs the curves of the body in hang-ten comfort. Now be honest—what software clings to the mind and creative impulse in equivalent fashion?

Note how I changed the word back to software as in utensil, something devoted more to efficiency and effectiveness than to the sheer joy of creation. Rarely is there software to be found that thrills the soul, whose design fits form to function so exquisitely we look forward to working with the program to help solve a problem—or just to use it. But as a ware—a utensil and work extension—software programs have done very well indeed.

The (big) business of software

Software is big business, worth more than \$300 billion annually, and that does not include associated consulting services.

Software is no small change in the world economy. Yet the development, packaging, and delivery of software has changed quite profoundly in recent years.

Steve Ballmer, chief executive officer of Microsoft, predicts that within 10 years software will no longer be sold in shrinkwrapped packages, but rather there will be services that may incidentally include a program component. Microsoft, Oracle, and other major independent software vendors (often referred to as ISVs) see a major move to running software as a service directly on the Web. Already, delivery of software has moved from diskettes to CD-ROM to Web-based downloads. As well more software is being offered for use



directly on the Net.

At the same time, others (see David Gelernter's article at <http://www.edge.org>) would argue that Sun's motto has become the reality: the network is the computer. And others again would argue that software has hit a plateau as the problems of making it work well are the key issues of the day.

Think of all the years and resources Apple and Microsoft have spent cleaning up the Mac OS and Windows. Scrubbing these operating systems clean of reliability, scalability and security problems has proved to be no

small task as witnessed by the oft-delayed delivery of updated versions. The consequence is that progress in "advanced" OS interfaces, such as tablets, gestures or handwriting, voice recognition, or natural language-like commands has been very slow. But there is no doubt that the sheer complexity of n-tier distributed processing over the Web has absorbed some of the best software people working on and combining old solutions in new ways (think of XML from SGML, replication and messaging, or collaboration services in agent or workflow software).

For whatever reasons, software has been going through a consolidation period as developers and independent software vendors come to terms with the latest killer app—the emergence of the Net by way of the HTTP-based servers and HTML-based browsers. So don't be looking for killer applications in our software lists; but rather look for the re-emergence of value.

Jacques Surveyer is a writer and develop mentor. He can be reached at jbsurv@inforamp.net.

Software for the new business climate

As business moves from standalone workstation-based productivity to Internet-enabled toolsets, the complexion of you what you require to serve your needs changes

By Jacques Surveyer

Business software has been bursting with energy for the past decade: first with much easier to use accounting software; which progressed to total enterprise resource planning (ERP) systems from vendors such as SAP, Peoplesoft, and JDEdwards. These systems united accounting with human resources planning, manufacturing, distribution, and warehousing so companies could control internal operations with best of breed software rather than a hit-or-miss home brew.

With the spread of the Internet, these applications were quickly followed by supply chain management (SCM) software that integrated manufacturing, inventory control, production and transportation scheduling, plus purchasing operations out to the key suppliers for an organization. Again, complex optimizing software with tight integration to existing systems, including ERP, were key to the success of SCM systems.

The latest trend is towards integrating customer relationship management (CRM). So if you are a business student or working for a medium scale organization, there is high likelihood you will be working with one or several of these systems.

Following are some high leverage programs that will help you to get the most out of these systems. In addition to report writing, Crystal Reports 8 Developers Edition (<http://www.seagatesoftware.com>) provides graphics and a broad choice of output targets: to file, mail, a Web browser, and cellphones and other WAP-enabled devices. In addition to Crystal, there are two other great solutions: the suite of business intelligence (BI) software from Cognos (<http://www.cognos.com>) that also add graphics, pivot tables, crosstabs, and

statistical data mining, to report writing; and Hummingbird Software's (<http://www.hummingbird.com>) Executive Information Portal, which ties together ERP, SCM, CRM and BI systems in a Web-based interface. The fact that these are all Canadian-based companies is incidental to their well-deserved success.

Business charting

It is somewhat surprising that one of the programs that comes closest to our ideal of being a natural is a business graphics program. Visio (<http://www.microsoft.com>, \$1,200) is an enterprise auto-documentation system. This means that Visio only has to be pointed at an organization's network to diagram all the devices and links on a network; to a Web site to diagram all of its pages, links, and resources; to a database to diagram all the tables and their relationships; and to programs to diagram all the sources in unified modeling language (UML, a system of graphical notation used in object-oriented software design) diagrams.

Visio goes out and automatically diagrams each layout using its rich set of shapes, stencils and templates, and following the natural links. In many cases the automatically created diagram is very close to a finished chart. In the case of databases and programs, users get the benefit of a big head start on all the drudge work involved in documenting programming systems.

But Visio helps because it has a complete set of database entity relationship smarts and the UML diagrams. But what really adds to Visio's effectiveness is the Visual Basic for Applications (VBA) macro capability added to Visio's own high degree of customization and control of its various stencils and shapes. Add to this drag-and-drop features and wizard-based conveniences and Visio becomes

one of the most robust diagramming and documentation systems around for an IT shop.

But it doesn't stop there. Visio is also a powerful diagramming and flowcharting tool capable of producing organization charts, office layouts, engineering diagrams, and process flowcharts. In short, Visio is one of the most robust charting programs on the market.

Given such praise for Visio, iGrafx Process (<http://www.micrografx.com>, \$1,200) would seem to have a formidable challenge. iGrafx does have drag-and-drop stencils and shapes similar to Visio, but it carries flowcharting in another direction towards process simulation and analysis. So once a workflow or process has been diagrammed it can be tested using process flow parameters for simulation, which are easily set up.

The simulation can show how a process or system will perform with statistical accuracy. iGrafx supplies a number of automatically generated statistics, but also allows users to quickly setup and capture their own. Likewise, for report writing and graphics, iGrafx has defaults that can be extended with its VBA 6.0 macro capabilities.

Mapping

GIS and mapping have been lurking in the shadows but are slowly gaining popularity. The Web site <http://www.mapquest.com> gives a taste of what is possible with some mapping programs. Three of the best are:

- ArcView GIS: Develops sophisticated marketing map views (\$4,500). <http://www.esri.com>
- MapInfo Pro 6.0: Develops mapping apps for 3D and the Web (\$1,200). <http://www.mapinfo.com>
- MapPoint 2001: Offers versatile maps and

routing capabilities (\$400). <http://www.microsoft.com>

The problem with all of these systems is that, like the colour ink for inkjet printers, the underlying data is very expensive and constantly changing as demographics, economics, and living patterns change around the world. But the insights that a good map with the latest data can provide may pay off.

Design and drafting

Finally, computer aided design (CAD) software is undergoing change. Again, in our list overrated software we have cited AutoCAD for slow innovation. However, a better diagnosis may be that there are so many opportunities in the CAD field and so many areas of engineering and architectural design/rendering that can use specialized CAD-based boosts that it is hard to decide where to start. Literally, AutoCAD has so much territory to cover and defend. Its AutoSketch, Actrix, and AutoCAD LTE are designed to ward off the low-end tools perpetually trying to chip away at the AutoCAD franchise.

Currently, DesignCAD Pro (<http://www.via-grafx.com>, \$450) is one of the best competitors. But AutoCAD has quietly amassed expertise in GIS with the AutoDesk MapGuide, Survey and View programs among others; it supports a large and widening set of specialized engineering extensions (civil, electrical, mechanical, etc); plus it owns a large interest in Discret, which markets such 3D and animation powerhouses as Combustion* and 3D Studio Max. In short, like weeds, the whole area of business graphics is sprouting enhanced applications for making design and analysis tasks more productive.

Continued on page 33

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3D Magazine, January 2000



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Software favourites

These lists of favourites are personal but reasonably well informed, as all of the products have been used or reviewed by this writer and/or *The Computer Paper* staff.

By Jacques Surveyer

To preserve some of the impulse that once was personal computing, a list of software that come closest to our dream of software also being soft-wear (i.e., comfortable, inviting) is in order.

So what follows are a few lists in the following categories:

- Absolutely, positively freeware no time-out, no advertising, no spam-mail hooks;
- Canadian software that shines as world class;
- Overrated software—programs that have the ability to disappoint;
- Top value software, more bang for the buck.

World-class Canadian software

Poco	Safe, feature rich email client. Shareware. http://www.pocomail.com
Copernic	Best Web search program by far. Freeware. http://www.copernic.com
ACDSee	Innovative photo album software. Shareware. http://www.acdsystems.com
CorelDraw	An early graphics suite that is still one of the best. http://www.corel.com
Corel Linux	The best desktop version of Linux. Very nice. http://www.corel.com
Alias	3D product design and animation tools. http://www.alias.com
Softimage	Top-of-the-line 3D and 2D animation tools. http://www.softimage.com

Crystal.NET	Report engine gets not only trimmer and faster, but also adds a Web service that can be called from anywhere. http://www.seagatesoftware.com
PowerPlay	One of many groundbreaking business intelligence tools. http://www.cognos.com
KnowledgeSeeker	Hierarchy tree-based data mining. Pioneer and still a leader. http://www.wangoss.com
HYSIM	Leading chemical process simulation software. http://www.hyprotech.com
Communicate!	Unified communication and messaging tool (current version Communicate! 2000). http://www.01.com.com
e-Forms	XML- and workflow-enabled forms management. http://www.jetform.com
XMetal	Along with HoTMetal Pro, this program leads the Web parade. http://www.softquad.com

Most disappointing/overrated software

Windows ME	Charging full scale prices for a service pack to a dead OS?
Desktop OSes	Only Linux, Windows 2000 approach reliability, security users should have had a decade ago.
Word processors	Bugs, print control, and conversion to HTML form the latest woe set.
MS PhotoDraw 2	All those wonderful effects go almost for naught without good masking and layering tools.

Continued on page 34

Software for the new business climate

Continued from page 28

Databases

The database world was turned upside down this year with the perennial Transaction Processing Performance Council benchmark champion Oracle being ousted first by Microsoft with SQL Server doing 262KtpmC (read 262 thousand TPC transactions per minute), then IBM DB2 achieving a whopping 441KtpmC. Even Sybase managed to leap ahead of Oracle with a very credible 157KtpmC benchmark, followed by Oracle at 144KtpmC.

But the more interesting trend in database software may be what has been happening in the Linux and freeware world. Linux now boasts not just the latest copies of IBM, Oracle, and Sybase databases (plus a host of freeware databases, see below) but also Java development tools and Web/application servers from all three vendors. These trends, along with improvements in multi-processing and 64-bit support, will make Linux an even more attractive database and Web server tool.

No small help to the Linux cause are the following database-friendly Web development tools that run in Windows or Linux, but produce output that runs in Linux:

- Cold Fusion 4.5 (\$1,950), <http://www.allaire.com>
- Dreamweaver 3 UltraDev (\$750), <http://www.macromedia.com>
- Tango 4 (\$1,500), <http://www.pervasive.com>

Free database software and applications are just bursting all over, as shown by the following:

- Interbase: For Linux, Windows NT, and

Solaris open source. <http://www.interbase.com>

- MySQL: For Linux, FreeBSD, OS/2, Solaris, Windows 32, and Windows NT. <http://www.mysql.com>
- Postgres: For Linux, Solaris, and FreeBSD. <http://www.postgresql.com>

Networking and Internet

Local area networks and operating systems are soon going to get nearly a 100-times boost in performance to 10 GBps Ethernet. The communication bandwidth explosion continues unabated. DSL and cable modem services are offering Internet users anywhere from five to 20 times the service they can get with ordinary 56Kbps modems—a 33 percent increase in cost for at least a 500 percent increase in speed.

The result is that OS vendors are scrambling to Net-ize their offerings to take advantage of all that bandwidth. For example, one of the key components of Microsoft.NET is its .NET Framework, which is composed of a new language C# (C-sharp) and runtime system, Common Language Runtime derived from Java but with the added key interoperability features.

So now Java applets or .NET applications can be either invoked remotely or piped down increasingly wide communication links. The net result is will be that the user/consumer will have a wider choice of what and how they invoke computer services. In many organizations, this will mean “the desktop king is dead, long live the server”—which is a bit of irony, reflecting the constant economic and functional struggle between centralized servers and powerful desktops PCs. □

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Carving up the graphics landscape

Graphic artists wooed by software ever more powerful, covering a broader spectrum of functions and easier to use

By Jacques Surveyer

Application service providers (ASPs) are a new category of software service provider that allow you to use (sometimes for a fee, sometimes not) all kinds of software. On some photo-hosting Web sites, for example,

you can use online tools to do basic image editing like cropping, removing red-eye or adjusting tones and colour balance. On the whole, however, graphics software is very likely to defy this trend toward Web-based services for a few reasons.

First, graphics programs still consume

all the computing power thrown at them so they would eat up large chunks of Web server processing and communication bandwidth to-and-fro-ing previews of images. Also, graphics design is still very personal and idiosyncratic. It now encompasses all aspects of image and multimedia processing from 2D images

to animations to 3D modeling to video editing and composition. Typically, graphic artists use more (at least a dozen) different programs for image design than any other field except perhaps engineering or financial analysis.

The 2D space

With all this richness of graphics software, it is remarkable that 2D design and illustration programs like CorelDraw (<http://www.corel.com>, \$620, includes PhotoPaint for photo manipulation, and

Continued on page 37

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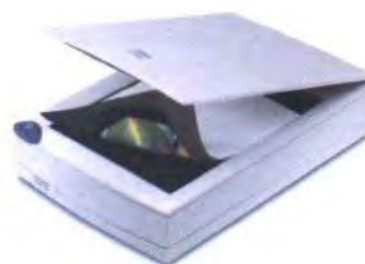
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Software favourites

Continued from page 33

- | | |
|-------------------|--|
| OS utilities | Price wars and constant threat that a utility will become part of an OS have sapped this once vibrant sector (e.g. where is a top-notch, Registry Editor, handwriting interface, etc.?). |
| Adobe InDesign | Hype and high expectations set this "Quark-killer" back; Corel Ventura, Adobe's own Pagemaker have a number of convenience features that are better than InDesign's. |
| Voice recognition | Again, hype is the killer. Average of one error in 20 words. |

The best absolutely free Software

- | | |
|------------|---|
| Apache | Most popular free Web server continues to thrive. http://www.apache.org |
| Copernic | Best personal Web search program by far. http://www.copernic.com |
| Google | Fastest and best search engine by far. http://www.google.com |
| Java | The most productive programming language. http://www.javasoft.com |
| Linux | From several providers, but choose Corel Linux on desktop, and Debian as server favourite. |
| StarOffice | Better Office 2000 file compatibility and features. http://www.sun.com |
| XML | The standard for data and now method interchange. http://www.w3c.org |

Top 10 values in software

- | | |
|------------------|--|
| Apache | Most popular free Web server continues to thrive. http://www.apache.org |
| Copernic | If you do Internet searches, this is the tool to use (free). http://www.copernic.com |
| Dreamweaver | Top Web database developer (\$710). |
| UltraDev | http://www.macromedia.com |
| Encarta 2000 DVD | One of the best DVD-based encyclopedias (\$120). http://www.microsoft.com |
| Java | Productive and cross-platform programming language (free). http://www.javasoft.com |
| Linux | From several providers. Proof that open source development works even on complex OS (free). |
| Notes R5 | Mail, messaging and collaboration pro (\$1,600 per 10 users). http://www.lotus.com |
| Photoshop 6 | One of the best image processors gets a lot better (\$800). http://www.adobe.com |
| SQL Server 2000 | Complete database and business intelligence system (\$1,600 per 10 users). http://www.microsoft.com |
| Visio 2000 | Enterprise auto-documentation system (\$1,200). http://www.microsoft.com |
| XML | Data, and now method, interchange standard of choice (free). http://www.w3c.org |

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Carving up the graphics landscape

Continued from page 34

RAVE for Web animation), Illustrator (http://www.adobe.com, \$520) and Freehand (http://www.macromedia.com, \$750, includes animation powerhouse Flash 5) still rule the roost.

But even more remarkable has been the cat fight among image and photo manipulation programs. It started with Micrografx's Picture Publisher, which allowed users to edit, crop, colour correct and combine photo images in ways that one could only dream of or achieve after labouring for days in a darkroom. Adobe's Photoshop soon followed with precise colour corrections, print control, plus wonderful layering and transparency effects. Fractal Design's Painter (now part of Corel) added brushes and natural media effects, while Corel's PhotoPaint added nifty masking and ease of use touches that are being imitated by other vendors to this day.

The new battlefield is how to help all those digital camera and Web graphics designers process images without overwhelming them with complex tools. One approach is to dumb down top-of-the-line products. Corel's PhotoPaint Digital Camera Edition, for example, takes away some of the manual controls and replaces them with wizards, which are easier to work through but offer fewer degrees of user intervention for custom settings.

There have always been light or "consumer" versions of image-editing software, such as Adobe Photo Deluxe, that are simple to use, but also offer a less impressive set of image-editing capabilities. But this category evolves, the ease of use and attractive prices are retained, while feature sets approach the heavyweights in scope and versatility. The other ease-of-use approach taken by PaintShop Pro (http://www.jasc.com, \$130, includes solid Animation Shop), PhotoImpact (http://www.ulead.com, \$150, includes Photo Album 6 and GIF Animator 4) and MGI PhotoSuite III (http://www.mgisoft.com, \$60) is to use wizards, dialogue boxes, and drag-and-drop styles and effects to make complex image-editing operations easier and less mistake prone.

All of the above compromise on supplying as full a set of tools as Photoshop. Nonetheless, many users will find the easy-to-use software very attractive for their home and Web image-editing uses, and may never need the level of control Photoshop offers.

However, that's not to say Photoshop is unapproachable by anyone who is not a professional graphic artist. Adobe has made its latest version of this software, Photoshop 6 (http://www.adobe.com, \$800), much easier to use, while increasing its capabilities yet again.

For ease of use, layers and styles are not only easier to organize but also to apply to images. In addition, the number of layers is increased from 99 to 8,000, and there is no limit to the number of custom styles that can be saved on disk. Copying CorelDraw's context-sensitive property bar makes many editing operations so much simpler.

New features include a number of vector drawing capabilities that can be layered over bitmap graphics and saved as shape thumbnails for easy reuse. Thus, Photoshop follows Jasc's PaintShop Pro 7

(http://www.jasc.com, \$150) and Deneba's Canvas 7 (http://www.deneba.com, \$480) into the world of graphic objects in which vector drawings, bitmap images plus text and type effects are brought kicking and screaming together into effective compositions.

Canvas 7 leads Photoshop in supplying a more complete vector-drawing, transparency control, page layout and text publishing set of features while Photoshop 6 leads in colour control, layering, masking and image effects.

3D emerging

But these graphics programs have to improve because lurking at the high end are top-rated 3D rendering programs, including:

- 3D Studio Max (http://www2.discreet.com, \$5,500, 3D modeling and rendering).
- Cinema 4D (http://www.maxoncomputer.com, \$3,300, animation, rendering, and sound).
- Combustion* (http://www2.discreet.com, \$3,500, video editing, animation, and composition).
- Lightwave 6.0 (http://www.newtek.com, \$3,600, 3D modeling, animation, and rendering).
- Maya 3.0 (http://www.aw.sgi.com, \$12,000, advanced rendering, animation, and modeling).
- SoftImage XSI (http://www.softimage.com, \$12,000, 3D modeling, animation, and graphics).

These are the programs used to produce special effects in movies (Maya 3.0 was used in *Perfect Storm* and *Excalibur*), product designs (3D Studio Max, Lightwave, and SoftImage), and video editing (Combustion*).

However, in reality, both 2D and 3D graphic design tools have been used for movies (*Antz*, *Toy Story*, *The Clue*, and scores of others), TV shows (*Ally McBeal*, *Roswell*, *X-Files*, and dozens more), plus commercials, and product layout and design.

The strength of the high-end 3D programs is that they have solved the tough animation and media integration problems that 2D animation tools like Adobe LiveMotion (http://www.adobe.com, \$380), Corel RAVE (http://www.corel.com, \$640, including CorelDraw and PhotoPaint), Flash 5 (http://www.macromedia.com, \$600, includes Freehand), and their drawing/illustration counterparts are just addressing.

Admittedly, drawing and 2D animation tools are one fifth the price or are constrained by Web-output formats, but these high-end 3D tools have rendering, lighting, animation, texture mapping and graphic composition skills that would be ultra competitive in the 2D world. ☐

Daily soap opera launches on the Web

NB—A new daily "soap opera" called Gimmesoap has been launched on the Web. Each daily episode is 500 words long and features new pictures of the main characters. Episodes are updated at midnight (U.K. time) every day and readers can also choose to have episodes emailed directly to them. The soap is targeted at office workers and is designed to provide a few minutes for viewers to relax and switch off from work.

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Maxtor 10.2GB IDE-ATA100 5400rpm/9ms/512K Hard Drive	\$119.00
Maxtor 15GB IDE-ATA100 7200rpm/9ms/2MB Hard Drive	\$146.00
Maxtor 15GB IDE-ATA66 5400rpm/9ms/512MB Hard Drive	\$125.00
Maxtor 20.4GB IDE-ATA100 7200rpm/8.7MS/2MB Hard Drive	\$175.00
Maxtor 30.7GB IDE-ATA100 7200rpm/8.7MS/2MB Hard Drive	\$219.00
Maxtor 30GB IDE-ATA100 5400rpm/9ms/2MB Hard Drive	\$168.00
Maxtor 40.9GB IDE-ATA100 7200rpm/8.7MS/2MB Hard Drive	\$299.00
Quantum 15GB FB+ LM ATA-66 7200rpm/9.5ms/512K Hard Drive	\$148.00
Quantum 20.5GB FB+ LM ATA-66 7200rpm/8.5ms/2MB Hard Drive	\$179.00
Quantum 30GB FB+ LM ATA-66 7200rpm/8.5MS/2MB Hard Drive	\$229.00
WD 10.2GB IDE-ATA66 5400rpm/9.5ms/2MB Hard Drive	\$126.00
WD 15.3GB IDE-ATA66 5400rpm/9.5ms/2MB Hard Drive	\$128.00
WD 20.5GB IDE-ATA66 5400rpm/9.5ms/2MB Hard Drive	\$146.00
WD 20.5GB IDE-ATA66 7200rpm/9ms/2MB Hard Drive	\$179.00
WD 30.7GB IDE-ATA66 5400rpm/9.5ms/2MB Hard Drive	\$169.00

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IBM 18GB 10KRPm/6.4ms/2MB Ultra160 SCSI Hard Drive	\$649.00
IBM 36GB 10k/4.9ms/4MB Ultra160 SCSI Hard Drive	\$939.00
Seagate 18.4GB 10Krpm/6ms/2MB U160 SCSI Hard Drive	\$579.00
Seagate 50.0GB U2W SCSI Hard Drive	\$1,469.00
WD 18.0GB 10Krpm/2MB U2 SCA2 SCSI Hard Drive	\$696.00
WD 18.3GB 10Krpm/7.8ms/8MB U2 SCA2 SCSI Hard Drive	\$719.00
WD 9.1GB 10Krpm/8MB U2W SCSI Hard Drive	\$498.00

Video Card

3Dfx Voodoo3 2000 16MB AGP Video Card	\$99.00
3Dfx Voodoo3 3000 16MB AGP Video Card	\$129.00
3Dfx Voodoo3 3500 16MB AGP Video Card w/TV Turner	\$249.00
3Dfx Voodoo5 5500 64MB AGP Video Card	\$416.00
ASUS V6800 32MB DDR Delux GeForce256 AGP Video Card w/TV	\$293.00
ASUS V7100 16MB DDR Pure GeForce-II MX AGP Video Card	\$166.00
ASUS V7100 32MB DDR Pure GeForce-II MX AGP Video Card w/o TV	\$209.00
ASUS V7100 32MB DDR Pure GeForce-II MX AGP Video Card w/TV	\$228.00
ASUS V7700 32MB DDR Delux GeForce-II AGP Video Card w/o TV	\$439.00
ASUS V7700 64MB DDR Pure GeForce-II AGP Video Card w/TV Out	\$499.00
ATI 32MB All-in-Wonder Pro128 AGP Video Card OEM	\$269.00
ATI 32MB Fury Rage128 PRO AGP4 Video Card w/o TV in/out	\$145.00
ATI 32MB SRAM Xper2000 AGP Video Card	\$106.00
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Matrox 32MB Millennium G400 MAX Dual Head Video Card Retail	\$279.00
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MS Internet Pro P/S2 Keyboard	\$55.00
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Logitech Cordless Wheel Mouse	\$49.00
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Plextor 12x10x32 Int. IDE CD Writer Drive w/Kit\$	\$419.00
Plextor 8x4x32x Int. IDE CD Writer Drive	\$299.00
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SONY 10X4X32 CDRW Int. EIDE Bare CD-ReWriter Drive	\$319.00
SONY 8X4X32 CDRW Int. EIDE Bare CD-ReWriter Drive\$	\$276.00
Yamaha CRW8424 Int. E-IDE CD-ReWriter Drive	\$228.00
Yamaha CRW8424S Int. SCSI	\$268.00
Yamaha CRW8824 E-IDE Int. CD-ReWriter Drive	\$229.00

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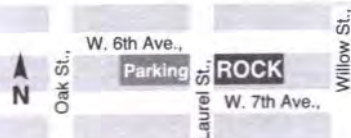
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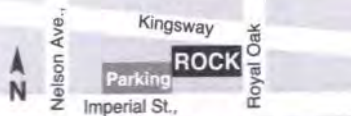
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104 Win98 P/S2 Keyboard
Logitech 2B P/S2 Mouse
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32MB DDR Pure GeForce-2 MX AGP Video Card
18" ATX Tower Case/300W Power Supply
Logitech Internet P/S2 Keyboard
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8MB DX 3D AGP Video Card
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LSI Dual channel Ultra2 33MHz Integrate SCSI Controller
18.2GB 10krpm/6.8ms/4MB Ultra160 SCSI Hard Drive
ATI 4MB SDRAM RAGE-XL Integrate Video
Net Server A9891 ATX Case w/o Power Supply
Power Supply 300W Redundant ATX
Toshiba 40x SCSI CD ROM Drive
Intel EtherExpress Pro/100+ Integrate
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Canon DeskJet S450 Color Printer	\$246.00
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HP Color LaserJet 4500 Printer	\$3,589.00
HP Color LaserJet 4500DN Printer	\$5,479.00
HP DeskJet 2000Cxi Color Printer	\$659.00
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HP DeskJet 2500CM Color Printer	\$2,039.00
HP DeskJet 840C Color Printer	\$226.00
HP DeskJet 930C Color Printer	\$296.00
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3COM 24Port 10/100 Dual Speed Superstack Hub	\$1,245.00
3COM 8Port 10Base TX Office Connector Hub	\$98.00
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D-Link 16Port 10/100Base Dual Hub	\$438.00
D-Link 16Port 10/100Base Dual Hub	\$279.00
D-Link 24Port 10Base Hub	\$319.00
D-Link 4Port 10/100Base Dual Hub	\$125.00
D-Link 4Port USB Hub	\$49.00
D-Link 5Port 10/100Base Dual Hub	\$98.00
D-Link 7Port USB Hub	\$105.00
D-Link 8Port 10/100Base Dual Hub	\$179.00
D-Link 9Port 10Base Hub (8xRJ45, 1xBNC)	\$76.00
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Linksys Etherfast Cable/DSL 4 Port Router	\$258.00
OEM 8Port Networking Hub 10 Base Stackable	\$39.00

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Creative WebCam III USB Camera	\$69.00
EPSON PC3000Z Digital Camera	\$1,286.00
EPSON PC650 Digital Camera	\$389.00
EPSON PC750Z Digital Camera	\$649.00
EPSON PC800 Digital Camera	\$759.00
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Kodak DC220 Digital Camera	\$946.00
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Logitech QuickCam VC (Parallel) Camera	\$99.00
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IBM 12-24GB Int. SCSI Tap Backup Drive	\$799.00
IBM DLT DDS-3 Tape Drive Backup Unit	\$1,079.00
On Stream 30GB INT IDE Backup Drive	\$308.00

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3COM 3C410 Home Connect PhoneLink Network Card	\$99.00
3COM 3C410-Kit Home Connect PhoneLink Network Kit	\$186.00
3COM 3C509B-TPO ISA RJ45 Networking Card	\$87.00
3COM 3C905B-TX-NM Ethernet 10/100 Network	\$66.00
3COM 3C905C-TXM 10/100Base PCI Networking Card	\$68.00
Acer Ethernet Combo ISA PnP 10Mbps Card	\$19.00
Acer Ethernet Combo PCI PnP 10Mbps Card	\$19.00
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GVC Ethernet 10/100 PCI Networking Card	\$25.00
GVC Ethernet ISA Network Card	\$29.00
GVC Ethernet PCI Combo Network Card	\$28.00
Intel EtherXpress Pro 100 Plus PCI Network Card	\$79.00

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3COM Megahertz 10/100 LAN PC Card	\$126.00
3COM Megahertz 10/100 LAN PC Card	\$179.00
D-Link 10/100Mbps 16-bit Fast Ethernet PCMCIA Adapter	\$116.00
GVC 10/100 PCMCIA Ethernet Card	\$86.00
GVC 56K PCMCIA V90 Modem Card	\$96.00
LinkSys PCMPC100 10/100 Lan Card	\$98.00
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USR 56K V.90 External USB Pro Voice Fax/Modem	\$188.00
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USR 56K V.90 Internal ISA Voice/Fax Modem Card	\$99.00
USR 56K V.90 Internal Voice/Fax Modem Card Retail	\$189.00
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Controller Card	\$258.00
USB PCI Controller Card	\$29.00
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ZIP+ Drive	\$238.00
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Imega 100MB SCSI Int. ZIP Drive	\$206.00
Imega 250MB Ext. Parallel ZIP Drive	\$186.00
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Imega 250MB Ext. USB ZIP Drive	\$239.00
Imega 250MB Int. ZIP Drive	\$146.00
Imega 2GB JAZ Int. SCSI Drive	\$439.00
Imega 2GB JAZ Int. SCSI Drive	\$446.00
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Acer 732TXV P3-500/64MB/9GB/6xDVD/56K/14.1" TFT Notebook	\$3,379.00
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Fujitsu B2131 C400/64MB/6.4GB/56K/10.4" TFT Notebook	\$2,939.00
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IBM 390 P3-450/64MB/12GB/24x/65K/Win98/14.1" TFT Notebook	\$3,729.00
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IBM 11210 C4500/32MB/6GB/24x/56K/Win98/NoFD/13" HPA Notebook	\$1,698.00
IBM 11230 C4500/64MB/6GB/24x/56K/Win98/NoFD/13" HPA Notebook	\$1,949.00
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IBM 11542 C500/64MB/12GB/24x/65K/W2000/12.1" TFT Notebook	\$2,439.00
Toshiba 4270xDVD C4500/6GB/64MB/6xDVD/56K/Win98/14.1" TFT	\$2,859.00

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- Landmark 200 ATX w/250W
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- Microsoft Intelli mouse w/wheel and pad

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- ISP2150(2U rack): Dual PIII-800 CPUs / 10-100TX / 40x /Dual U2W 1024 MB RAM/ AGP Video / 4 x 36G U2W hot swappable\$9280
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- 2x 18GB U2W SCSI HD
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- Adaptec 29160U2W /29160U2W kit.....\$290/340
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- Mylex U2W scsi 958T (2940U2W).....\$250
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- Adaptec 2940 U2W/ U2W kit.....\$300/330
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market ... E-century with e-fighting....
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PCI 128 Sound and 120W Speakers

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ATI Xpert2000 32MB AGP
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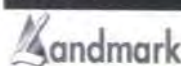
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20GB UDMA66 HDD
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1738
\$60.80/mo*

P-III-933
1968
\$68.88/mo*

Pentium III CD-Creator

Gigabyte 6VXE7+ M/B
133MHz FSB & U-ATA 66 Ready
128MB PC133 SDRAM
20GB Ultra66 HDD
Panasonic 1.44MB FDD
nVidia TNT2 32M 4X AGP
Samsung 750S 17" Monitor
Acer 107 Keyboard
ATX Tower w/250W P/S
Acer Wheel Mouse
Yamaha 8x8x24 CD-RW
SoundBlaster PCI 128
MLI460 600W Spkr+Subwfr

P-III-733
1498
\$52.48/mo*

P-III-800
1598
\$56.00/mo*

P-III-866
1768
\$61.88/mo*

P-III-933
1998
\$70.00/mo*

Pentium III Dream Machine

Asus CUV4X/ Gigabyte 6VX7+4X M/B
128MB PC133MHz SDRAM
30GB U-ATA 100 HDD
Panasonic 1.44MB FDD
nVidia TNT2 32M 4X AGP
NEC FE700 17" Flat
Logitech Internet Keyboard
ATX Tower w/ 250W P/S
Microsoft Wheel Mouse
Yamaha 8x8x24 CD-RW
Panasonic 8X DVD Drive
SoundBlaster Live 1024
Altec ACS 65i Spkr+Subwfr

P-III-733
1898
\$66.48/mo*

P-III-800
1998
\$70.00/mo*

P-III-866
2168
\$76.00/mo*

P-III-933
2398
\$83.88/mo*

All P-III systems come with 5-year service & 2-year parts warranty and one month FREE internet
Options: Windows98 SE / ME / 2000 Pro +\$138/148/208 • Acer 56K V/F/Modem (HW) +\$50 • D-Link 10BT Ethernet Card +\$20 • MS Office 2000 SBE / Pro +\$268/468

Power/Budget Maximizer

Celeron Net-Surfer

ECS Mainboard
64MB PC100MHz SDRAM
10GB Ultra66 HDD
Panasonic 1.44MB FDD
3D 8M AGP Video
Acer 107 Win 98 Keyboard
17" ATX Tower w/ 250W P/S
Wheel Mouse + Pad
48x CD-ROM
3D Wave Stereo Sound
120W Stereo Speakers
56K Modem & 10/100 BaseT LAN
Samsung 550S 15" Monitor +\$190

C-600MHz
668
\$23.38/mo*

C-633MHz
698
\$24.38/mo*

C-677MHz
738
\$25.80/mo*

C-700MHz
788
\$27.68/mo*

Celeron Book-PC

Intel 810 Mainboard
Built-in 3D AGP Video
3D Stereo Audio
56K Modem
10/100 Fast Ethernet
TV Out
Ultra-slim Chassis (270x300x80mm)
64MB PC100MHz SDRAM
10GB Ultra66 HDD
Keyboard / Mouse / Speaker
52X CD-ROM / 1.44MB FDD
Samsung 550S 15" Monitor +\$190

Notebook Size !
Ultra-Slim !

C-533MHz
668
\$23.38/mo*

C-566MHz
678
\$23.80/mo*

AMD Duron / TB PowerMax

AMD Duron Power User

AMD Duron CPU
Gigabyte 72M Motherboard
64MB PC133MHz SDRAM
10GB Ultra66 HDD
Panasonic 1.44MB 3.5" FDD
ATI Rage128 8M AGP
Acer 107 Keyboard
ATX Tower w/ 250W P/S
Acer Wheel Mouse
48X CD-ROM
3D Stereo Sound (O/B)
120W Stereo Speakers
Samsung 750S 17" .24 Monitor +\$260

D-600
698
\$24.48/mo*

D-650
738
\$25.88/mo*

D-700
798
\$28.00/mo*

AMD Thunderbird X-Gamer

AMD Thunderbird CPU
Gigabyte 72X Dual-BIOS M/B
128MB PC133MHz SDRAM
20GB Ultra66 HDD
Panasonic 1.44MB 3.5" FDD
nVidia TNT2 32M 4XAGP
Samsung 750S 17" .24 Monitor
Acer 107 Keyboard
ATX Tower w/ 300W P/S
Acer Wheel Mouse
Acer 52X CD-ROM
SoundBlaster PCI 128 (O/B)
MLI460 600W Speakers + Subwoofer

TB-700
1318
\$46.18/mo*

TB-800
1388
\$48.48/mo*

TB-850
1488
\$52.48/mo*

TB-900
1548
\$54.48/mo*

TB-1GHz
1868
\$65.38/mo*

All Celeron & AMD systems come with 3-year service & 1-year parts warranty and one month FREE internet
Options: Windows98 SE / ME / 2000 Pro +\$138/148/208 • Acer 56K V/F/Modem (HW) +\$50 • D-Link 10BT Ethernet Card +\$20 • MS Office 2000 SBE / Pro +\$268/468

CPU/RAM

EDO 16M 72pin 2x8 / 4x4 \$55/70
EDO 32M 72pin 2x8 / 4x4 \$108/138
32M PC100 SDRAM OEM / Major \$50/55
64M PC100 SDRAM OEM / Major \$88/95
128M PC100 SDRAM OEM / Major \$168/178
64M PC133 SDRAM OEM / Major \$88/95
128M PC133 SDRAM OEM / Major \$168/178
256M PC133 SDRAM OEM / Major \$378/418
ECC 128 / 256M PC133 SDRAM \$238/478
Rambus 128 / 256M \$428/998

AMD CPU
Duron 600 / 650 / 700 \$98/128/160
Thunderbird 750 / 800 / 850 \$248/278/368
Thunderbird 900 / 950 / 1G \$418/555/728

Intel CPU
Celeron 600 / 633 / 667 \$148/168/198
P-III 733 / 750 / 800 \$298/360/388
P-III 850 / 866 / 933 \$518/548/768

Motherboards

AMD Socket A Motherboard
Asus A7V-WOA / A7V \$228/238
Gigabyte 72M / 72X \$160/178
Gigabyte 72XR (ATA100/Raid) \$228

Celeron / P-III Motherboard
Abit SL6 / SE6 \$198/228
Asus CUV4X / CUSL2 \$168/235
Gigabyte 6VXE7+ / 6VX7-4X \$118/138
Intel 815EEAA / 815EEAAL \$218/238
Intel VC820 \$198
Intel N440BX / L440GX (Server) \$700/720
Super Micro 370DL3 / DE6 \$768/868

Drives & Controllers

Fujitsu 10.2 / 20 G ATA66 \$125/150
IBM (7200rpm / ATA100 IDE)
30 / 45 / 60 / 75G \$238/338/598/788
IBM 9G U160 SCSI 7.2K / 10K \$350/368
IBM 18G U160 SCSI 7.2K / 10K \$518/538
IBM 36G U160 SCSI 7.2K / 10K \$860/888
Maxtor (ATA 100 IDE)
10 / 20 / 30G 5400rpm \$128/150/178
40 / 60 / 80G 5400rpm \$238/388/478
15 / 20 / 30 / 40G 7200rpm \$155/178/228/318
Quantum (ATA66 IDE / SCSI)
LM 15 / 20 / 30G 7200rpm \$155/188/238
9G U2W / 18G U160 SCSI \$298/488
Seagate (SCSI)
9 / 18G U2W 7.2K SCSI \$338/498
18G U160 SCSI 10K / 15K \$555/698
36 / 74G U160 10K SCSI \$888/1638
Western Digital (U-DMA IDE)
10 / 20 / 30 / 45G \$128/160/198/268
10 / 20 7200rpm \$155/188
Adaptec (SCSI Adapter)
2930U / 2930U2 \$138/328
29160 U160 / U160 Kit \$308/418
TekRam 315U / 390F SCSI Kit \$68/148

Tape Backup

HP Colorado 8G IDE / Para \$278/338
HP Colorado 14G IDE / Para \$338/398
Onstream 30G IDE / SCSI Int. \$408/688
Onstream 50G SCSI Int. \$968
Onstream 30 / 50G Disc (3-pack) \$168/208
Seagate 8GB DAT SCSI Int. / Ext. \$738/938
Seagate 24GB DAT SCSI Int. / Ext. \$1038/1208

Scanners

Acer 640U / 640BU / 1240UT \$98/148/218
AGFA Snapscan 1212P / 1212U \$118/120
Canon 330P / N640P \$88/128
Canon N650U / N1220U \$155/288
Canon 1210U / FS2710 (35mmFilm) \$388/738
Epson 610 / 636U / 1200U \$148/148/268
Epson 1200U Photo \$388
HP 3300C / 5300 USB \$138/328
HP 6300C / 6350C USB \$525/650
Visioneer OneTouch 7600 USB \$138
Visioneer OneTouch 8100 USB \$188
Visioneer OneTouch 8600 USB \$248

CD / DVD / Sound

Acer 48x / 52x CD-ROM \$55/60
Creative 52x / Toshiba 48x \$60/78
Panasonic 8x DVD \$148
Pioneer 16x DVD \$188
Sigma DVD Controller PCI \$98
Acer 3D Wave PnP Sound PCI \$18
SoundBlaster Ensoniq / 128 PCI \$38/50
SoundBlaster Live Value 1024 \$75
SoundBlaster Live Platinum \$268
SoundBlaster Live MP3 \$138
SoundBlaster Live Xgames \$138

ZIP / JAZ / LS120

ZIP 100M IDE / Para / USB \$78/138/148
ZIP 250M IDE / Para / USB \$178/198/248
ZIP 100M / 250M Disc \$12/22
JAZ 2G SCSI Int. / Ext. \$398/468
JAZ 1G / 2G Disc (min. 3) \$120/128
JAZ SCSI to Parallel Adapter \$68
LS120 Super FDD Int. / Ext. \$98/228
LS120 Disc \$13

Modems/Camera

Acer 56K V.90 Voice/Fax PCI (HW) \$48
USR 56K V.90 Fax Modem SW/ HW \$55/88
Creative WebCam Para / USB \$78/78
Creative WebCam Go USB \$198
Intel Easy PC Camera USB \$88
Logitech QuickCam Express USB \$68

Spkr/ Mice/ KB/ Cases

USB Adapter / Hub
PCI to USB Card \$38
USB 4 Port Hub \$38
Speaker
120 / 260 / 600W + Subwoofer \$10/20/30
Altec ACS 33 / 45 / 54 / 48 \$65/98/108/168
Altec ACS 65i \$98
Creative 4 point FPS 1000/2000 \$98/198
Creative Theatre 5.1 \$388
Yamaha M30 Speaker/Subwoofer \$78

Mouse
Acer Wheel Mouse \$15
Logitech Trackman Marble / FX \$65/85
MS Trekker Wheel / Intellimouse \$18/28
MS Optical Wheel Mouse \$48
Keyboard
Acer 107 / Fujitsu 8725 \$13/20
Logitech Internet Keyboard \$38
Logitech Cordless KB & Wheel Mouse \$128
MS Natural Keyboard / USB \$32/68

Case & Fan
ATX 16" / 18" Case & 250W P/S \$45/55
ATX 18" Case & 300W P/S \$80
Removable HDD Drawer 33 / 66 \$25/35
External HDD/CD-Rom Holder \$80
Slot Fan / HDD Fan \$12/15
Golden ORB Fan \$18

Digital Camera/Camcorder

Canon A50 1.31M Camera \$608
Canon S10 2.1M Camera \$718
Canon S20 3.3M Camera \$998
Canon Ultra Camcorder \$1198
Epson Photo 650 Camera \$408
Epson Photo 800 Camera \$648
Epson Photo 850Z Camera \$1038
Epson Photo 3000Z Camera \$1268

Printers

Color Printer
Canon 2100/3000 \$98/155
Canon 6100 / S450 / 8200 \$198/248/468
Epson 580 / 860 / 900 \$98/188/\$75/348
Epson 870 Photo / 1270 Photo \$408/678
HP 840 / 895 \$228/328
HP 930 / 950 / 970 \$298/368/438
HP 1220 / 2000 \$648/468
Lexmark Z11 / 3200 / Z52 \$98/128/278

Laser Printer
Brother 1030 \$348
Brother 1240DX / 1250DX \$438/478
Brother 1270N (Network Ready) \$598
Brother 2060 / 2060N \$1268/1618
Brother 4350 MFC \$555
Brother 8600 MFC / 9600MFC \$748/968
Brother 2400C / 2400CN Color \$2668/3198
HP 1100 / 2100 / 2100TN \$555/978/1448
HP 1100A / 3150C MFC \$688/868
HP 4050 / N / TN \$1598/2068/2288
HP 5000 / N / GN \$2098/2988/3738
HP 8100 / N / DN \$3788/4198/4848
HP 4500 / N / DN Color \$3538/4198/5398
Samsung 6000 / 7000 \$448/898
Samsung 4500C MFC \$338

* Lease based on 36-month, 10% buyout. * All prices reflect 2.5% cash discount and are subject to change without prior notice. * All trademarks are the property of their respective owners.

CD Writers

HP 9150i (8x4x32)	\$278
HP 9350i (10x4x32)	\$328
HP 9510i (12x8x32)	\$398
HP 9600SI (12x8x32 SCSI)	\$448
HP 9600SE (12x8x32 Ext. SCSI)	\$528
HP 8230e (4x4x6 USB)	\$338
Panasonic 8432 IDE CD-RW	\$248
Plexor 8432 Int. IDE CD-RW Kit	\$318

Plexor 12x10x32 Int. IDE CD-RW Kit	\$428
Sony 8432 Int. IDE CD-RW Kit	\$268
Yamaha 8824 Int. IDE / Kit	\$238/268
Yamaha 8424 Int. SCSI / Kit	\$338/388
Yamaha 8824 Ext. SCSI Firewire	\$518

CD-R/ RW Media

BASF/ Sony CD-R (10pc)	\$9.80/13.80
8X CD-R (25/100pc)	\$20/72
Princo 80min CD-R (1/10pc)	\$2/18
BASF/ Sony CD-Rewriteable	\$2.68/5.0

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SALES: (604) 303-0705
TECH: (604) 273-9550
FAX: (604) 278-5268

Web: www.icicomputer.com
email: ici@icicomputer.com



Corporate Server Centre

Intel L440GX Server

- Intel Pentium III 800/850/1GHz CPU
- Intel L440GX+ Server Board (support Dual CPU & RAID)
- 128MB PC133 ECC SDRAM
- IBM 18GB U2W SCSI Hard Drive
- On-board Adaptec Dual Channel Ultra2 SCSI Controller
- On-board GD 5480 2M Video Adapter
- On-board EtherExpress Pro 100+ LAN adapter
- Creative 52X CD-ROM
- Panasonic 1.44MB Floppy Drive
- Samsung 550S 15" SVGA Monitor
- 107-key keyboard & Wheel Mouse
- ATX Server Chassis w/300W P/S

PIII-800
\$2668
\$95/mo

PIII-850
\$2828
\$102/mo

PIII-1GHz
Call

Intel 815E Workstation

- Intel Pentium III 733/800/866MHz CPU
- Intel 815EEAAL MotherBoard
- 128MB PC133 SDRAM
- 20GB ATA100 Hard Drive
- On-board Intel Graphics Adapter
- On-board EtherExpress Pro 100+ LAN adapter
- On-board Creative PCI Sound Adapter
- Creative 52X CD-ROM
- Logitech Internet keyboard
- Microsoft Intellimouse
- 280W Stereo Speakers
- Panasonic 1.44MB Floppy Drive
- ICI 17" ATX case w/250W P/S
- NEC FE700 17".25 Flat Screen Monitor

PIII-733
\$1478
\$51.80/mo

PIII-800
\$1578
\$57.30/mo

PIII-866
\$1748
\$61.20/mo

Intel Linux Net Server

Complete Server Solution:

- Connect all your computers to the Internet (using one account)
- Firewall solution included
- Website hosting (Intranet or Extranet)
- E-mail server: manager company e-mail
- Fax server: send and receive faxes
- File server: share large files easily
- Browser based setup: zero effort maintenance

Hardware Solution:

- Pentium III 733MHz CPU
- Intel 815 EEA Motherboard
- 64MB PC133 SDRAM
- 20 GB Ultra66 Hard Drive
- 1.44MB FDD & 48X CD-ROM
- ATI 8M RageII AGP Video
- 18" ATX Tower
- Dual 10/100 Ethernet card

Software Solution:

- Newlix Server
- 25 client licens

\$1328

NoteBook / Mobile Solution

IBM

i1210 C-500 32M 6G 12.1HPA 24X 56K	\$1548
i1230 C-500 64M 6G 13HPA 24X 56K	\$1808
i1250 C-500 64M 6G 12.1TFT 24X 56K	\$1948
i1500 C-500 64M 12G 12.1TFT 24X 56K	\$2388
A20m PIII-500 64M 6G 12.1TFT 24X 56K+LAN	\$2968
A20m PIII-700 64M 12G 14.1TFT 24X 56K+LAN	\$3918
A20p PIII-700 128M 18G 15TFT DVD 56K+LAN	\$5038
T20 PIII-650 128M 6G 13.3TFT 24X 56K+LAN	\$4088
T20 PIII-700 128M 12G 14.1TFT DVD 56K+LAN	\$4968

Acer

200DX C-550 32M 5G 12.1HPA 24X 56K	\$1689
200T C-550 64M 5G 12.1TFT 24X 56K	\$1968
521TE PIII-600 64M 6G 13.3TFT 24X 56K	\$2598
521TXV PIII-600 64M 6G 14.1TFT DVD 56K	\$2998
600TER PIII-600 64M 12G 13.3TFT CDRW 56K+LAN	\$3198
602TER PIII-650 128M 12G 13.3TFT CDRW 56K+LAN	\$3448

Fujitsu

E6150 C450 128M 6G 14.1TFT 24X 56K	\$2498
E6556 PIII-650 64M 15G 14.1TFT DVD 56K	\$3688

HP HANDHELD PC

HP Jornada 540 (16M) / 548 (32M)	\$598/728
HP Jornada 680 (16M/56K) / 690 (32M/56K)	\$1098/1198
HP Jornada 720 (32M)	\$1298

3Com

PalmPilot IIIe / IIIx / IIIc	\$208/333/538
PalmPilot V / Vx	\$438/533

TOSHIBA

4330 C-650 64M 10G 14.1TFT DVD 56K	\$3148
3440CT PIII-500 64M 6G 11.3TFT DVD 56K	\$3218
4260X DVD PIII-450 64M 12G 14.1TFT DVD 56K	\$3168
4340 PIII-650 64M 12G 14.1TFT DVD 56K	\$3528
7220CTE PIII-650 64M 12G 13.3TFT 56K	\$4198
8100 PIII-700 128M 12G 14.1TFT DVD 56K	\$4798

NoteBook Add-On's

PCMCIA CARD

Adaptec 1350 Mini SCSI Parallel Port Kit	\$98
Adaptec 1460D/1480A Slim SCSI Kit	\$170/245
DLink 56K + 10/100	\$138
Intel Pro100 LAN CardBus (Realport)	\$198
Intel Pro100 LAN+56K Modem Cardbus Realport	\$298
Linksys Ethernet PCMCIA 10BT / 10/100BT	\$78/98
MegaHertz 3CCFEM556 56K Modem+10/100	\$308
Xircom Realport 56K V.90 + 10/100 BT	\$398

PORTABLE FD, CD-ROM & CD-WRITER

Trillium External USB Floppy	\$128
Micro Solution Backpack 1.44MB FD	\$168
Micro Solution Bantam 24X CD-ROM	\$218
Micro Solution Bantam 24X CD w/Sound	\$258
Micro Solution 4X424 CD-Writer/Dualport	\$388/418

NOTEBOOK MEMORY & HDD & CASE

32/ 64/ 128M	\$80/120/238 & up
IBM 6/ 12/ 18/ 25GB 2.5" HDD	\$248/348/525/768
Toshiba 6/ 12/ 18GB 2.5" HDD	\$228/318/428
Targus Nolepac CN01/CN20	\$41/30

Display Centre

Video Card

3D Labs Oxygen VX1 32M AGP	\$278
Asus 6600 GeForce 32M Deluxe	\$298
Asus 6800 GeForce 32M DDR Deluxe	\$338
Asus GeForce 64M Pure / DDR	\$268/408
Asus V7100 GeForce2 MX 32M	\$218
Asus V7700 GeForce2 32M DDR/TV	\$448
Asus V7700 GTS DDR 32M / 64M	\$398/518
ATI Rage 3D 8M / Xpert 2000 32M AGP	\$48/108
ATI Rage Fury 32MB / 32MB Pro	\$148/160
ATI Rage Fury MAXX 64MB 4xAGP	\$248
ATI Radeon 32MB / All-in-Wonder	\$348/428
ATI Radeon 64MB DDR / VIVO	\$418/438
ATI All-in-wonder 128 Pro 16M / 32M	\$208/268
Creative GeForce2 GTS 32M	\$398
Matrox Millennium G400 16M / 32M	\$148/188
Matrox G400 32M Dual Head/ Max	\$228/288
Matrox G400 TV 16M	\$398
Voodoo3 2000/3000/3500 16M	\$118/148/268
Voodoo5 5500 64M 4x AGP	\$428

LCD Panel

NEC 1525V / 1525M 15"	\$1098/1268
NEC 1525X / 1525S 15"	\$1589/2398
NEC 1810-1 18" / 2010-1 20"	\$3668/5555
Panasonic LC50 15" / LC90S 19"	\$1550/5678
Samsung 570S / 570B	\$1298/1398
Samsung 150MP / 170MP	\$1818/3388
Viewsonic VG 150 / VP 150M 15"	\$1298/1515
Viewsonic VG 151 15" (Digital)	\$1418
Viewsonic VG 181 18" (Digital)	\$3698
Viewsonic VP 181 18" (Digital)	\$4228

Monitors

AOC 17" 7Glr .25 / 19" 9VLR .26	\$278/398
NEC DP73 / DPro 710S 17"	\$418/548
NEC DP91 / DPro 900U 19"	\$678/888
NEC DP200U / DPro 2040U 22"	\$1298/1598
NEC 17" AS70 17" / AS90 19"	\$288/468
NEC FE700 / FE700M / FE750 17"	\$378/448/478
NEC FE950 19" / FE1250 22"	\$678/1238
NEC FP950 19" / FP1350 22"	\$788/1368
Panasonic 17" SL75	\$348
Samsung 550S 15" / 750S 17" .27	\$198/268
Samsung 753DF 17" .20 1280x1024 (-\$30)	\$348
Samsung 700IFT 17" .20 1280x1024 (-\$50)	\$388
Samsung 700NF 17" .25 1600x1200 (-\$30)	\$398
Samsung 955DF 19" .20 1600x1200 (-\$50)	\$538
Samsung 900NF 19" .25 1600x1200	\$628
Sony E200 / G200	\$518/578
Sony 19" E400 / G400	\$698/798
Sony E500 / G500 / F500	\$1298/1468/2468

Viewsonic Monitors

E771 17" .27mm 1280x1024	\$318
E773 17" .25mm 1280x1024	\$378
EF70 17" .25mm 1280x1024	\$398
G773 17" .26mm 1280x1024	\$388
PF77 17" .25mm 1600x1280	\$528
PF775 17" .25mm 1600x1280	\$478
PS775 17" .25mm 1600x1280	\$468
E790 19" .26mm 1600x1280	\$518
GS790 19" .26mm 1600x1280	\$598
PF790 19" .25mm 1600x1280	\$668
PF795 19" .25mm 1920x1440	\$828
P810 21" .25mm 1600x1280	\$1168
P815 21" .25mm 1800x1440	\$1268
PF815 21" .25mm 1920x1440	\$1298

Network Products Centre

Intel Product Line

Wireless Networking

Intel 1.6M PC Adapter w/ AnyPoint Suite	\$178
Intel 1.6M USB Adapter w/ AnyPoint Suite	\$168

Network Adapter

Intel 8460B 10/100 Management Adapter	\$63
Intel 8470B 10/100 Server Adapter	\$135
Intel 8472B 10/100 Dual-Port Server Adapter	\$288
Intel 8490 Gigabit Server Adapter	\$928

Hub & Switch

Intel In-Business SH10T5 5 Port Hub (10BT)	\$64
Intel In-Business SH10T8 8 Port Hub (10BT)	\$77
Intel In-Business SH10TX4 4 Port Hub (10/100)	\$115
Intel In-Business SH10TX8 8 Port Hub (10/100)	\$160
Intel In-Business SS101TX4 4 Port 10/100 Switch	\$148
Intel In-Business SS101TX8 8 Port 10/100 Switch	\$205
Intel In-Business SH101TX16 16 Port 10/100 Hub	\$298
Intel Express 330T Stackable 16 Port Hub (10/100)	\$768
Intel Express 330T Stackable 24 Port Hub (10/100)	\$1098
Intel Express 410T Standalone 16 Port Switch (10/100)	\$780
Intel Express 410T Standalone 24 Port Switch (10/100)	\$1088
Intel Express 460T Standalone 16 Port Switch (10/100)	\$1088
Intel Express 460T Standalone 24 Port Switch (10/100)	\$1380
Intel Express 520T Scalable 12 Port Switch (10/100)	\$1868
Intel Express 550T Scalable Routing Switch	\$2888

Printer Server

Intel Netport Express 10/100 Ext. Printer Server 1 Port	\$308
Intel Netport Express 10/100 Ext. Printer Server 3 Port	\$438
Intel InBusiness Printer Station 10/100 2 Port	\$228

InBusiness Station

Intel InBusiness Storage Station 30G / 60G	\$1248/1798
Intel InBusiness Small Office Network Station	\$1798
(8 port Hub / 13G Storage & Backup / E-Mail / Firewall / Printer Server)	
Intel InBusiness Small Office Network Plus Station	\$2468
(same as above, with additional 13G for mirroring)	

Virtual Private Network

Intel Shiva VPN Gateway Express	\$5678
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3COM & D-Link

Network Adapter

3COM 3C905B-TX 10/100 PCI Adapter	\$62
Acer 10BT Combo / 10/100 PCI Adapter	\$18/25
D-Link 528CT PCI Combo	\$20
D-Link DFE-530/538TX 10/100 PCI Adapter	\$25

Home/Office Network Kit

D-Link DFE-905 4 Port 10/100 Hub/2xNIC/2xCable	\$155
Linksys 5 Port 10BT Hub/2xNIC/2x cable	\$78
Linksys EtherFast Cable/DSL Router (1 port)	\$160
Linksys EtherFast Cable/DSL Router (4 port)	\$228
(Built-in 4-Port 10/100 switch, Firewall & Single IP Address Feature)	

10 BaseT Hubs

3COM 3C19260 5 Port Hub	\$60
3COM 3C16440 SS II Entry Hub 12 Port	\$220
3COM 3C16441 SS II Entry Hub 24 Port	\$338
3COM 3C16700 OfficeConnect 8/TPO	\$118
D-Link DE-805 TP/C 5 Port Hub	\$55
D-Link DE-809 TP/TC 9 Port Hub	\$68

100Mbps Hubs & Switches

3COM 3C16750 OfficeConnect 8 Port 10/100BT	\$199
3COM 3C16751 OfficeConnect 16 Port 10/100BT	\$329
D-Link DSH-5 10/100 5 Port Hub	\$105
D-Link DSH-8 10/100 8 Port Hub	\$150
D-Link DSH-16 10/100 16 Port Hub	\$288
3COM 3C16951 SS-II 10 Switch 1100 12 Port	\$950
D-Link DSS8+ 8 Port 10/100 Switch	\$148

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- Samsung 550S / 750S / 750B ... \$189/285/339
- Samsung 753/ 755/ 955DF ... \$369/399/539
- Samsung 900NF/950P/1100P ... \$659/499/1089
- MAG 786FD/ 796FD 17" .24 ... \$419/469
- Mitsubishi DScan 70/72/900U ... \$469/549/989
- NEC AS70/ FE700 / FP950 ... \$299/399/799
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- Ricoh 8x8x32x / 12x10x32x ... \$219/289
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< BEST OF BREED SOFTWARE >

DVD-ROM emerges, finally

Whether for distribution of software, encyclopedias, games or movies, software packagers and users alike will benefit from the larger capacity of this latest optical storage technology

By Jacques Surveyer

Like a child's vacation refrain, "are we there yet?" it seems we've been waiting forever for the arrival of DVD on the desktop PC. This Christmas may be the breakthrough, however, as hundreds of DVD movies—including many new director's cuts—along with some great educational and game software will soon be available on this media format. The other factor that will result in mainstream adoption is the anticipated drop in the price of DVD drives to the \$250 to \$300 range, or equally likely, the inclusion of DVD drives in many more home PC packages. The result is that DVD will finally start to live up to its huge 4.5 GB-plus promise and become a key player in entertainment and software distribution.

DVD needs

First let's get a great DVD software player for all your movies, music, and other content. Intervideo's WinDVD 2000 (<http://www.intervideo.com>, \$45) is a prime candidate. It not only supports all the popular DVD and CD-ROM formats, it also supports MP3, VOB, MPG, and AC3. It has one of the least restrictive minimum hardware requirements: an Intel Pentium processor with MMX, or an AMD with 3DNow, AGP Graphics card, 32 MB of RAM, Microsoft DirectX on Windows 98/ME/2000.

Next, you'll need some content to justify the DVD player. Following are lists of my favourite DVD titles, broken down into various categories.

DVD director's cuts

Blue Velvet: Widescreen and still chilling. \$27.
Fantasia Anthology: A three-DVD set about the making of the two Fantasias. \$75.
The Good, the Bad and the Ugly: Spaghetti westerns explain themselves. \$30.
Groundhog Day: Bill Murray delivering a morality tale with French subtitles? \$30.
Life is Beautiful: How to make life beautiful by Johnny Tothpick. \$48.
Monty Python Life of Brian: They call it the "Criterion Edition." \$42.
Shakespeare in Love: Extra scenes, costuming, players and reviewers comments. \$42.
Terminator 2 Ultimate Edition: Excellent commentary and special effect details. \$42.
The Emperor and the Assassin: The exquisite Gong-Li in history as a complex play. \$39.
Usual Suspects: More Kaiser Sose tales. \$27.
Young Frankenstein: In which Mel Brooks explains "What knockers!" \$32.

DVD encyclopedias

Encyclopedia Britannica 2000
<http://www.mindscape.com>, \$80.
Encarta Encyclopedia Deluxe 2001,

<http://www.microsoft.com>, \$120.
Louvre Museum DVD
<http://www.amazon.com>, \$60.
Ultimate Human Body DVD
<http://www.dkinteractive.com>, \$45.
Ultimate Science Library DVD
<http://www.dkinteractive.com>, \$45.
World Atlas DVD
<http://www.kdinteractive.com>, \$60.
WorldBook Family References
<http://www.ibm.com>, \$150.

Games

Baldur's Gate
<http://www.interplay.com>, \$50.
Civilization: Call to Power
<http://www.activision.com>, \$62.
Riven
<http://www.broderbund.com>, \$60.

Clip Art

Art Explosion 600,000
<http://www.buy.com>, \$100.
PrintMaster 8.0
<http://www.mindscape.com>, \$52.
PrintMaster Platinum 7
<http://www.mindscape.com>, \$49.
Print Shop 10 Deluxe DVD
<http://www.mindscape.com>, \$64.

Having titles on DVD means no more fumbling through five to seven CD-ROMs, swapping them in and out of your drive while attempting to look up everything on heteroskedasticity or trying to figure your way through the wonder worlds of Riven.

Perhaps the closest fit to a "pleasure-to-work-with" software are the DVD-based encyclopedias. Now that you don't have to switch discs and can preload critical parts of the encyclopedia onto your hard drive, response time and free flow of work can follow the many internal links, timelines, maps, and historical tables that make these programs very effective research tools.

Even better, most are chock full of Web-based hyperlinks. It would be nice to see the software tied in with a personal search engine such as KCSL's XPortal or Copernic. But these tools are brimming with extra references like atlases, dictionary, and thesaurus, so offline or online you have powerful and so-easy-to-do reference tools. ☐

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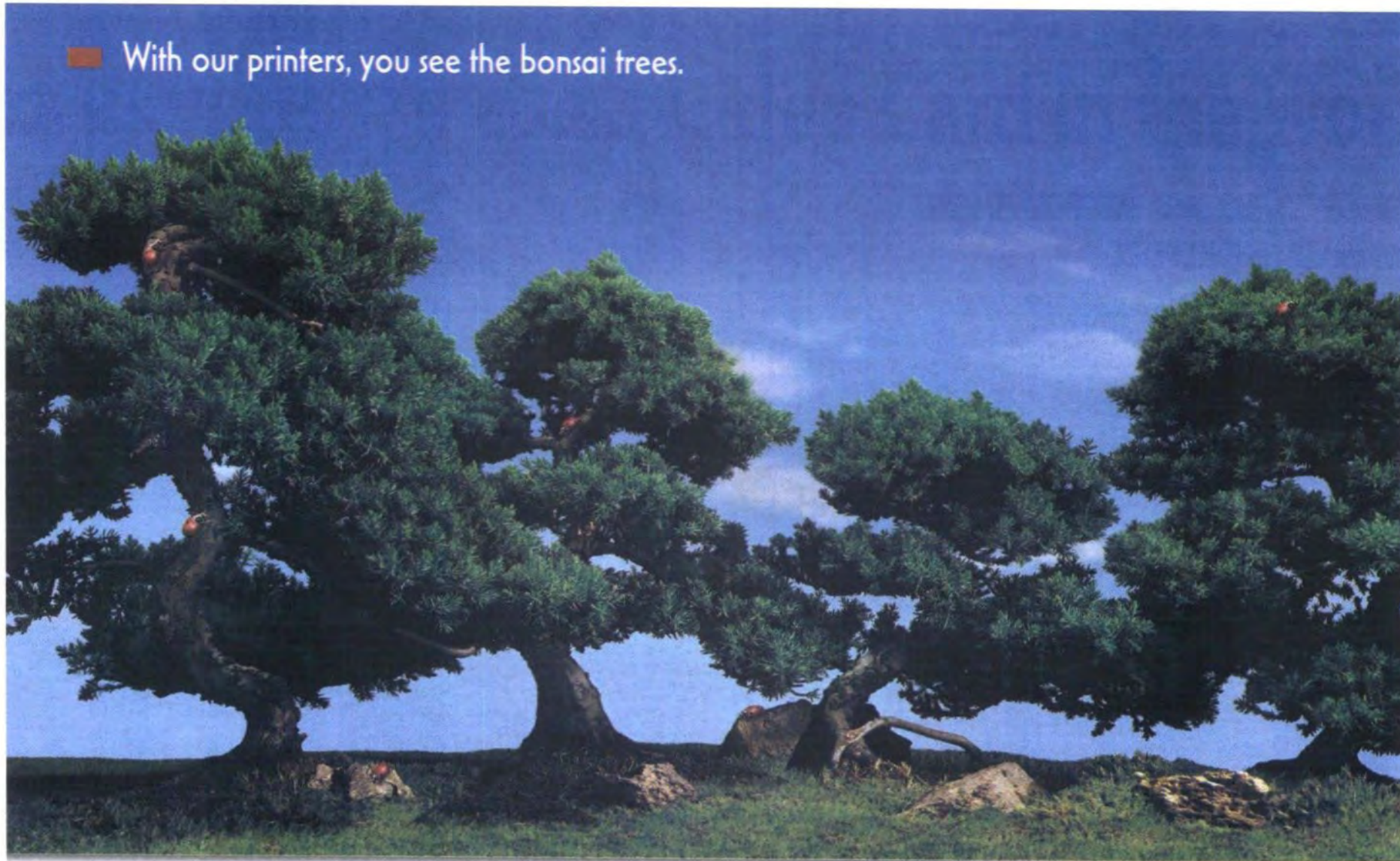
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Web publishing challenges productivity suites

For a long time, Word and Excel have been the pillars of Microsoft Office.

But the two pillars are showing the signs of age. Word processors in general have not kept pace with desktop publishing and Web page layout programs. For example, if one has to do a page with any complex layouts—particularly columns and text frames associated with intricate printed reports or Web-ready brochures or folders—then word processors poop out. In these cases it is easier to work in desktop publishing programs if the output is primarily for print, or Web-page development programs if the target is the Internet.

Fortunately, the premium edition of Office includes Publisher 2000 and FrontPage 2000, which are more than equal to these tasks. But this means word processing is smeared over three programs: Word for collaboration and mail merge work; Publisher 2000 for more complex reports and brochures; and, finally, FrontPage 2000 for documents that will primarily be used for Web pages.

It would be nice to say that passing documents among Word, Publisher and FrontPage is flawless, but in reality, translation between the three programs leaves a lot to be desired. The transfer fails to preserve formatting and layouts with any degree of faithfulness. It is particularly galling to see that Word and Publisher documents exported to the Web must either become highly static GIF or JPEG images. Though this offers fairly close reproduction, the documents are effectively un-editable, or are badly mangled in the translation to HTML.

Given that Binary Research's Click2Convert (<http://www.clicktoconvert.com>) does an impeccable job by contrast just adds to the frustration. However, all of the major word processing programs are in the same boat, with Lotus WordPro and Corel WordPerfect exhibiting similar problems in transforming documents for the Net.

Excel is also starting to show its age. For

example, Corel's Quattro Pro has more formulas and graphing capabilities and is rapidly catching up to Excel's formatting and analysis features.

Also, although Excel's conversion to Web pages are good, Quattro Pro is more flexible and user controllable.

However, Excel really does shine by way of the sheer number of third-party add-ons available from statistics, math programming, advanced financial calculations, risk analysis, mapping and other analytical calculation vendors. But with the increased importance of Excel's link to SQL Server's powerful data mining and OLAP services, expect to see either Microsoft or a third party provide a better Excel modeling language to greatly simplify the link between Excel and OLE/DB for OLAP services.

Sun Microsystems is challenging Microsoft and other suite vendors by making its StarOffice suite (<http://www.sun.com>) available for free. Star Office has components nearly as capable as Word, Presentations, and Excel. StarOffice programs can read Office file formats directly or export StarOffice files into Office 97 or 2000 formats.

The problem with StarOffice is that a few advanced Microsoft Office features get dropped in the translation. In addition, StarOffice is no better at converting faithfully to Web pages than Microsoft Office applications or those of any other office suite. StarOffice's database, Web development, and desktop publishing modules are weak or non-existent in comparison to Microsoft Office's Access, FrontPage and Publisher modules in the Premium edition.

But perhaps of more importance to large organizations, StarOffice lacks a macro facility anywhere close to the versatility of Office's Visual Basic for Applications. However, the 6.0 version of StarOffice is due out before the end of the year, and at this point Sun promises to make StarOffice not only free but competitive and open source.

Microsoft's .NET Building Block services will hopefully offer more collaboration and data interchange features to Office programs. They certainly will allow developers to offer a broad range of Office functional-

ty up on the Web with greater ease. Look for this in the upcoming Office 2001 in the first half of next year. And who said office suites were a slumbering dead end?

—Jacques Surveyer

Managing personal information anywhere

Personal information management is one software category profoundly affected by Internet technology. Once upon a time, the PIM software that resided on your desktop computer was inaccessible if you were out in the field. Then digital organizers like the Palm handheld, with its elegant synchronization method, allowed you to carry key information like your contacts or appointments with you, all fully up to date.

The evolution of personal information management continues, with unified messaging the new mantra in which Internet text-based chat or voice, voice mail, fax, and email are all accessible and can be managed from one place.

One player to watch is Mississauga, Ont.-based O1 Communique (<http://www.o1com.com>) with its Communicate i2000, one of the most versatile unified messaging programs on the market, that can manage all of the above tasks and more. To add interest, Communicate! 2000—also from O1 Communique—supports video conferencing, text-to-speech conversion, and telephone logging services.

Even more impressive, early next year O1 Communique will offer mobile routing services. This means users will be able connect through any Internet browser (including those on Pocket PC, Palm, and BlackBerry PDAs, as well as WAP and GPRS cellphone connections) to their Communicate! 2000 machine and manage all their messages as if they were at their desktop PC.

In effect, your PC becomes your personal

information server, and the various access devices you might use to check email, voice mail, appointments, etc., become remote terminals. And so again, we see that communicating with PCs is where the real action.

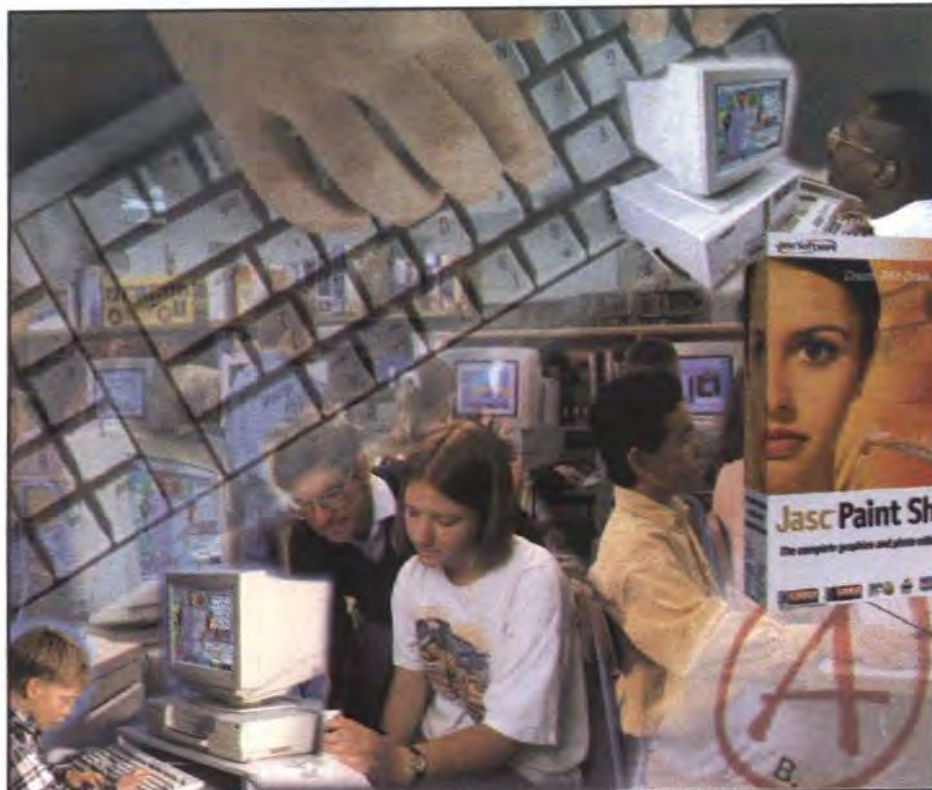
As PIM software companies transition to Web services they Net-enable the classic contact management services, such as contact databases, calendaring, client interaction tracking, meeting scheduling, to-do lists, and workflow management. Thus products that have gained acceptance as personal organizers are being given features that allow them to also serve as workgroup or team organizers, with commonly accessible calendars and more. Personal organizers like Microsoft Outlook and Lotus Organizer, for example, have become front ends for larger workgroup systems like Exchange or Notes.

Larger contact managers such as ACT! 2000, GoldMine 5, Info Accelerator 8, and Maximizer 2000 have also made the transition to groupware.

All of these programs are rushing to make their programs more Net capable with direct output to the Web pages, XML data interchange, and even total operation within a Web browser using Java or Javascript.

To illustrate how seriously the software industry is taking these opportunities, Janna Systems, a Toronto-based contact management software developer, was recently bought by customer relationship management giant Siebel Systems for nearly \$1 billion in stock.

—Jacques Surveyer



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How will Canadian cities blossom in the Internet age?

By Stefan Dubowski

Over the past 9,000 years, since the first prototypes of urban life began at Jericho in Palestine and Catal Huyuk in Anatolia, it has always been a mystery how certain places acquire the magic to become centres of political, religious, technological and economic creativity.

Many cities have, for a time, had the magic. They've attracted or created human talent, new ideas, economic activity and a vibrant, healthy urban culture out of proportion to their simple size. How our own Canadian cities can ride the waves of the New Economy to a sustainable, healthy existence in the global economy is the trillion-dollar question.

In her book, *The Death and Life of Great American Cities*, Jane Jacobs has this to say about what a living city needs for diversity and urban liveliness:

"A mixture of uses, if it is to be sufficiently complex to sustain city safety, public contact and cross use, needs an enormous diversity of ingredients."

But Jacobs' words seem to have gone unnoticed in the high-tech industry. Here we see "e-clusters," valleys, alleys and corridors dedicated to the world of binary code.

We notice high-tech closeness in Kanata, Ont., where visitors have access to CrossKeys Systems Corp., Alcatel Networks Corp. (formerly Newbridge Networks) and Mitel Corp. from one street, March Road.

Consider St. John, N.B., where a number of call centres and IT training facilities take up residence.

Some say Montreal has a lock on some categories of high-tech research and development. And plenty of software comes from B.C.

George Hunter is the executive director of the B.C. Technology Industries Association (BCTIA). He sees examples of this congregation happening in the Yaletown and Gastown areas of Vancouver.

"If you listen closely over lunch you can hear all of the business deals going on," he said over the telephone. "There's this intense need for interaction with peers. The real drive is on for areas that are 'funky.'"

What's the appeal? "Other companies are there," Hunter said.

Is this in keeping with Jacobs' definition of diversity? Or does our tech-penchant segregate services and stifle city excitement?

According to Beth Moore Milroy, director of Ryerson Polytechnic University's School of Urban and Regional Planning, such concentration might seem homogeneous, but in truth diversity rules.

"It's almost one of those timeless features," Moore Milroy said. Consider Canada's major financial district, which lines Bay Street in Toronto.

"You would see a variety of services if you looked closely at the financial district... You'd see lawyers, you'd see restaurants, you'd see corner store activity. I don't think [the high-tech sector] is all that different."

But computing companies are different in one respect: they're on the leading edge of communication. What's the point of clustering when colleagues and conversation are only a mouse-click away?

"Email certainly is important," Moore Milroy said. "But we find something very interesting, nonetheless, with people. They learn more from meetings than from printed words."

Thus email is relegated to a scheduling feature for face-to-face interaction, she said. "The meetings still go ahead."

This "timeless feature," clustering, is reborn, however, thanks to Canada's interest in technology. Whereas once the clusters were left to create their own infrastructure, "cities again are getting into providing the 'intangibles,'" like the capacity to meet and easy access to capital markets.

It's part of the reason why a group of companies called the Spadina Bus is promoting a downtown Toronto area as the premiere e-business cluster.

Eric Meerkamper, the Spadina Bus founder, says this city's aged fashion district acts as an ideal incubator for new media companies. It's not far from the financial area and start-up cash. But just as importantly, it gives novel technology a chance to thrive.

"The most dangerous thing you can do is isolate yourself," Meerkamper said during a telephone interview. "You have to keep up on the changes. You want to know what's going on."

But it's not easy. After all, in any given "geographically defined e-cluster" competitors stand side by side. Contentious? Meerkamper doesn't think so.

"See it from our customers' point of view," he said. Meerkamper works for a consulting company called D-Code, which keeps office in the Spadina area. "They have the alternative to go from place to place... They know they're going to find what they want."

It's great for customers. But how is it good for the companies themselves?

Clustering might help with employee retention, Meerkamper says—albeit in an odd way. High-tech workers, like most people, enjoy the camaraderie e-clusters afford.

"It's very attractive. Companies can promote themselves to employees, [who become] not only a part of a company, but part of a community."

Mind you, high-tech workers are in demand these days. What's to stop your Web developer from joining the team across the street? Nothing. But he's more likely to stay put if he likes his job and likes the cluster—less likely if he likes his job and doesn't enjoy being out of the geographic loop.

"Work as a place of community is very important to this age group," Meerkamper said. D-Code researches the "nexus" generation: 18- to 34-year olds. "The people you work with can be an important component."

As for the competition, Meerkamper said there's more than enough work for everyone. This speaks to the employee shortage, too.

"People are turning away business because they don't have the people. They can't handle it."

This is what Meerkamper called "co-opetition." Companies might vie for the same customer but they help each other as well, creating a mesh of opportunities for employees, clients and—very important—investors.

When an investor backs a clustered company, she backs an entire community,

Meerkamper suggested. This is one route to success for industries and individual firms.

Think of it as an outdoor incubator. One investor gleams many choices from this place. The difference is the high-tech hopefuls maintain their own roofs, instead of sharing one.

Meerkamper notes another benefit of e-clustering: infrastructure services. It's easier for a company to take up residence where cables are connected, high-speed is standard and the power won't go off.

(Some say the Spadina area still needs some work on that last point.)

But clustering isn't all roses. Consider this: a high-tech jumble of software companies, content producers and consultants might seem vibrant at first. But what if no one moves and nothing changes over time?

It's a stagnant end. But in Meerkamper's mind the Spadina Bus should attract a healthy turnover rate. Migration occurs as companies seek larger offices, lower rents. Perhaps a firm discovers that most of its clients live on the West Coast. Goodbye T.O., hello B.C.

Moore Milroy has her own thoughts about the Spadina Bus. For one thing, "we tend to

think of clustering as something that happens outside of downtown... There, people want to be around others in the same industry. Why? It increases their collective knowledge and allows people the contacts they need to move from one company to another."

And if the Spadina Bus cluster harkens back to a previous era in Canada's history—in that clustering is "timeless," as Moore Milroy said—the digs perpetuate this connection. We're talking ancient knitting mills and textile factories.

So out of homogeneity comes diversity. Jacobs might be pleased. (We couldn't find a contact number for the urban planning guru, even though she lives in Toronto.)

"Very few companies do the same thing around here," Meerkamper said. "But you'll find everything surrounding e-business."

For his part, Hunter enjoys the clustering scene. He works in Yaletown, a popular new-media congregation. If nothing else its stack of companies makes Yaletown an attractive spot these days.

"You need a shoehorn to get into Yaletown and Gastown," Hunter said. "It's very vibrant right now."

—CanadaComputes.com

U.S. colleges reject call for on-campus Napster crackdown

CAMBRIDGE, Mass.—Some U.S. colleges are rejecting a request from rock band Metallica and rap star Dr. Dre to ban MP3-swapping Napster on campuses, but the musicians' lawyer says he has no plans to sue those with open network policies. Not yet, anyway.

Howard King, who is representing Metallica and Dr. Dre in a copyright infringement lawsuit against Redwood City, Calif.-based Napster, sent letters to a number of large U.S. colleges suggesting that permitting access to the peer-to-peer file-sharing technology was akin to abetting music theft.

But institutions such as the Massachusetts Institute of Technology (MIT) in Cambridge have told King they would not comply with requests to rid their networks for Napster users. Others have yet to respond.

While the letters had asked the colleges to provide a response by Sept. 22, King said the date wasn't a "deadline" colleges had to meet in order to avoid legal action.

"We want to see what the universities have done—or are willing to do—to protect the rights of copyright owners," he said. "It was not our intention to turn around and sue universities who refuse to ban access to Napster. It's really our intention to keep a dialogue open to persuade them to do the proper moral, ethical and legal thing."

"We would plan to follow up with those who don't respond—or don't respond the way we'd like them to respond—probably with further requests," King said.

Metallica's and Dr. Dre's lawsuit against Napster was filed this spring, paralleling a similar complaint from the music industry, filed by the Recording Industry Association of America and music publishers. The record-company lawsuit led to a preliminary injunction that could

have closed the MP3-swapping service if the order hadn't been stayed by Napster's appeal. The U.S. Court of Appeals was slated to hear oral arguments from lawyers Oct. 2 in San Francisco (just after TCP went to press).

When the lawsuit from Metallica and Dr. Dre was filed, Yale University, the University of Indiana and the University of Southern California were also named as defendants, but they were later dropped from the suit after agreeing to block access to Napster on their networks. King said Napster is still the only defendant currently named in the suit.

At MIT, spokesman Robert Sales said that the university's policy is to maintain an open network.

In a letter to King, James Bruce, MIT's vice-president in charge of information systems, said: "MIT has had a long history of providing its faculty, staff and students with uncensored access to the Internet and its vast array of resources. ... This policy is consistent with MIT's educational mission and out deeply held values of academic freedom."

However, Bruce wrote that MIT does "does not condone copyright infringement," and he invited King to offer any information that could identify individuals who have illegally copied the music of Metallica or Dr. Dre.

"Once we are certain that an individual making the allegation indeed owns the intellectual property and that the alleged activity... is not protected by fair use, we work promptly and decisively to stop the infringing activity," Bruce wrote.

Many colleges have banned access to Napster on campus, but frequently administrators say such action is taken because the MP3-swapping taxes network and computer resources.

—Newsbytes



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TV industry told to transform or die

LOS ANGELES—The digital revolution is changing the face of television in many ways, but Robert Tercek says the biggest opportunity in digital video is electronic customer relationship management, or eCRM.

Tercek, the president of the programming division at PacketVideo (<http://www.packetvideo.com>), has plenty of experience on the front line of the revolution. He oversaw the development of interactive media at Sony's Columbia TriStar Television, founded 7th Level, a game developer, and was creative director for MTV.

Tercek was the keynote speaker for the opening day of Digital Coast 2000 (<http://www.digitalcoast2000.com>), a conference in Los Angeles, California, that highlights the convergence of the Internet and the traditional media, i.e. print, radio, broadcast television and film.

Tercek says eCRM is the technology behind one-to-one marketing, which is not available through television today. He also believes television, which he referred to as "the most dominant medium in the last century," is undergoing a fundamental change.

"Television has been blamed for many things," said Tercek. "Television is not the problem, it is a symptom of a mass society. We have a mass consumer society, with mass marketing, which led to the rise of television as a mass medium. Television gave the opportunity to create mass brands and stimulated mass demand."

"Now we are seeing a shift to mass customization, to a one-to-one economy," Tercek continued. "It will be a wrenching transition for the television industry. Everyone wants things customized to him or her, you see this as a growing trend on the Internet. Television will have to become customized, because the audience will no longer be passive, they will be an active participant."

Tercek's address focused on four vectors that will drive the change in television from its current state to an interactive medium in the future: form, value, audience and control.

By form, Tercek refers to the transition from analogue networks to digital, two-way networks. He quoted Alvin and Heidi Toffler's book *Power Shift*, which noted six important words for the future of entertainment: ubiquity, interactivity, connectivity, convertibility, mobility and globalization. Tercek says that the new wave of television must address each of those six items.

"Convergence is a term that is much derided. It also causes confusion. Television will not converge with PCs, convergence will come from micro-processors and telephones," he predicted. "The value is in communication. The terms television and video will merge, and community and commerce will come from connectivity. Connectivity is the future of video. All media is heading towards a telephony sphere, that's how to reach the next billion users," he added.

Tercek went on to predict that television programs will turn into digital software that work on any network.

The value will come from the change from a fixed product to a commodity, according to Tercek. "Video will no longer be on a tape with shrink wrap. Technology like Napster will lead to the commoditization of content. On demand access will prevail. Video will be given away free with value-added elements wrapped around it," he said. "The goal is to occupy all of your customer's time. If you don't take their time, they go to someone else."

The third vector, the audience, will change from observer to participant, said Tercek. "Television viewers have always been powerful. If they don't

watch a show, it is gone, sometimes after three weeks.

If they watch a show, it comes back the next week. However, two-way networks will measure every switch viewers make. It is Orwellian, but it will lead to eCRM, which will transform a mass audience to an audience of individuals."

To the industry executives in the room he added: "Are you ready to embrace eCRM?"

The final vector Tercek spoke about was control.

The World Trade Organization demonstrations in Seattle last year, he said, were a combination of a revolt against brands and commercialism and a feeling of being left out among those who were still waiting to strike it rich in the new economy.

"There is a backlash now, because an information overload has led to a feeling of desperation. The wild, gold-rush mentality has led to a transformation of identity. Not everyone can found a dot-com that goes public and makes millions of

dollars, not everyone can win on *Who Wants to be a Millionaire?* Television was a freedom from choice, and mindlessness is liberating. The future is freedom, and freedom means responsibility," he added.

Tercek left his audience with an advisory to the members of the television industry. "Transform and be transformed, and survive the evolutionary process."

—Newsbytes

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Is Linux in your future?

It is no surprise that Linux is emerging as the fastest growing operating system. Linux has momentum for a few reasons.

First, it's free, reliable and runs very fast. Second, it hosts a growing amount of freeware, including such Web stalwarts as Apache Server, Interbase, and MySQL databases; PHP, Python, and PERL scripting services; and StarOffice Suite, Netscape, and Java with several free IDEs, including Borland's JBuilder Foundation.

In addition, all of the major database and Web server heavyweights—including Bluestone, Informix, IBM, Oracle, Sybase, and others—have ported their main products to Linux.

Finally, the next version of Linux will have improved clustering and multiprocessor support built in. So Linux has become the lightweight Web server of choice.

On the desktop, Linux has received three boosts. First, Corel Linux has set the standard for ease of installation and graphical user interface (GUI) use.

By developing its own GUI-based file manager and user admin programs, Corel Linux (<http://www.corel.com>, free, or \$60 for the Deluxe version, which includes WordPerfect and other utilities) simplifies operations users of Mac or Windows desktops have come to expect to be very fast and easy.

In addition, by adopting KDE and developing the WINE Windows emulator, Corel has given impetus to better windowing capabilities in Linux, be it KDE, Gnome, or other GUI.

The second boost is the relatively high price Microsoft is charging for its first operating system that can claim to have close to the same reliability and availability as Linux (Windows 2000).

The jury is still out, however, as no public benchmarks on reliability, security, or performance have been done comparing the two systems.

This may be due in part to the fact that both OSes are in major transition to 64-bit multi-processing, and Windows 2000 will have added security and reliability by means of its .NET managed executable environment.

But the fact remains that Windows 2000 currently sells for two to three times more than Windows 98. Presumably the Whistler version of Windows 2000, which will replace Windows 98, will be pitched in the same price range. If that is true, then the Windows OS may become 15 to 25 percent of the cost of a new desktop PC, at which point switching to free Linux with free Office-compatible software and other free or low-cost applications will become quite compelling.

Finally, Linux on the desktop has received a boost from China.

In January, IDG reported that China has decreed Linux the desktop operating system of choice.

How effectively the government can impose such a choice remains to be seen. Stay tuned to see how this works out over the next few years.

But the future presence of a billion Linux desktops in China would make Linux-compatible applications and standards very compelling indeed.

In the meantime, Microsoft has been and continues to work overtime on Windows at all levels.

Windows CE has moved to several different hardware architectures including StrongArm and MIPs.

This renews the hardware independence started in Windows NT but then abandoned (Windows 2000 runs only on Intel architecture).

But the new .NET managed executables have the inherent capability to be cross platform, just like Java Virtual Machine applications. So more than ever before, Microsoft has real choices as to which hardware architectures and markets it chooses to enter.

—Jacques Surveyer

Developers take individual approaches to Web tools

The following tools have emerged from the helter skelter to become Web tools of choice for a broad range of needs. The only problem in making a choice, however, is that each of these programs take a very individualistic approach to Web development.

- **Cold Fusion Studio:** Strong database and page design tools (\$2,100). <http://www.allaire.com>.
- **Dreamweaver UltraDev:** Forte in page, template, and database (\$710). <http://www.macromedia.com>.
- **GoLive:** Great page, site, and Javascript programming tool (\$380). <http://www.adobe.com>.
- **HoTMetaL Pro:** Text, page, and XML Web tools par excellence (\$150). <http://www.softquad.com>.
- **SilverStream:** Java Server pages and Enterprise Java Beans with top design tool (pricing not available). <http://www.silverstream.com>.

As soon as Microsoft gets Visual Studio.NET working—which is expected to be about the second quarter of 2001—Visual Interdev and Commerce Server 2000 with ASP+ will also become quite competitive. But right now ASP+ is so revolutionary it renders the older ASP code obsolete.

For big site development, a number of tools like Forte Developer 6, Oracle's JDeveloper, and IBM's WebSphere allow users to develop enterprise wide Web systems with round-the-clock reliability, security, and huge scalability demands, but these systems can cost upwards of \$250,000.

—Jacques Surveyer



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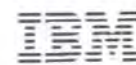


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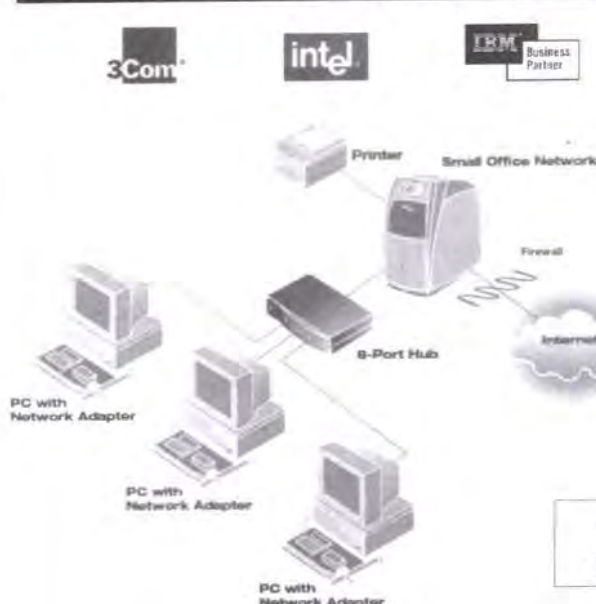
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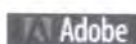
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Free speech advocates seek to expose 'censorware' foulups

By Stefan Dubowski

In an attempt to help crack online censorship, the Digital Freedom Network (DFN) held a contest to "foil the filters."

This free-speech advocacy group from Newark, N.J. asked people to send in examples of the worst—or perhaps best—example of "censorware" screw ups.

"The idea is to bring to attention... mainly that filtering software doesn't work," said Bobson Wong, DFN's executive director, during a telephone interview.

Wong is no fan of Internet filters, believing that they do more harm than good.

"The makers claim that they can view the entire Web—which is simply impossible."

These not-so-smart programs are designed to keep prying eyes—particularly under-aged peepers—from perusing nasty online content, like pornographic pictures and lewd stories. But Wong has heard from unhappy surfers, caught between these algorithmic bars:

- A woman named Sheryl Babcock was not allowed to enter one Web site because her last name contains an unwelcome word. Wong said the site owner wouldn't make an exception for her. If she wanted to join the fold, she'd have to use another name.
- A Navy officer who was studying for an exam wanted to log on to the Web site, aplussex.com. But here again, the corporate firewall's filters wouldn't let him through because the word "sex" is hidden in this universal resource locator (URL).
- The people from Scunthorpe, England, are out of luck with filters. Dot-com merchants from this place had better avoid naming their hometown in the URL if they want everyone to access their sites.
- Do you like poetry? Keep in mind that some electronic censors hide Web sites about Charles Dickens, Emily Dickinson and e.e. cummings.
- Internet filters blocked a reporter's stories because they contained the words, "who reports." The filter read the word "whore" therein.

The way Wong sees it, these filters do children more harm than good. What if the child wants to look up information about cucumbers or the Earl of Sussex?

"That's depriving kids access to an education. The Internet is supposed to be a great tool for sharing information."

The problem is, the Internet is also a great tool for sharing lies, selling pornography and pushing propaganda. What's a parent to do, watch his or her children every time they go near a computer?

"Filtering is no substitute for parental discretion," Wong said. "And it's not as if every time you go online you're going to stumble upon a picture of a naked woman. You have to search for it."

And here's where Wong advocates education, not "censorship." Parents might teach their kids how to surf safely. Consider Child Find Canada's rules. This group, concerned with kids' safety, offers guidelines for porn-free surfing:

- Keep the computer in a common place, like the family room or den.
- Tell your children not to send pictures of themselves without your permission.
- Trust your kids to trust their instincts. If what they're doing feels wrong, it might

very well be.

Internet filters will likely grow more intuitive, Wong said.

But in the meantime he suggests we turn off this electronic net.

"It involves boundaries and trust. But to use software that is so flawed, so far behind, you'll have to wait a long, long time before it becomes even marginally more intuitive."

—CanadaComputes.com

Foil the Filters winners

In late September, DFN posted the following winning entries in its Foil the Filters contest at its Web site (<http://www.dfn.org>):

Grand prize

Joe J. reports being prevented from accessing his own high school's Web site from his own high school's library. Carroll High School adopted filtering software which blocked "all ques-

tionable material." This included the word "high."

Runner-up




You wouldn't think someone named Hillary Anne would have censorware problems, but all attempts to register hillaryanne@hotmail.com were rejected because censorware spotted the hidden word "aryan." Hillary says "I had to email and fight the system like crazy to actually be able to use my registered nickname again."

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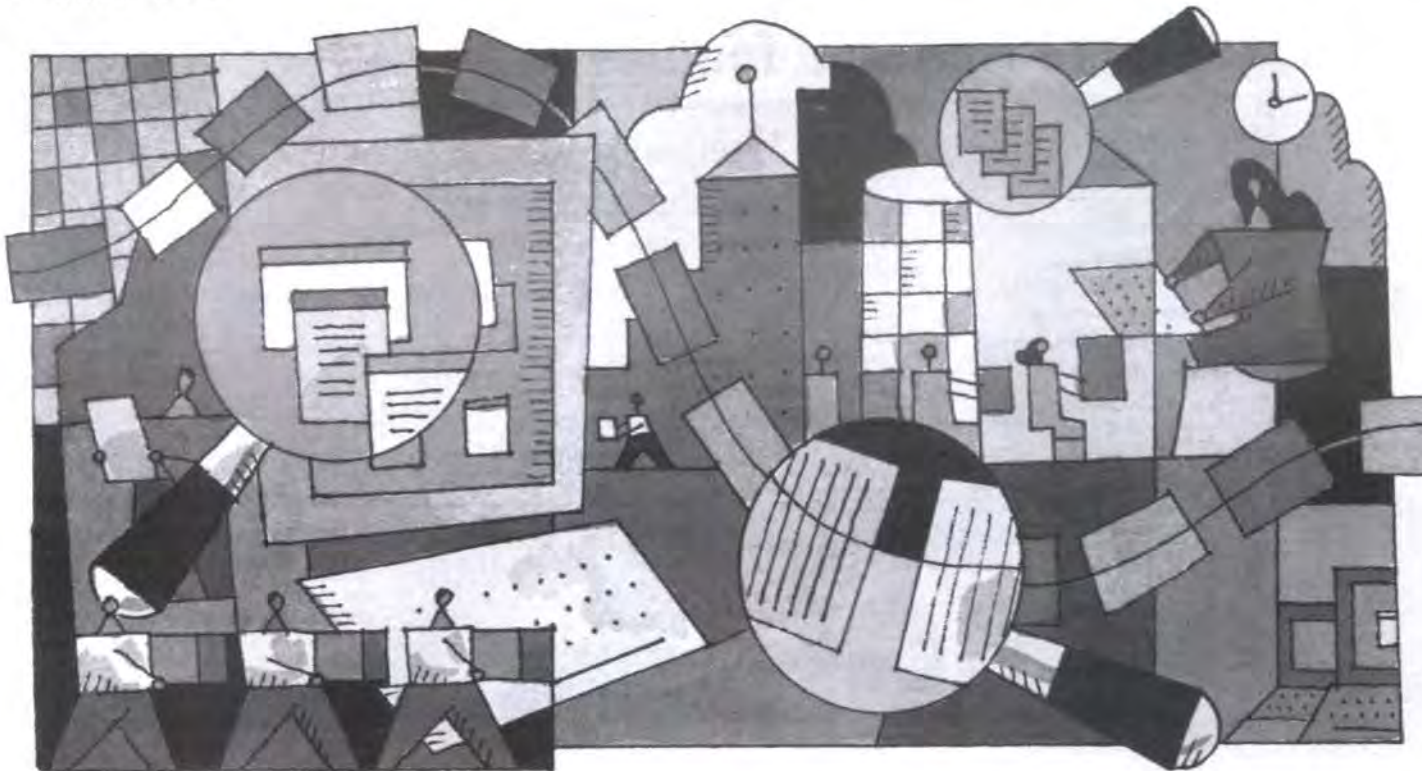
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Multifunction, multi-talented

TCP Lab puts all-in-one office peripherals to the test

By Sean Carruthers

Multifunction has been a buzzword for as long as we can remember, but precious few devices have really embodied the word's spirit: the resulting products either forced two items together arbitrarily, or produced an end product that wasn't particularly useful, no matter which way you looked at it.

One product category whose manufacturers embraced the concept and got it right, however, is the multifunction printer. People who work in small offices or at home often find they have a jumble of devices that are very similar in principle. A laser printer, a photocopier, and a fax machine all use printing technology. A photocopier, a scanner, and a fax machine all use imaging technology. It's more efficient to roll them into one unit to save money and space.

Is a multifunction unit right for you?

For the home or smaller office environments in which there are only a few people who need access to the equipment, an all-in-one solution may be ideal. Instead of a number of smaller devices taking up precious space in a home office, you only have to find desk space for one item. Further, you only have to worry about replacing one set of print cartridges, instead of replacing them on the printer, the copier and the fax machine. Even better, you can access all of the different functions from the same PC. Why print something out on your printer then take it over to the fax machine, when you can use your PC as the hub for all of the different steps in the process?

In addition to saving space, owning one item that handles all your printing and imaging needs can also be cheaper, at least in terms of the initial hardware investment.

A multifunction machine isn't suitable for every situation, however. If you have a number of people who need access to one or more of the machine's capabilities, you may end up with lineups, because when a multifunction is being used as a printer, your copier is effectively

out of commission. The same is true for scanning when someone is copying.

The other major issue with combining all of the components into one handy package is that if the unit breaks down, you're losing three or four different functions. It helps to choose a reliable brand, of course, but if the multifunction printer is to be used for mission-critical activities, it might still be safer to split the different functions into separate devices. This is especially true if usage will be heavy on any or all of the components, and even more so if you cannot afford to lose all of those components for the time it takes to repair or exchange the whole unit—even if that's just overnight exchange.

Now, on with the review!

Inkjet models

Brother MFC-9100c

From: Brother International Corp. (Canada) Ltd.
Tel: 800-361-6466. <http://www.brother.ca>
Estimated street price: \$699



- Uses a design with four separate ink tanks. This makes for more efficient use of colour ink, especially for those who routinely use more of one colour than others.
- 1440x720 dpi maximum print resolution.
- 7 pages per minute (ppm) black draft, 4 ppm in colour for both printing and copying.
- Parallel only connection to the PC.
- Has both colour copy and a mono copy buttons for

easy one-touch copying in either mode. Colour copy quality is excellent.

- Reduction/enlargement from 25 through 400 percent, in varying increments.
- Scanning resolution of 300x600 boosted to 1,200 dots per inch (dpi) using software interpolation.
- 250-sheet input cassette is largest we saw this month, giving users a lot of output between paper refills.
- Automatic sheet-feeder on the top unit can hold up to 50 sheets for copying or scanning. Users also have the option of flatbed scanning for odd-sized originals.
- Fax is built into the unit.
- Unit is rather large and heavy, even compared to some of the laser-based models. Users with limited space may want to double-check the dimensions.
- The MFC-9100c ships with an extensive bundle of software, including Visioneer PaperPort, TextBridge OCR, Corel Print and Photo House and FaxStorm.
- Software components don't link together as seamlessly as you'd hope. To realize how to use optical character recognition (OCR) software, we had to consult the help file because there was no clearly labeled option on the desktop.
- An RCA jack on the front of the device accepts NTSC input for capturing and printing items from compatible digital cameras, video cameras, and VCRs.
- The machine has no on/off switch, which means if you need to reset it, you'll have to pull the plug.
- Compatible with Windows 3x/9x/NT/2000.

The Brother MFC-9100c is one of the biggest units we saw this month (either inkjet or laser) and accordingly, it has packed in a ton of features and functionality. It's one of the few inkjet models that has fax onboard, and in addition to its more versatile flatbed scanning area, also comes with an auto document feeder for easier faxing (it actually uses the same scanning component for both, in an innovative design). On top of that, it has a higher-capacity input tray, which means you won't have to replace the paper as often. Although not really professional-quality, the video printing is certainly a nice bonus.

It's not a perfect solution, though. Because of the size, it may be too large to sit comfortably on your desktop. Also, we had a few minor paper jams (a bit inconvenient for

incoming faxes, although it should be noted that the onboard buffer will save quite a few incoming faxes for later printout, if the paper was out or jammed while faxes were being received). Even so, the MFC-9100c is a surprisingly full-featured model considering the price point, and would make a pretty good choice for demanding users who need colour output more than blazing speed.

Canon MultiPass C530

From: Canon Canada
Tel: 800-263-1121. <http://www.canon.ca>
Suggested retail price: \$299



- Single-cartridge design has two individually replaceable ink tanks (one black, one colour).
- 720x360 dpi print resolution provides adequate quality, though output is a bit ragged at times.
- Parallel only way to connect with the PC.
- Up to 5 ppm in black draft mode, and up to 2 ppm in colour.
- Up to 3 ppm in copy mode.
- 100-sheet input tray may be a bit on the small side for the busy office.
- Fax component is built into the unit.
- Although the unit ships with a single printhead, users can replace the individual ink tanks (one black, one colour) separately for less money (full printhead with ink costs \$92, and users can also use an all-black printhead, which costs \$61; individual tank costs listed in chart).
- Sheet-feed scanning unit scans at 300 dpi, which can be boosted to 600 dpi with software interpolation.
- Unit is not technically one-touch copy, but it's close: press copy, then start. Users can make up to 99 copies of a single original.
- Size can be reduced to 70 percent, in 10 percent increments.
- When not in use, front paper tray folds up over the button pads, minimizing the space use and preventing accidental pressing of the controls.
- Printer ships with Adobe PhotoDeluxe, ChromaFax, Claris Home Page, and TextBridge.
- Compatible with Windows 9x/NT.

For users on a budget who want a multifunction unit, Canon's MultiPASS C530 may be the way to go with a suggested retail price of only \$299. As a budget-oriented model, of course you have to give up some features, and with the C530, it's speed and print quality. The lower speed is especially noticeable with colour output, but it's much slower than some of the other machines in this month's roundup. Print quality, on the other hand, uses Canon's older 720x360 dpi printhead, which provides ragged quality on draft, and adequate results in best-quality output mode.

The scanning component is a fairly good match for the print side, providing reasonably clear copies at best-quality mode. Further, the unit comes with a fax component built in (one of the few inkjets that does), which is even more impressive considering the machine's price point. The software installation is pretty straightforward, and

Continued on page 64



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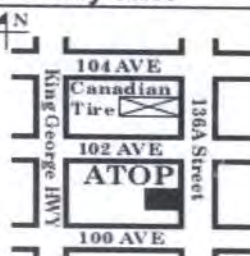
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Multifunction, multi-talented*Continued from page 62*

gives you a lot of control over your communications configuration during setup. Lastly, the unit comes with a fairly reasonable software bundle.

In the end, the Canon MultiPASS C530 is a perfectly good solution for those who want to save some money, and aren't really demanding about the speed and output quality. Those who need fast, high-quality output will want to look at other options.

Epson Stylus Scan 2000

From: Epson Canada

Tel: 800-807-7766. <http://www.epson.com>

Suggested retail price: \$649



- Micropiezo print technology uses two-cartridge design.
- 6 ppm in black draft, 5 ppm colour draft.
- 1,440x720 maximum print resolution.
- Features both parallel and USB connection options.
- 100-sheet input tray a bit small for a busy office.
- Up to 3 ppm in copy mode.
- Scanning resolution of 300x600 can be boosted to 4,800 dpi with software interpolation.
- USB installation was quite problematic. Installation program couldn't find all the necessary components to complete the process, forcing manual browsing and file location, and even then installation was unsuccessful because not all files were included.
- Scanning is by sheet-feed, which means you can only scan single, loose pages and not items from books, record covers, or anything wider than 8.5 inches.
- One-touch copy capability, single-copy only.
- Zoom settings are fixed at 70 percent, 93 percent, and 141 percent.
- Fax capability is not built into the machine, but the software allows you to use your PC's modem for faxing. Comes bundled with WinFax.
- Presto! OCR software built in, providing quite accurate character recognition, and even does a fairly good job on formatting.
- Compatible with Windows 9x/NT/2000, and USB-enabled Mac systems.

In theory, USB interfaces are supposed to simplify life for the user, but the Epson Stylus Scan offers some evidence of how not to implement USB. We went through the installation process three times and were unable to get the printer functional under USB with our test bench. Even after switching to the parallel cable, installation was still a headache, and WinFax software interfered with other aspects of the computer. In short, the software aspect of this printer seriously tried our patience, and will potentially try yours, if your PC has the same conditions during installation.

You're in luck, though... I called tech support so you don't have to. When installing the scanner portion, you need to choose a location, and look under the /epson/win2000 directory on your CD, when it's looking for the USB scanner. After it has gotten past this hiccup, it will try to install the USB printer component, which you will find under the /epson directory on the CD (if it can't automatically find the files). Yes, this is a headache, especially considering the fact that plug-and-play is supposed to be easier than this.

On the hardware side, the printer is an Epson, which means output quality is high, once you get it to work. The colour reproduction was top notch, and speed was reasonably fast.

The biggest problem is that scanning is sheet-feed, which limits the types of items you can scan. Those who are fans of Epson's print quality may want to save up a little bit more money and go for the Stylus Scan 2500 (reviewed below), which offers more scanning flexibility.

Epson Stylus Scan 2500

From: Epson Canada

Tel: 800-807-7766. <http://www.epson.com>

Suggested retail price: \$899



- Micropiezo inkjet technology uses two-cartridge design.
- 1,440x720 dpi maximum print resolution.
- 6 ppm maximum black draft, 5 ppm colour draft.

- Features both USB and parallel interface for connection to PC.
- Copy speed up to 2.4 ppm.
- 600x600 dpi flatbed scanning will handle sheets up to letter size, and resolution can be boosted to 9,600 dpi with software interpolation.
- 100-sheet input tray is small for a machine with this form factor and functionality.
- One-touch copying up to 20 copies at a time.
- One-touch scan button sends a message to the PC, which then allows you to select the scan destination via Epson SmartPanel.
- 50 to 200 percent zoom is adjustable from the printer, in varying increments.
- There is no built-in fax, but Epson software uses your PC's modem.
- Presto! OCR software is built in, providing quite accurate character recognition. It even does a fairly good job on formatting.
- Other software includes WinFax Basic and Adobe PhotoDeluxe.
- Compatible with Windows 9x/NT/2000 and USB-enabled Mac systems.

As expected (since the two units are somewhat related), this Stylus Scan 2500 gave us the same installation hassles as the 2000, and problems were corrected the same way. Once installed and fully operational, the 2500 was a very nice machine, offering excellent scanning and print quality.

Where the 2500 stands out is in the design. Instead of having to feed sheets through a little slot, the top of the machine is a flatbed scanner, which allows more versatility of scanning, including parts of larger (and thicker) objects. The 2500 also has more buttons to control your copying and scanning on the unit itself, which means you're not as reliant on the PC.

The Stylus Scan 2500 Pro model, which is available for \$1,199, offers the same features supplemented by an automatic document feeder.

Hewlett-Packard PSC 500

From: Hewlett-Packard Canada

Tel: 800-387-3867. <http://www.hp.com>

Estimated street price: \$499



- 600x600 dpi print resolution using PhotoREt technology, 1,200 dpi without.
- Two-cartridge design.
- 9 ppm in black draft print mode, 5 ppm in colour.
- Capable of up to 5 ppm in copy mode.
- Flatbed scanner allows scans of pages up to letter size; 300x1,200 dpi resolution can be boosted to 9,600 dpi with software interpolation.
- As with some other HP printers, uses parallel but requires a specific cable, which is included.
- One-touch copy with excellent output quality. Up to 50 copies per original.
- 100-sheet input tray may be a tad on the small side for a unit of this size.
- Removable panel on the back can be replaced with an optional duplexing unit, for added printing flexibility.
- Zoom from 25 to 400 percent in one percent increments, as well as special options like poster and mirror.
- All software installed smoothly and worked without any fiddling around.
- IRIS OCR software is included. It's fairly good with the actual characters, but sometimes is not so good at the formatting.
- No fax included, and no fax software included.
- The package includes a French overlay for the button panel.
- Compatible with Windows 9x/NT.

While many companies have one major focus, Hewlett-Packard has specialized in both printing and scanning for quite a while, so it's not a surprise that HP has multifunction units and that it does them well.

The PSC in the product's name stands for "print scan copy."

The biggest complaint about the PSC 500 is that it doesn't offer any software for faxing; although you can certainly tie the machine into a fax program that already exists on your system.

However, this involves extra work and potentially more money.

It would have been nicer to see a fax program included by default. Otherwise, the scanning and printing software works nicely, and is generally easy to use and understand. More demanding users may want to try a different OCR package for closer matches, but the included IRIS software should be adequate for many users.

Overall, the quality on the PSC 500 is excellent, either for standard printed output or copy output.

Those who don't need fax out of the box will find it an excellent choice, at a fairly decent price point.

Samsung SCX-1000

From: Samsung Canada

Tel: 800-726-7864. <http://www.samsungcanada.com>

Estimated street price: \$399

*Continued on page 66***8500-V****Get a Peak at the World's Most Powerful Notebook****UPGRADABLE Desktop Replacement Notebooks™****TOP SECRET**

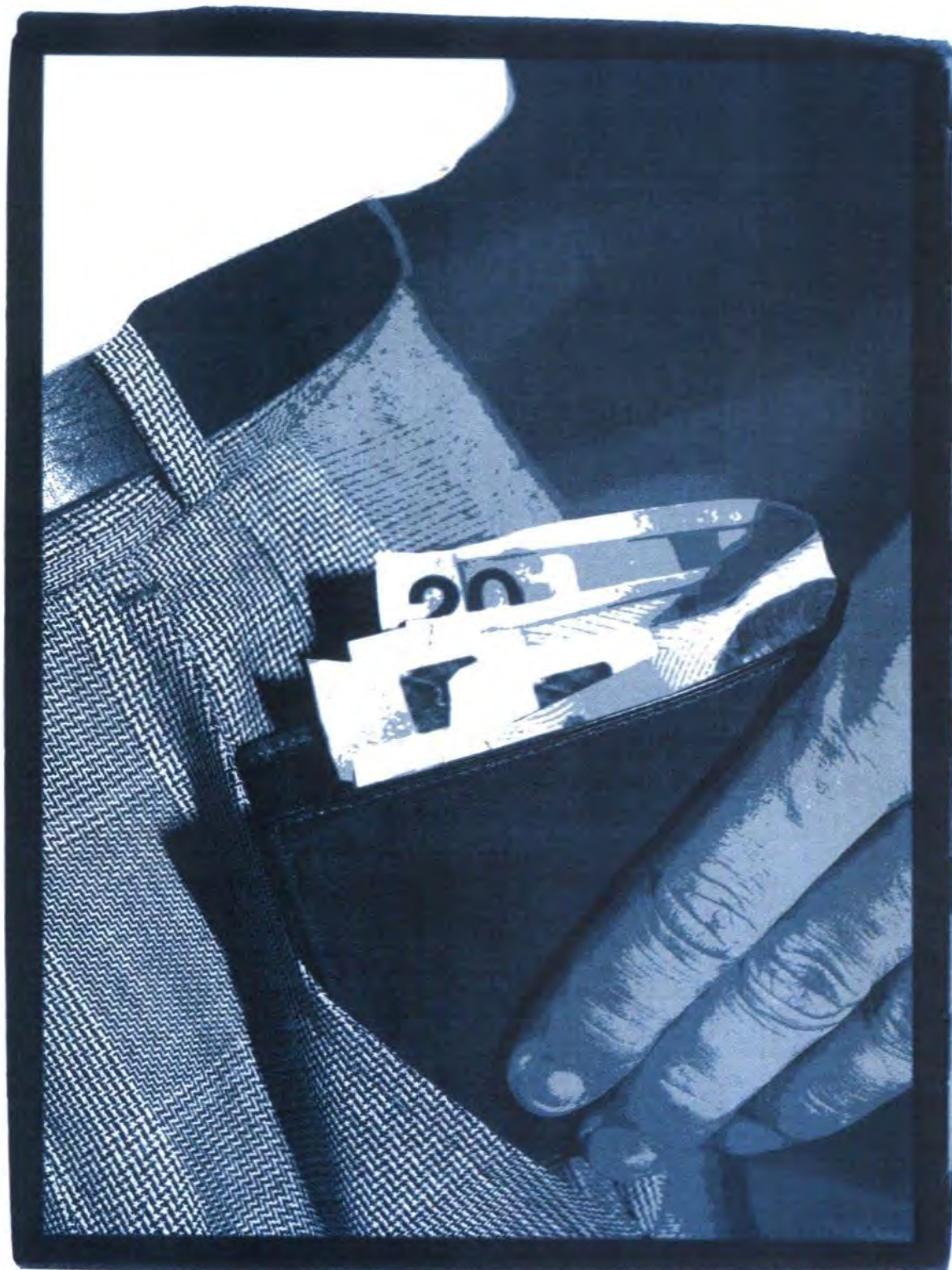
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< HANDS ON >

Multifunction, multi-talented

Continued from page 64

- Connects to PC via either parallel or USB.
- 1,200x1,200 dpi maximum print resolution.
- 150-sheet paper input capacity.
- Capable of 9 ppm in black draft mode, and 4.5 ppm in colour.
- Up to 4 ppm in copy mode.
- Flatbed scanning handles sheets up to letter size.
- 300x600 dpi scanning resolution can be upped to 4,800 dpi with software interpolation.
- Reduction/enlargement from 25 to 400 percent, in increments of one percent.
- Uses a two-cartridge inkjet design. Can use Lexmark cartridges, as brands share a print engine.
- User can copy in colour or monochrome with the touch of a single button (each mode has a separate one-touch button), up to 99 copies at a time.
- Faxing is not built into the machine itself, but the software that comes with the program makes use of your PC's modem for fax capability.
- Email capability is built into the SmartThru software.
- Adobe PhotoDeluxe Home Edition 3.0 also comes bundled with the unit.
- Full-sheet printing is a bit on the slow side, even in draft mode, though reproduction is quite good.
- Zoom, contrast, and resolution settings are all accessible via buttons on the printer itself (for PC-free setup), as well as a number of special copy options, like multi-up and poster printing.
- Bundled AnyPage OCR software works quite well... even items flagged as possibly incorrect were actually interpreted correctly.
- Designed for use with Windows 9x/NT.

Though Samsung focuses mainly on laser technology when it comes to consumer printing, it has opted for inkjet technology in this multifunction unit. It's a good choice, providing high-quality colour reproduction in addition to scanning and copying. The one omission in the hardware is the fax component, but the bundled software will use your PC's faxmodem for that purpose.

The real story with the Samsung SCX-1000, though, is that it provides a lot of functionality and quality for a price point that's very reasonable. With one of the lowest prices in this roundup, it nonetheless includes a flatbed scanning surface, as well as a high-quality print engine and excellent OCR software. For those on a budget, this is certainly a great deal.

Xerox WorkCentre 490cx

From: Xerox Canada Ltd.

Tel: 800-275-9376. <http://www.xerox.ca>

Estimated street price: \$499



- 1,200x1,200 maximum print resolution.
- Two-cartridge design.
- 100-sheet input tray small for a busy office.
- Features both USB and parallel interfaces for connection to the PC.
- Up to 10 ppm in black draft mode, 5 ppm colour.

- Up to 5 ppm in copy mode.
- Sheet-feed scanning method limits the type of items you can copy/scan.
- 300x600 dpi scanning can be boosted to 1,200 dpi with software interpolation.
- One-touch copying, up to 99 copies per original.
- Reduction/enlargement between 25 and 200 percent, in increments of one percent.
- Upon installation, printer defaulted to LPT1 instead of USB despite plug-and-play installation, requiring a manual correction in the driver dialogue.
- Fax is built into the unit.
- Scanning software installs smoothly, and is easy to use.
- Pagis Pro 2.0 and LaserFax software are included.
- TextBridge OCR software is included, providing pretty accurate text recognition and formatting when you specify the correct settings.

When it comes to office equipment, Xerox is another of the big names, and it shows with this multifunction printer. Print quality is very good throughout, and there are a lot of features, including built-in fax (which wasn't included in many of the inkjet models this month). One could complain that the inclusion of sheet-feed instead of flatbed scanning limits the kind of scanning and copying you can do, but those who don't need to copy larger sheets or thicker items will find this to be an excellent solution at a fairly reasonable cost.

Of special note, this was one of the printers that didn't have the USB implementation down perfectly yet. It doesn't hamper usability all that much (a quick change in the driver dialogue is all that's required). Here's hoping that Xerox irons out this snag in future revisions of the product.

Editor's Choice Inkjet multifunction



Samsung SCX-1000

While it doesn't have all the bells and whistles of some of the other contenders, the SCX-1000 offers excellent output, a good bundle of software, and a more versatile flatbed scanning component, all for a very reasonable price. With its configuration, it may even be appealing to those who aren't on a budget.

Laser models

Brother MFC-9600

From: Brother International Corporation (Canada) Ltd.

Tel: 800-361-6466. <http://www.brother.ca>

Estimated street price: \$1,399



- 600 dpi laser-based reproduction provides high-quality monochrome reproduction.
- Up to 12 ppm in either print or copy mode.
- Has both USB and parallel interfaces, allowing printer's use with either Windows or Mac machines.
- Unit is rather large and heavy. Users with limited space may want to double-check the dimensions.
- 250-sheet input cassette is largest we saw this month, giving users a lot of output between paper refills.
- 300x600 dpi scanning can be boosted to 1,200 dpi with software interpolation.
- An automatic sheet-feeder on the top can hold up to 50 sheets for copying, or users can use flatbed scanning instead, for odd-sized originals.
- The scanning unit will actually scan in colour to the PC, which is not something that many of the laser-based multifunction units will do.
- One-touch copying of up to 99 copies per original.
- Reduction/enlargement between 25 and 400 percent, in varying increments.
- Fax is built into the unit.
- The MFC-9600 ships with an extensive bundle of software, including Visioneer PaperPort, TextBridge OCR, Corel Print and Photo House and FaxStorm.
- Software components don't link together as seamlessly as you'd hope. To figure out how to use the OCR software, we had to consult the help file as there was no clearly labeled option on the desktop.
- An RCA jack on the front of the device accepts NTSC input for capturing and printing items from compatible digital cameras, video cameras, and VCRs.
- Running the automatic installation gave us an error, asking us to install PaperPort first, even though that was something the option we selected was supposed to do. We ended up searching the CD to do so manually.
- Further, Brother's specific USB port was not installed by the program. This is, needless to say, somewhat user-unfriendly, especially when added to the problem directly above.
- Compatible with Win9x/NT, as well as USB-enabled Mac.

In many ways, the MFC-9600 is the big brother of the MFC-9100c—the form factor is quite similar, and many of the features are the same, including video input, and the innovative automatic document feeder that makes use of the same scanning component that works with the flatbed scanning area. Obviously, however, there are some key differences, the most notable of which is that the machine is a monochrome laser-based solution. The trade off is that although you no longer have colour output, your print speed is much quicker, and quality is consistently higher. The good news is that this model features the same scanning unit, which means you can still scan in colour to the PC.

The biggest problem is the installation program, which may not be smooth on every machine. We encountered a fatal error right off the bat, and had to do a few manual tweaks. Also, the USB installation was left incomplete, forcing us to move over to the parallel port (again, an example of some of the problems still to be overcome with USB

Continued on page 70

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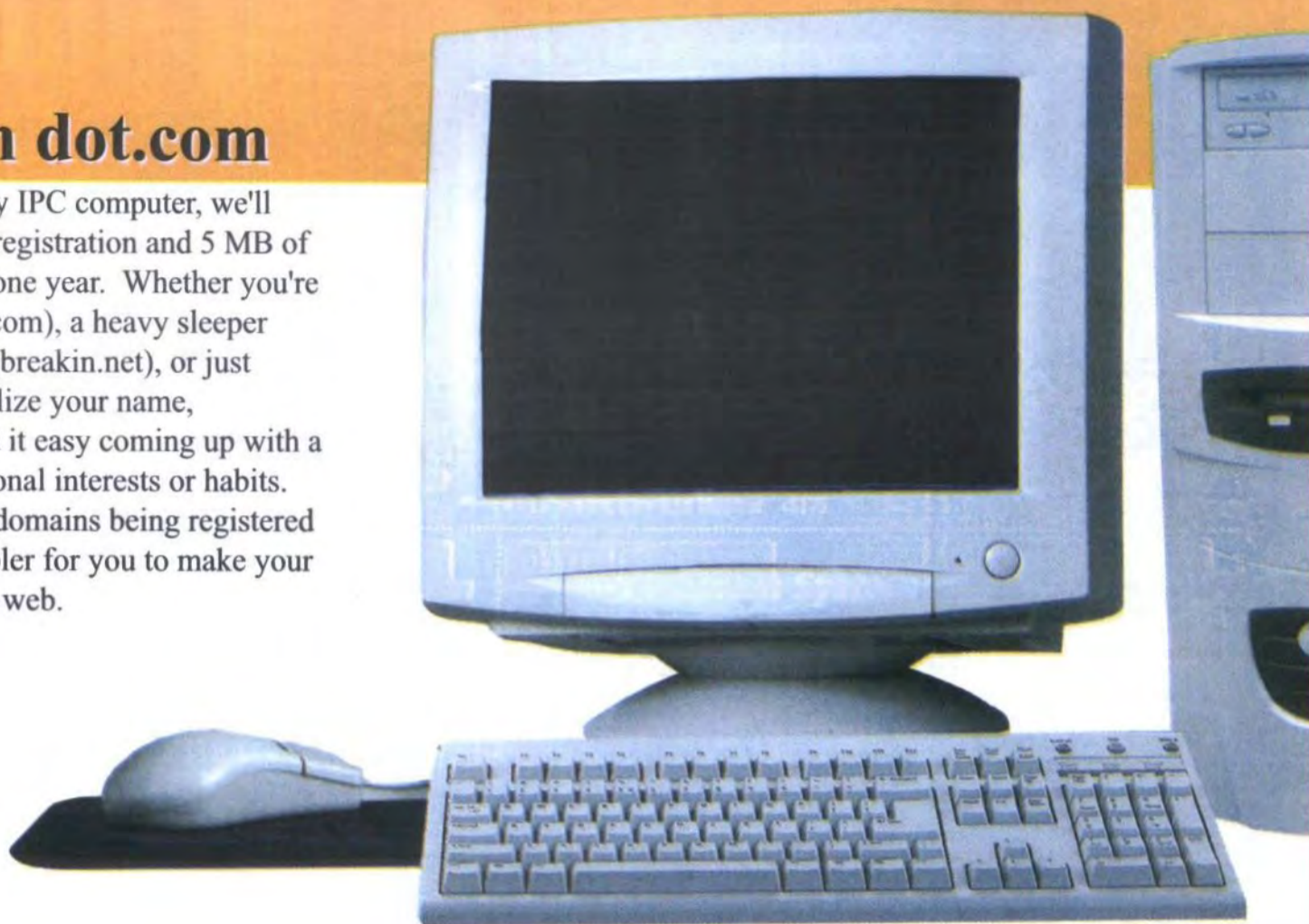
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Multifunction, multi-talented

Continued from page 66

in general, owing to non-standard port naming and implementation).

Despite these problems, the MFC-9600 was still a very nice device, with a lot of features, and innovative design in the scanning component and high-quality output. For those with the desktop space for it, it certainly has a lot to offer.

Canon MultiPASS L6000

From: Canon Canada

Tel: 800-263-1121. <http://www.canon.ca>

Suggested retail price: \$699



- 600 dpi laser-based printing provides high-quality monochrome reproduction.
- Uses parallel port only.
- 6 ppm for printing and copying.
- One-touch copying for up to 99 copies of a single original.
- 600x300 dpi scan resolution.
- Sheet-feed scanning limits the type of items you can fax or copy.
- In addition to scanning and copying, fax capability is onboard.
- Setup program offers a lot of flexibility for your fax/voice/answering machine configuration.
- TextBridge OCR software is included, providing pretty accurate text recognition, although trying to recognize specific formatting and fonts may not be as accurate.
- OCR isn't bolted into the Canon Desktop manager, which means a bit of application switching, and some slightly non-intuitive steps.
- Scan quality is generally about the same as you'd expect from a fax machine, and users can only scan in black and white or grayscale.
- Reduction down to 70 percent of original, in 10 percent increments.
- 100-sheet input tray may be a bit on the small side, if you have a lot of incoming faxes.
- Compatible with Windows 9x/NT/2000.

Canon has been involved in multifunctions for a while, and has a solid background in fax technology. With the MultiPASS L6000, Canon marries the fax with a laser print engine, but with mixed results. Essentially, the device is a fax machine with a few extra capabilities. The print reproduction from the PC is crisp, which is just what you'd expect from a laser-based solution. The printer also does reasonably well at handling images sent from the PC.

Where the MultiPASS falls down is on the scanning side. With a scanning component that is optimized more for faxing, the resolution isn't particularly high and the results suffer. Further, even though a fax machine is typically black and white, you cannot scan in colour to the PC with the scanning component. This seems typical of laser-based multi-

functions, however. In the end, the MultiPASS L6000 makes a perfectly good printer and fax machine combination, and is adequate for those who only need monochrome scan capability.

Hewlett-Packard LaserJet 3150

From: Hewlett-Packard Canada

Tel: 800-387-3867. <http://www.hp.com>

Estimated street price: \$1,155.99



- 600x600 dpi maximum print resolution.
- Up to 6 ppm in both print and copy modes.
- The LaserJet 3150 uses a parallel interface only, with a proprietary cable.
- 100-sheet paper input small especially if the machine will be receiving a lot of faxes or a lot of multi-page copies.
- 300x300 dpi scan resolution can be raised to 600 dpi with software interpolation, in grayscale only.
- Sheet-feed scanning design limits what you can scan and fax.
- One of the paper output trays is essentially a narrow wire suspended a few inches above the desk, and paper is prone to spillage. Users may be more inclined to switch to the vertical paper output path instead, which is simple as the flip of a lever.
- Copy size can be adjusted manually in one percent increments from 50 through 200 percent, with easy selections (legal to letter, for example) built in as presets.
- You can make up to 99 copies of an original document (up to 30 pages long per original).
- Fax capability is built right into the machine.
- Quality is top-notch throughout all of the categories, especially on the print side. With HP's reputation for printing quality, this is not a surprise.
- JetSuite Pro software installs smoothly, and is very intuitive, giving you control over all aspects of the machine's operation (for example, when you insert a sheet of paper into the copy/fax slot, the PC automatically asks you if you'd like to scan, copy or fax it, which is fairly smart programming).
- OCR is generally quite good (although with the occasional substitution of capital "I" for a lower-case "l"). Formatting, though, is sometimes a bit strange.
- A networking option is also available, using the JetDirect hardware, which adds \$255 to the cost.
- Compatible with Windows 3x/9x/NT/2000

As with Hewlett-Packard's other entries into the world of printing, the LaserJet 3150 is a very capable printer, providing excellent print output from both the PC and the built-in copier function. Likewise, with its scanning technology, the ability to copy and scan documents is also excellent. However, considering the price of the unit, we have a few reservations: first, it would have been nice to see a flatbed scanner instead of a sheet-feed version, so copying would be more versatile. Secondly, although you don't need colour scanning for fax and you can't copy in colour, at this price it really would have been nice to see one of HP's well-regarded colour scan-

ning components, for those times when you just want to scan to the PC.

That's a small complaint, though, when you consider the overall quality of the machine.

It may cost more than some of the other solutions, but it also works exactly as intended, with consistently high quality.

Oki OkiOffice 84

From: Oki Data Corp.

Tel: 800-654-3282. <http://www.okidata.com>

Estimated street price: \$1,154



- Uses LED electrophotography instead of laser.
- Parallel port only for connection to the PC.
- Capable of up to 8 ppm for both printing and copying.
- One-touch copying, and up to 50 copies per original.
- 600 dpi class print resolution, which means true print resolution is lower (300 dpi).
- Holds up to 100 sheets, which may not be big enough if you receive a lot of faxes.
- Toner cartridges and drums come separately with the Oki printers, which is more cost-efficient in terms of toner. However, because of the way the cartridge is installed into the drum, toner spills are almost inevitable.
- 300 dpi scanning component.
- Sheet-feed scanning limits the type of items that can be scanned.
- Because toner can spill fairly easily, it can get into the scanning area, causing streaking on the copies (and sometimes on the originals).
- Scanning to the PC is a bit slow, but quality is generally high. Scanning is black and white only, however.
- JetSuite's OCR is quite good, both with the characters and formatting.
- Up to 50 copies from a single original, with reduction/enlargement from 25 through 200 percent (via the PC only).
- Fax capability is built right into the machine.
- Compatible with Windows 3x/9x/NT

Oki has long been a proponent of LED-based printing technology, and continues to use LED in the OkiOffice 84. Like Oki's previous multifunction solutions, the OkiOffice 84 is very much in the tradition of the fax machine, with extra functionality. Scanning quality is very good (though a bit slow), and OCR is top-notch. Those looking for colour won't find it here, but monochrome photographic scans are A-OK. Fax capability is built right into the machine, which means you don't need to have the PC running.

The downside to the OkiOffice is the same thing that plagues other Oki technology, and that's the setup of the print cartridges. The drum unit has an open top, into which toner cartridges are inserted. Because of the setup, however, it's very

Continued on page 73



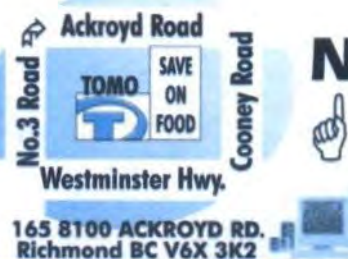
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Multifunction, multi-talented

Continued from page 70

easy to get toner all over the place... on your hands and clothes, and into sensitive areas of the printer. This is more inconvenient than anything on a simple printer, but when combined with a built-in scanner, it becomes more problematic, because the spilled toner can get into the scanning area and ruin copies and stain originals. The advantage, though, is that a \$43 toner cartridge is much less expensive than a full \$200 cartridge, making the setup more economical. If you can put up with the design, the economics might make the Oki printer more attractive overall.

Xerox WorkCentre 390

From: Xerox Canada Ltd.
Tel: 800-275-9376. <http://www.xerox.ca>
Estimated street price: \$749

- 600 dpi true print resolution.
- 10 ppm in both copy and printing modes.
- Paper input holds up to 99 sheets—mysteriously one sheet less than the next-smallest size this month. Needless to say, this could be a bit too small for busy office environments.
- Features both parallel and USB interfaces with the PC.
- Sheet-feed scanning component limits the type of items you can copy/scan.
- 300x600 dpi scanning can be boosted to 1,200 dpi with software interpolation.
- As with the inkjet from Xerox, the printer defaulted to LPT1 instead of USB upon installation, even after plug-and-play installation on the USB port, which crashed the machine upon reboot. It was necessary to go into safe mode and manually correct the setting in the driver

dialogue.

- Although paper output is strictly monochrome, users can scan to their PC in colour, which is a really nice touch; scanning is high-quality.
- The WorkCentre 390 does not technically feature one-touch copy, but it's awfully close: hit the copy button, then start.
- Users can make up to 99 copies of a single original.
- 25 to 200 percent reduction/enlargement, in one percent increments.
- Pags Pro 2.0 and LaserFax software are included.
- TextBridge OCR software is included, providing pretty accurate text recognition and formatting, when you specify the correct settings.
- Fax capability is built into the machine.
- Compatible with Windows 9x/NT/2000.

On the monochrome laser side of things, Xerox also offers a high-quality machine.

The WorkCentre 390 (notice the Canadian-ized spelling?) bundles scanning, copying, and faxing into a single printer.

Scan quality is very good, as is the printed output. Additionally, this is one of the exceptions in the laser multifunction category, in that it can actually scan to the PC in colour.

Because it's more fax-oriented, it makes use of a sheet-feed scanning mechanism, which is one of the machine's few downsides.

The only other notable downside we came across during testing was the USB installation problem that also occurred with Xerox's inkjet model, above.

Hopefully this, too, will be fixed up in future versions.

< HANDS ON >

Editor's Choice Laser multifunction



Brother MFC-9600

Xerox WorkCentre 390

This one was a tough call: most of the machines offered excellent output quality and a ton of features, and all of them had their annoying quirks. We're naming both the Brother and the Xerox entries as winners for a couple of reasons. First, both offer colour scanning, which seems to be the way the others

Continued on page 74

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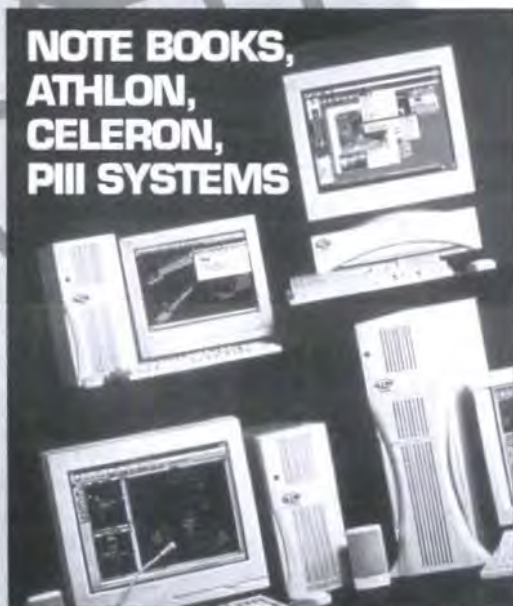
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Inkjet-based multifunction device survey

	Brother MFC-9100c	Canon MultiPASS C530	Epson Stylus Scan 2000	Epson Stylus Scan 2500	Hewlett-Packard PSC 500	Samsung SCX-1000	Xerox WorkCentre 490cx
Print method	thermal inkjet	Bubblejet	micropiezo inkjet	micropiezo inkjet	thermal inkjet	thermal inkjet	thermal inkjet
Maximum resolution (dpi)	1,440x720	720x360	1,440x720	1,440x720	1,200x1,200	1,200x1,200	1,200x1,200
Rated speed (black / colour)	7 / 4 ppm	5 / 2 ppm	6 / 5 ppm	6 / 5 ppm	9 / 6.5 ppm	9 / 4.5 ppm	10 / 5 ppm
Paper input (number of sheets)	250	100	100	100	100	150	100
Accepts legal-size paper	yes	yes	yes	yes	yes	yes	yes
Accepts envelopes	yes	yes	yes	yes	yes	yes	yes
Connection to PC	parallel	parallel	parallel, USB	parallel, USB, serial 8	parallel	parallel, USB	parallel, USB
OS compatibility	Win3x/9x/NT/2000	Win9x/NT	Win98/2000, Mac	Win98/2000, Mac	Win9x/NT	Win9x/NT	Win9x/NT/2000
Scanning							
Scan method	flatbed	sheet-feed	sheet-feed	flatbed	flatbed	flatbed	sheet-feed
Scan resolution (dpi)	300x600	300x300	300x600	600x600	300x1200	300x600	300x600
Max. scan, software interpolation	1,200	600	4,800	9,600	9,600	4,800	1,200
Colour scanning	yes	yes	yes	yes	yes	yes	yes
Copy							
One-touch copy	yes	no (copy then start)	yes	yes	yes	yes	yes
Copy resolution (dpi)	600x600	360	300	300	600x2400	600x600	600x600
Copy speed	7 ppm	3 ppm	3 ppm	2.4 ppm	5 ppm	4 ppm	5 ppm
Reduction/enlargement (%)	25 / 400	70 / 100	70 / 141	50 / 200	25 / 400	25 / 400	25 / 200
Fax onboard	yes	yes	no (uses PC's modem)	no (uses PC's modem)	no	no (uses PC's modem)	yes
Cartridge type	separate CMYK ink tanks	black and colour ink	black and colour ink	black and colour ink	black and colour ink	black and colour ink	black and colour ink
Cartridge yield (pages / coverage*)	400 / 750 black	225 / 100 (7.5%)	900 / 300 (15%)	900 / 300 (15%)	495 / 690 (15%)	500 / 500	1,075 / 240
Cartridge cost	\$25 black / \$10 ea. colour	\$14 black / \$35 colour	\$46 black / \$46 colour	\$46 black / \$46 colour	\$35 black / \$43 colour	\$47 black / \$57 colour	\$60 black / \$55 colour
		\$91 full printhead with ink					
Dimensions WxDxH (cm)	49.2x48.1x37.2	36.5x32.3x20.6	43.6x61.7x30	51.8x57.4x30	46.9x43.8x32.1	41.6x36.4x25.2	43.7x36.1x19.3
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* Five percent coverage assumed, unless noted.

Continued on page 76

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Ricoh/ Plectro 12x10x32 CD-RW \$299/419
Yamaha 8x4x24 / 8x8x24 CD-RW \$229/239
Acer/ Goldstar/ Panasonic 8x4x32 CD-RW \$199/199/225
SCSI 6x4x32 / Sony 10x4x32 CD-RW \$199/349

Mouse / Keyboard / Case

Logitech Wheel Mouse / Cordless KB & Mouse \$15/119
Logitech i Touch Pro \$129
Fujitsu 4725 / 8725 104 PS/2 Keyboard \$69/25
MS Internet KB / MS Mouse \$25/25
PackardBell Multimedia Keyboard \$15
AT 15" / ATX 17" / 19" / 24" Tower Case \$35/45/55/65

Video Card

Diamond 8MB AGP / Matrox M3D 4MB PCI \$49/49
Pine SIS 8MB PCI / ATI 4MB PCI \$55/49
ATI Fury Pro 32MB AGP / Maxx 64MB \$165/249
ATI AGP 8MB Xpert 98 AGP / PCI \$66/99
ATI Xpert 98 8MB / Xpert 2000 32MB / Pro \$65/125/149
ATI All-in-Wonder Pro 128 32MB \$269
Voodoo III 2000 / 3000 / 3500 \$118/165/275
Voodoo5 5500 \$405
Asus 6600 / 6800 / V7700 \$238/279/389
HIS TNT2 32MB / GeForce 2 32MB AGP \$99/199
nVidia TNT2 M64 32MB / TV Out / TV In & Out \$109/125/155
Matrox 6400 32M S / Dual AGP 4X \$179/219
Creative Annihilator 2 32M AGP \$389

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Elite System	Celeron System	Power Works Station	Athlon System	Professional Station	Alpha Net Server
AMD K6II 500MHz CPU Super 7 Motherboard 64MB PC100 RAM Fujitsu 10GB Hard Drive Panasonic Floppy Drive 8M 3D Video Integrated 56K FaxModem + free Internet Delta 48x CD ROM Drive PCI 3D Audio on-board 140W Stereo speakers Alpha 13" Tower Case 98 Keyboard & Mouse	Intel Celeron II 633 CPU Intel 810 Motherboard 64MB(PCI100) SD RAM Fujitsu 20GB Hard Drive Panasonic Floppy Drive Intel 3D Video on-board 56K FaxModem, free Internet Delta 48x CD ROM Drive PCI 3D Audio on-board 140W Stereo speakers Alpha 15" ATX Tower Case Win98 Keyboard & Mouse	Intel Pentium III 800MHz GigaByte PC133 Motherboard 64MB PC133 SD RAM Fujitsu 20G ATA66 Hard Drive Panasonic Floppy Drive SIS305 3D Video 16M Motorola 56K FaxModem, free Internet Creative 52x CD ROM Drive 32 bit PCI 3D Surround Sound 140W Stereo Speakers Alpha 16" ATX Tower Case 250W 98 Keyboard & Scroll Mouse Norton AntiVirus	AMD Thunderbird 900 CPU Asus A7V Motherboard 128MB PC133 RAM Maxtor 20GB 7200 Hard drive Panasonic 1.44MB Floppy Drive SIS305 3D Video 16M Motorola 56K FaxModem, free Internet Creative 52x CD ROM Drive 32 bit PCI 3D Surround Sound 600W Speakers w/subwoofer Alpha 17" ATX Case 300W 98 Keyboard & Scroll Mouse	Intel Pentium III 800 MHz Asus CUV-4X Motherboard 128MB (PC133) RAM Maxtor 30GB 7200 hard drive Panasonic 1.44MB Floppy Drive Riva TNT2 32M 3D Video USR 56K FaxModem, free Internet Creative 52x CD ROM Drive SB Live Value Sound Card GNT 5000 Speakers, sub-woofer Alpha 17" ATX Case 300W 98 Keyboard & Scroll Mouse	Intel Pentium III 750MHz CPU Intel L440GX MB, Dual U2W SCSI, Dual CPU Slots 128MB Memory, 2GB max Fujitsu SCSI U2 hard drive 18G Panasonic 1.44MB Floppy Drive 2MB video on board Toshiba SCSI CD ROM 40x Intel EtherExpress Pro on board NetServer Case ATX 300W, (hot swap capable) Win98 Keyboard & Mouse
\$529.00	\$599.00	\$899.00	\$1229.00	\$1249.00	\$2199.00

System Options (with System purchase only)

15" Azura monitor 0.28dp	\$179	Acer 8x4x32 CDRW (w/SW)	\$199
17" Envision monitor 0.27dp	235	Canon 2100 Color Printer	92
19" Envision monitor 0.26dp	369	Acer Scanner 640U 600x1200	92
		Rogers Internet Kit	19

System Upgrade Options: Add

64M->128MB RAM PC100	79	10.2->20GB Fujitsu hard drive	28
64M->128MB RAM PC133	79	20->30G Maxtor 7200rpm hard drive	85
128M->256MB RAM PC133	158	52x CD Drive -> Panasonic DVDIII 6x	49

***** The Legend continues ***** The Legend continues ***** The Legend continues ***** The Legend continues ***** The Legend continues ***** The Legend continues *****

HARD DRIVES & Controllers

Fujitsu 10.2/20G	115/145
IBM 30G/45G ATA100/7200RPM	259/375
Maxtor 20/40/60G	145/239/379
Maxtor 15/20/30/40G7200rpm	145/175/229/299
Quantum 13/17/20G	149/159/179
Quantum 7200rpm 15/20/30G	149/179/235
W.D. 20/30/45G	159/189/269
W.D. 15/20G 7200rpm	169/199
SCSI Quantum 9/18G 7200rpm	319/519
SCSI Quantum 9/18/36G 10K	499/759/1279
SCSI Fujitsu U160 9.1/18.2G	299/459
SCSI Fujitsu 10K 9.1/18.2/36G	389/589/899
Abit Hot Rod ATA 100 Ctrl	59

Inkjet Printers

Canon BJC50/85	475/385
Canon BJC 1000SE/2100/3000	69/95/149
Canon BJC5100/6100/8200	165/189/469
Canon S450 (Separate ink tanks)	239
Epson 440/777	99/145
Epson 740/760/860/900	139/139/179/399
Lexmark 5770/Optra CLR45	375/829
Lexmark Z12/Z32/Z42/Z52	89/175/239/279

Laser Printers

Brother HL1030 10ppm	375
Brother HL1240/1660E/2060	459/1099/1299
HP LaserJet 1100	539
Okidata 6W 6ppm	229
Samsung ML4600 1200dpi 4MB	325
Samsung 6050/7000	409/889

Scanner

Acer 640U USB/640 BU	95/109
Arteck 600x1200dpi USB (slim)	89
Canon 340P/640U	82/119
Epson Perfection 610	179
Perfection photo 1200U/1200U Photo	259/379

Zip/Floppy DRIVE

1.44MB Floppy Drive	17
Zip Drive 100MB/ 200MB	66/125

Misc.

IEEE 1394 FireWire Ctrl	99
USB 4 Port Hub	35
USB Adaptor (PCI)	32
Printer Adaptor ISA/PCI	25/39
External CD/Hard Dr. kit parallel	22
H.D.mobile rack plastic/steel/SCSI	15/22/29
H.D.mobile rack ATA66 w/fan	23
CDR/CDRW (10 pieces)	9.9/12.9
Zip disk / 120MB Floppy	12/11

CPU

(OEM Prices, for retail version add \$15)	
Intel MMX 233/Cyrix MX300	57/43
Intel PIII 500/550/600E	199/209/239
Intel PIII 600EB/650/667/700E	259/285/285/285
Intel PIII 733/750/800/866/933 279/339/349/489/699	
Celeron II 566/600/633/667/700/135/135/145/179/209	
AMD K6II 500/Duron 600/650/700	89/99/119/149
AMD Thunderbird 750/800/850/900/950/1G	235/269/339/399/529/699

MEMORY

SDRAM(PC100)64/128/256M	79/159/379
SDRAM(PC133)64/128/256/512M	79/159/379/829
RAMBUS 128/256M	439/999

MOTHERBOARDS

Abit BE6II/VA6/SE6/VH6	169/119/219/165
Abit KT7/BP6	229/199
Gigabyte 6VXE7+/6VX-4x	108/139
Gigabyte Athlon GA7ZM/ZX	159/179
ASUS P2-99/P3B-F/CUSL2	129/185/229
ASUS P3V/P3V-4X/CUV4x	135/165/165
ASUS P5A Super 7 AT/ATX	125/135
ASUS Athlon K7V/ATV	229/229
Acer AX34 w/sound, 4xAGP	139
Acer MK33 KT133, w/sound, 4xAGP	165
Acer MX3W/ProE 810E 133 w/sound, 4M video	145
Acer AX3S 815E 4xAGP w/video & sound	219
Acer AX6BC	135
Intel 820VC w/128MB RAMBUS	359
MicroStar K7T Pro	175
MicroStar Intel 810 w/video,sound,modem&lan	105
SIS Super 7 Motherboard w/video,sound,modem	119
Celeron Sk370 w/video, sound for celeron	79
Intel Willow w/video, sound for CeleronII	89
GfX Pro w/32MTNT2 Video, sound, modem, Lan	119
VIA Thunderbird M.B. w/sound,modem,lan	139

NETWORKING

3-COM 905B PCI 10/100TX	68
D-Link 538TX PCI	25
Acer/Aceton Ethernet (PCIorISA) 10M	15/13
Acer/Aceton Ethernet PCI 10/100 BaseT	17/15
Intel 8460B 10/100	59
Soho PCMCIA Networkcard 10or10/100	49/79
10M Hub Aceton 5 ports	29
10/100 Hub 5 port/Acer 8 ports/24 ports	99/118/379
Switch-AOpen 10/100 5 ports/8 ports	109/129
Ethernet RG58/RJ45 6'30'/50'/100'	5.9/12/19
Ethernet RJ45 1000' strand	99

MONITORS

15" LCD Proview PT500/Samsung 570S	849/1269
15" Azura / Samsung 550S	185/195
15" Sony E100 /Mag 570FD 0.25dp	299/259
15" Viewsonic Optiquequest Q51/Q55	219/239
17" KDS/Impression/Envision 0.27dp	239
17" Mag 786FD 0.24dp 1600x1200	399
17" AOC 7Glr/Acer view G772 0.25dp	265/299
17" GoldStar Flatron 0.24 775FT/795FT	359/419
17" NEC FE700/AS70	379/279
17" PanaSync E70i/PL70	299/449
17" Samsung 750s	279
17" Samsung 700NF(Flat)/700IFT(after \$50reb)369/359	
17" Sony E200/G200	509/559
17" Optiquequest Q71/Q75	295/389
17" Viewsonic E771/E773/G773	319/379/389
17" Viewsonic EF70/PS775/PF775	389/465/479
19" GoldStar 995E/Panasonic PF90	489/639
19" Envision/Samtron 0.26dp	375/429
19" Viewsonic GS790/PF790/Q95	585/699/479
19" Sony G400/E400 .25dp	789/699
19" Samsung 900NF(Flat) 0.25dp (after 50Reb)	599
21" Viewsonic Optiquequest Q115 0.25dp	979

VIDEO

Logitech QuickCam Express VideoCam	59
SIS PCI 8M / ATI PCI 4M	49/49
SIS AGP 8M/8M TV out/16M	43/52/59
Acer GeForce2 MX32M	179
Asus V6600 Geforce 32M/Deluxe/Pro64	229/289/265
Asus V7700 Geforce 32M/64M	389/499
Asus V6800 Geforce 32M Pure/Deluxe	275/299
ATI TV Wonder/ Wonder VE	95/69
ATI AGP All-in-wonder 128 32M AGP/PCI	235/279
ATI AGP All-in-wonder 128 Pro 4x 16/32M	209/269
ATI AGP XPERT98/Xpert @Play 8M	49/75
ATI AGP 2000 32M Pro/128	129/105
ATI AGP FuryPro/MAXX 64M	155/199
ATI Radeon 32/64MDDR/64M/VIVO	319/359/399
Creative GeForce256 AnnihilatorPro	389
Diamond Viper II 32M S3	139
Matrox G400 16M/32M	129/169
Matrox G400 32M Dual 300/366 MHz	209/279
Nvidia TNT2 M64 32M/32M w/TV	97/119
Nvidia TNT2 Pro 32M	119
S3 Savage4 AGP 16M/16MTV/ 32M	69/79/109
Voodoo III 2000/3000/3500	105/129/239
Voodoo V 5500	399

CD-ROM

Acer 52x/48x/Asus 50x	55/49/66
Creative52x/Actima 52x	56/52
Delta 48x/IBM 32x	48/43
SCSI Toshiba 40x	128
CDRW Goldstar LG 4432	185
CDRW 8432 Panasonic/Acer	205/199
CDRW 8432 Creative/Sony	199/209
CDRW Yamaha 8424/8824	235/235
CDRW HP 9110i/9310i	279/329
CDRW Ricoh/Plextron 12x10x32	299/399
External CDRW Sony 4x2x6/HP8210E	269/269
SCSI CDRW Yamaha 8424/8824	275/289
Software for above CDRW	18
DVD Pioneer 16x/Panasonic 6x/8x	179/115/139
DVD SCSI Pioneer 6x	195
Decoding software for DVD movie	20
TecRam 310 SCSI Adaptor	54

Multimedia

16 bit 3D sound card/Acer AW37	15/18
Acer 200/230 PCI 128	18/19
AOpen AW744 Optical Fibre 4 Channel	46
ASound 3D PCI sound card	16
Xwave 32bit sound card	18
Sound Blaster Ensoniq/PCI128/LiveValue28/44/67	
Speakers 120w/600w Subwoofer	9/35
Speakers: Altec Lansing ACS45.2/ACS5479/89	
Speakers: GNT 5000	52
Microphone/Headphone w/mic	8/14

FAX/MODEMS

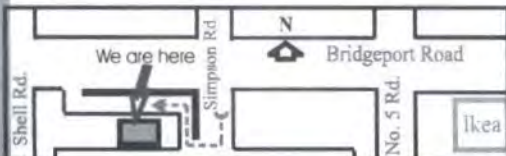
Motorola 56K V90 DataFax Voice	22
Acer 56K V.90 Voice PCI SM/PM /ISA29/42/65	
Diamond Supra 56K V.90 Voice	45
USR 56K V90 PCI voice/no Voice	47/42
USR56K Hardware modem PCI voice/no voice89/79	
External FaxModem 56K Acer /Cirrus Logic	89/79

Keyboard/Mouse

Win98 / Fujitsu/IBM Keyboard	10/18/27
MS Natural/Internet (w/system)	34/27
2 button Mouse Serial/PS2/USB	5.5/5.5/9
Genius/WHN Scroll Mouse	9/12.8
Logitech 2 Button/scroll Mouse	9/14
PS2 mouse(transparent)/Trackball	7/26
Finger/Wireless Mouse	23/26
MS Optical Wheel Mouse (w/system)	39

CASES

13"/15"/19" ATTower Case w/230w	27/29/39
16"/18"/19" ATX Tower w/250w	38/44/46
19"/24" ATX Tower w/300w	59/79
Power Supply 230/250/300W	25/29/45
19" Rackmount Case ATX	199



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Multifunction, multi-talented

Continued from page 74

should have gone.

While the Brother is one of the more expensive models, it had a killer configuration, with both sheet-feed and flatbed scanning, and a high-capacity

paper cartridge.

The Xerox is a notable entry on the laser side simply for its lower cost, despite inclusion of onboard fax and the colour scanner. The one that gets the edge is largely a matter of budget, therefore. □

Multifunction buying tip**Flatbed or sheet-feed?**

The scanning component on multifunction printers has traditionally come in one variety only, sheet-fed—which has been a

mainstay on the standalone fax machine. This is starting to change, with some manufacturers offering both sheet-feed and flatbed models.

Sheet-feed is pretty much what it sounds like: the scanning unit stays in place, and a series of rollers grabs your sheet of paper and rolls it past the scanner. For traditional faxing applications, this has been more than adequate, but it does have some limitations in the world of scanning and copying. Although you'll certainly find your fair share of documents on regular letter- or legal-sized sheets, there are always going to be times when you want to scan a page out of a book, a section of a larger sheet of paper, or something that may be too wide, thick, and/or inflexible to fit through a sheet-feed unit (like an album cover, for example). It seems a bit of a waste to have to run to a photocopier to get these items in a form usable for fax-out, especially if you've purchased the multifunction printer partially for copy capability.

Thus we now have the flatbed models, which have a scanning surface roughly the same as that on standalone flatbed scanners, or roughly the size of a single sheet of letter paper. Granted, this isn't as convenient for faxing out legal-sized sheets, and you still have to do a bit of reconstruction if you want to scan an entire album cover, but the flatbed model is eminently preferable if you want to copy pages of a book without resorting to tearing them out. The other big downside is that it's a bit more difficult to fax out multi-page documents unless you load them to the PC first, or unless the multifunction unit has an automatic sheet-feeder for the flatbed unit, too.

—Sean Carruthers

Laser-based multifunction devices

	Brother MFC-9600	 Canon MultiPASS L6000	Hewlett-Packard DeskJet 3150	Oki Okioffice 84	Xerox WorkCentre 390
Print method	laser electrophotographic	laser electrophotographic	laser electrophotographic	LED electrophotographic	laser electrophotographic
Maximum resolution (dpi)	600x600	600x600	600x600	600-dpi class	600x600
Rated speed	12	6	6	8	10
Paper input (number of sheets)	250	100	100	100	99
Accepts legal paper	yes	yes	yes	yes	yes
Accepts envelopes	yes	yes	yes	yes	yes
Connection to PC	parallel, USB	parallel	parallel	parallel	parallel, USB
OS Compatibility	Win9x/NT, Mac	Win9x/NT/2000	Win3x/9x/NT/2000	Win3x/9x/NT	Win9x/NT/2000
Scanning					
Scan method	flatbed	sheet-feed	sheet-feed	sheet-feed	sheet-feed
Scan resolution (dpi)	300x600	600x300	300x300	300x300	300x600
Max. scan, software interpolation	1,200	600	600	300	1,200
Colour scanning	yes	no	no	no	yes
Copy					
One touch copy	yes	yes	yes	yes	no (copy then start)
Copy resolution (dpi)	600-dpi class	600x600	300x300	300x300	300x300
Copy speed	12 ppm	6 ppm	6 ppm	8 ppm	10 ppm
Reduction/enlargement (%)	25 / 400	70 / 100	50 / 200	25 / 200 (via PC only)	50 / 200
Fax onboard	yes	yes	yes	yes	yes
Cartridge type	separate toner & drum	combined toner & drum	combined toner & drum	separate toner & drum	combined toner & drum
Cartridge yield (pages*)	3,000	2,700	5,000	1,500 toner / 10,000 drum	3,000
Cartridge cost	\$80 toner / \$200 drum	\$126	\$200	\$42.75 toner / \$187.50 drum	\$150
Dimensions WxDxH (mm)	49.2x45.6x42.9	36.5x36.5x24.2	38.4x39x27.2	31.1x38.7x19	35.6x41.4x23.9
Weight (kg)	17	8.6	10.6	7.6	10.3
Warranty	1 year	1 year	N/A	1 year	1 year
Price	\$1,399 street	\$699 SRP	\$1,135.99 street	\$1,154 street	\$699 street

* Number of pages based on five percent coverage, unless noted.

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(www.computerjobs.com)

MCDDBA Windows 2000

(Microsoft Certified Database Administrator)

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- Database analysts
- Database developers

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Average yearly salary: \$57,000 per year
(www.computerjobs.com)

MCSD Windows 2000

(Microsoft Certified Solution Developer)

MCSD certification is appropriate for:

- Software engineers
- Software applications engineers
- Software developers
- Technical consultants

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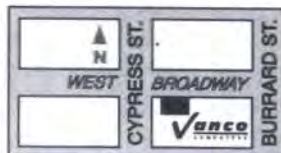
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600/ 700/ 750\$1139/1209/1229 800/ 850/ 900\$1259/1349/1399 950 / 1000\$1529/1689	700/ 750/ 800\$1249/1279/1309 850/ 900\$1399/1449 950/ 1000\$1579/1749	PIII 733/ 750/ 800 ...\$1249/1299/1329 PIII 866/ 933\$1479/1689	Celeron II 533/566/600 ..\$659/709/719 Celeron II 633/667/700 ..\$729/769/819 Intel PIII 500/550/600 ...\$719/729/769	Duron 650/ 700\$719/759 TB 700/ 750/ 800\$799/829/859 TB 850/ 900/ 950 ...\$949/999/1129
Asus K7V ATX M/B With Sound 128MB SD-RAM PC-133 20GB Ultra DMA Hard Drive 1.44 Floppy Drive Riva TNT2 32MB AGP Video 500W Speakers + Subwoofer 52X Creative CDROM Drive 56K V.90 Fax/Voice Modem 10/100 Network Card ATX 300W Tower Case Windows Keyboard & 2B+ Wheel Mouse MS Windows Millennium CD 1 Month FREE ROGERS Cable	Asus A7V ATX M/B With Sound 128MB SD-RAM PC-133 15GB 7200rpm Hard Drive 1.44 Floppy Drive Riva TNT2 32MB AGP Video 500W Speakers + Subwoofer 52X Creative CDROM Drive 56K V.90 Fax/Voice Modem 10/100 Network card ATX 300W Tower Case Win Keyboard & 2B+ Wheel Mouse MS Windows Millennium CD 1 Month FREE ROGERS Cable	Asus CUV4X ATX M/B w/Sound 128MB SD-RAM PC-133 20GB Ultra DMA Hard Drive 1.44 Floppy Drive Riva TNT2 32MB AGP Video 500W Speakers + Subwoofer 52X Creative CDROM Drive 56K V.90 Fax/Voice Modem 10/100 Network card ATX 250W Tower Case Win Keyboard & 2B+ Wheel Mouse MS Windows Millennium CD 1 Month FREE ROGERS Cable	Elite Intel BX PIII All-in-One M/B 64MB SD-RAM PC-100 20GB Ultra DMA H.D. Built-in 8MB AGP Video 48X CD-ROM 1.44 Floppy Drive Built-in 3D Sound Pro 140W Speakers 56K V.90 Fax/Voice Modem 10/100 Built-in Lan ATX 250W Tower Case Win Keyboard & 2B+ Wheel Mouse 1 Month FREE ROGERS Cable	AMD Duron M8105LR M/B 64MB SD-RAM PC-100 20GB Ultra DMA H.D. 8MB AGP Video Card 48X CD-ROM 1.44 Floppy Drive Built-in 3D Sound Pro 140W Speakers V.90 Fax/Voice Modem 10/100 Built-in Lan ATX 250W Tower Case Win Keyboard & 2B+ Wheel Mouse 1 Month FREE ROGERS Cable
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Apple News

Cache design adds value to new iBooks

By Justin Siemens

Apple Expo 2000 was held in Paris in mid-September, and Steve Jobs had quite a few goodies in store for the Mac faithful. On the plus side we got the public beta of OS X, new iBooks, and new ATI cards. On the down side, this was the first keynote in recent memory not to be Webcast live, and the rumoured new PowerBooks were nowhere to be found. But we'll get to that in a minute.

New iBook & iBook SE

Apple has released new iBooks, which though almost identical to the old models externally, are almost completely new internally. The only cosmetic changes to the iBook line are the colours, the rest of the case remains the same. The new colours are Indigo and Key Lime on the base models, and Key Lime and Graphite on the special edition (SE) models. Also, the white portions of the case are supposed to be more glossy in appearance than the old frosted white on older iBooks. Otherwise these look like the same iBooks we've come to know in the past year, complete with the same 12.1-inch screen and tray-loading CD-ROM drive. Inside however, these new iBooks are amazing. The processors, which used to be a choice of 300 or 366 MHz, have been increased to 366 or 466 MHz.

Also, they have a new version of the G3 chip not previously available in any Mac product. The new chips are rumoured to consume 40 percent less power, and they feature a new L2 cache design in which the cache is built into the CPU and runs at a 1:1 ratio. With old G3, the cache was external and usually ran at a 2:1 ratio. What does this mean in practical terms? The new iBooks have 256KB of cache that runs at 366 MHz (or 466 Mhz), and the old iBooks had 512KB of cache that ran at 150 MHz (or 183 MHz). Half the cache at more than double the speed might end up being slightly faster, and it's definitely cheaper for Apple.

Another change is in the input/output options. New iBooks feature USB, FireWire, video out, and CD-ROM or DVD-ROM drives (in SE models only) across the line. Both FireWire and video out have been on Mac users' most wanted lists for the past year. Good to know someone at Apple is listening.

Finally, the new iBooks have larger drives (10 GB or an optional 20 GB) and ship standard with 64 MB of RAM (plenty for OS 9, not enough for OS X). The best part is they are cheaper than the previous models at \$2,199 and \$2,699 respectively. They also now include iMovie 2.0 on the hard drive. They should be available now from Apple retailers, although the Key Lime will initially only be available direct from the Apple Online Store (<http://www.apple.ca/store>).

Apple's new iBook



ATI Radeon now build-to-order option

Jobs also announced something he was going to announce at Macworld Expo in July but didn't due to some "internal disagreements" with ATI (<http://www.ati.com>). We're glad that's all cleared up, because now the new ATI Radeon 256-bit graphics card is available as a build-to-order option from the Apple Store in all G4 tower and G4 Cube systems.

This card delivers more than double the performance of the aging Rage 128 and it's roughly equivalent to the new 3dfx Voodoo 5

5500 card. The Radeon comes with 32 MB of VRAM and sports an AGP interface with outputs for VGA and the new Apple ADC (Apple Display Connector) displays. The cost of adding one to your new G4 is \$150, which is a steal—purchasing this card separately through a retailer could cost as much as \$450. Also, the retail version will not have ADC capability and will not be available for another few weeks at least. It will, however, feature S-video out for connecting to a TV, and both the build-to-order and the retail version will support Apple's Software DVD player, something the Voodoo card cannot do at this time.

Mac OS X Public Beta

Apple has released Mac OS X Beta on the date promised! And there was much rejoicing! However, as usual, there are also a few snags. Many thought the beta would be free, or at least downloadable for those who can spare the bandwidth. It's not. Also, many assumed the beta would contain everything DP4 had plus more, but instead some things have been removed, most notably AirPort support.

However, it's still great, all these years after Copland was first announced, to be able to use a Mac OS that's not just a revised OS 1.0 (albeit heavily revised). This is the first truly new from the ground up Mac OS since, well, ever. But is it worth \$45? Obviously, those of us in the media have to get it so we can write

Continued on page 80

XChat: full-featured IRC client

By Steve Coe

One of the most fun areas of the Internet, in my opinion, has always been Internet relay chat (IRC). It has been around since before the Web, but a lot of Internet users don't even know it exists.

Simply put, IRC is a network of servers, with innumerable different networks, with chat rooms, or channels, for various subjects. How close to the subject the content stays is a matter left to channel moderators. You can go into a channel, baseball for example, and end up, like I did once, having a long in-depth discussion on the works of Frank Zappa.

Of course, to access IRC you need software. In Windows, mIRC rules the roost. While this is a fantastic program, it's not free. Linux, however, has several IRC programs and the best I've found so far is XChat (<http://www.xchat.org>).

As a proviso, let me just state that I have

not tried any console-based clients, so as a consequence I have not yet tried the highly regarded Bitch-X.

XChat is available in source code form or as an RPM (Redhat package manager, a self contained archive of the compiled program file). The program uses Gimp ToolKit (GTK), so you need to make sure you have a suitable version installed.

When you first run XChat, you are greeted by the main window and a server list. Above the server list are boxes for you to enter three different nicknames for when a user is already using your first choice of nickname, a very nice feature, along with a box for your real name and username.

The server list gives a list of the various different networks you can connect to, and there are a lot of them. Some are specialized, but your best bet is to pick a network by clicking on it, then choosing a server from the list. Click, connect, and wait. Some servers require authorization, so it may take you

more than one attempt to find a server to connect to. If your first try is unsuccessful, choose Server List under the menu to the far left and try again.

Once connected, select Channel List under the Windows menu. Here you can set filters, such as minimum users currently on, or you can set a filter with a wildcard to only list certain named groups on the active channels.

A word of warning: on a slow connection, downloading a list of all channels can take awhile.

Once you've found a channel you like, click the channel, then the Join Channel button. That's it. You're on IRC.

The above is really just the very simple basics of XChat and IRC. XChat is more than just a plain IRC program. It has lots of great bells and whistles.

Through the XChat Web site you can download themes to change the look of the program, or plugins that do different things.

The most interesting plugin I saw was one

that allows remote users to specify MP3s to play on your machine. This could be interesting to play with, but could also be intensely irritating. Another plugin tells the channel you're in what MP3 you're currently listening to. OK, so I like MP3.

Another interesting feature: by right-clicking on any username, you can read various bits of information about the user.

There are far too many great features to go into in detail. Suffice to say that XChat is a very full featured program, and if you have even the smallest desire to try out IRC, it is the ideal program.

It can be used as a simple IRC program, but once you delve beneath the exterior you'll find feature upon feature and a plethora of plugins and scripts to add lots of different functionality to IRC.

I've been using IRC off and on for many years and XChat is by far the best client I've found so far.

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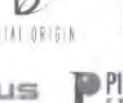
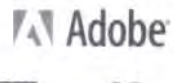
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< PLATFORM NEWS >



A screenshot from the recently released public beta of Mac OS X.

Cache design and value to new iBooks

Continued from page 78

about it, but how many out there will spend \$45 (US\$29) to try out beta software on their home machine? Apparently 21,000 copies were ordered in the first two days. Not bad for a beta.

Testing OS X, first impressions.

So now that we have it what do we think? The installation was very simple. Boot from the CD-ROM, click install, wait 10 minutes, and reboot.

This was one of the shortest OS installations in recent memory. Once in you notice everything is very smooth looking, thanks to system wide anti-aliasing.

The OS also seems quite fast, but not as fast as we would have hoped. This is due mostly to the video performance, though. Graphics acceleration does not appear to be completely implemented at this point, as evidenced by the sluggish window resizing and scrolling.

Also, there were significant amounts of dropped frames when playing a QuickTime movie on our G4.

The built-in mail application seems easy to use and well written, although basic. It does, however, support multiple accounts and offers built-in spell checking so it should be enough for most people.

Internet Explorer 5.5 beta is included and works well, but it hogs 90 percent of the CPU when it's in use, not exactly efficient code at this point. Still, it shows a lot of hope for the future.

If you are thinking of getting the beta, here are some things to keep in mind: You need a Mac that shipped with a G3 or G4, and at least 128 MB of RAM for decent performance. Also, the beta expires May 15th, at which point Apple says you will have to buy the full version if you want to be able to access your files. Right now it is only available from the Apple Store, which offers free shipping in Canada.

No new PowerBooks, iBooks narrow the gap

Here's an odd thing about the new Apple product line. Since no new PowerBooks were announced, we probably won't get new ones until the next MacWorld in January, which is a year from when the current ones were released. Until then, the new iBooks are actu-

ally a better deal for many people, and will probably hurt PowerBook sales over the next three months. Here is a chart to compare:

Feature:	iBook	iBook SE	PB 400	PB 500
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CPU (MHz)	366	466	400	500
Cache (KB)	256	256	1,024	1,024
Cache run ratio	1:1	1:1	2:1	2:1
Optical drive	CD	DVD	DVD	DVD
Incl. FireWire	Y	Y	Y	Y
Modem (Kbps)	56	56	56	56

As you can see, at this point the only real benefit to a PowerBook is the extra two inches of screen space. The PowerBooks also have a larger L2 cache, but they run slower so the benefit is diminished. This is not a lot extra when you consider an iBook SE is faster than a base PowerBook with the same amount of RAM and hard drive space for \$1,000 less. For those who can afford it, the PowerBook is still more expandable, but I suspect that for most people the iBook will be the more tempting choice. We'll see if Apple tries to bump the PowerBook up in the next few months or if they hold off for the rumoured G4 PowerBook at MacWorld Expo in January 2001.

Well, that's all for this month. We'll see what next month brings; System 9.1 or QuickTime 5.0 perhaps? □

Justin Siemens is a Macintosh IT specialist based in Vancouver, B.C. He can be reached at jsiemens@mac.com.

The Jazz Age Page

NB—Who was Nat Shilkret, The Rhythm Boys, and Fred Waring? If you don't know, get thee to the Jazz Age Page, a Web site documenting the period before and after the stock market crash of 1929. Here is the age of flappers, decadence, bank failures, and of course, jazz, depicted through pictures, biographies, text and sound files featuring speeches by political and cultural giants, as well as jazz cuts of the time.

<http://www.btinternet.com/~dreklind/Jazzhome.htm>



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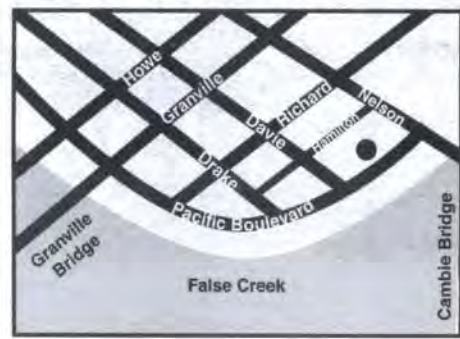
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Powerplant: piles of open source on a silver platter

By Steve Coe

While high-speed Internet access is slowly becoming a reality across Canada, a lot of people, like myself, are still stuck in the dark ages of dialup. While my downloading speed isn't that bad, it's still tiresome to know that big files will take a long time.

For developers, and would-be developers, this collection contains a whole heap of free or shareware development software out there on the Internet that's difficult to sample if your connection is slow.

First you have to find the software. The Google search engine (<http://www.google.com>) can help, but it's still a chore. You can find a piece here and a piece there but, for the most part, it can be very tedious to find what you're looking for. Even a high-speed connection doesn't help much if you can't find what you want.

Enter The Kompany (<http://www.thekompany.com>) and a terrific CD collection of development tools, libraries, and other goodies. The collection comes with four, count 'em, four discs, which translates into well over 80 hours worth of downloading at transfer speeds of 56Kbps.

One disc contains source code, one con-

tains RPM (Redhat Package Manager) files, and another contains Debian packages for those of you who use Debian-based distributions such as Storm and Corel. Also included is the full version of Eric's Ultimate Solitaire from Loki (a nice little solitaire game, but the recently reviewed Pysol offers more).

"The Power you need to develop great Linux software" is what it says on the box, and it does contain a veritable smorgasbord of software, but it's not flawless. The collection is supposedly open source software, but some of it is commercial, like the demo of VMWare virtual machine software, which lets you run another operating system within Linux.

To cover everything on the CD would take a good number of columns, but suffice to say, if there's a programming language you are interested in, chances are you'll find something of use here: from Basic, to C, to less popular languages such as Forth, Pascal, and Prolog. The collection even includes a Visual Basic-to-C source converter, but I have yet to try it.

It also includes a large number of development libraries and IDEs (integrated development environments, which are not to be confused with the hardware interface with the same acronym) that highlight code in dif-

ferent colours and generally make your coding experience a nicer, friendlier time.

Also included are copies of GNOME and KDE, which is where I found the only problem. I installed the GNOME updates and now a lot of my GNOME software has stopped working properly. By default, the packages install into the "/usr/local" path, whereas in Redhat most packages like GNOME are installed simply in "/usr"—which seems to have caused a few problems. For example, the GNOME CD player now has no graphics on the buttons, so you have to guess what button does what. This is only a minor drawback for me, since I don't actually use GNOME, but if you use it, it might be chaotic on your system. I would make sure to have backup RPMs or Debian packages, if those are what you need, to be on the safe side.

As I stated at the start of this article, while high-speed Internet access is becoming more and more common, a lot of people are stuck on slow dialup connections. A CD collection like Powerplant saves a lot of downloading time. While open source software is in a constant state of flux and there will constantly be newer versions available of a lot of the packages, CDs provide a wonderful snapshot of development software for the beginning programmer, and perhaps even for the seasoned

pro with a slow connection.

This collection provides you with a lot of material to play with and while the use of some software is limited (how many people actually use Prolog these days?), for the most part it's exceptional stuff that will save a lot of searching and downloading time. It handily provides both easy-to-install packages and source code.

The Kompany sells Powerplant for US\$49.95, plus shipping and handling.

For the dialup impaired, like me, who are interested in learning to program, this collection offers fabulous value and convenience, despite a few glitches.

—CanadaComputes.com

Population clock

NB—If you need a little reminder of how many humans are swarming over the planet, the U.S. Census Bureau has a clever little Java clock that shows the increase in the world population and in the U.S. population in real time. A new baby is born each third of a second somewhere in the world and every eight seconds in the U.S.

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Making wireless mireless

Wireless datacomm is the next big step in the convergence of the telecommunications and computer industries

By Ross MacDonald

One thing that becomes abundantly clear as you wade forth into the swelling waters of wireless communications is that, like all things digital, nothing is abundantly clear. The current wave of new technologies certainly accommodates a wide array of communications services, but the question of whose technology allows what, and for which device muddies the waters significantly, especially when virtually every wireless provider in Canada is pressing you hard to climb aboard its particular boat. You can quite easily end up drowning in features that won't help you out while gasping for the very services you need.

Device devolution

For our purposes, the most practical mobile devices that can take advantage of wireless datacomm technology fall into three basic categories:

1. Cellular phones: nearly everybody has one these days, and with the advent of digital PCS a few years ago they can now serve as more than telephones.
2. PDAs (personal digital assistants): the ubiquitous Palm-type devices that are increasingly capturing hearts.
3. BlackBerries: more esoteric devices, used primarily in the business world, that started out as a sort of credit-card sized pager with a tiny keypad and four-line LCD, but



have evolved to include a palm-sized, but still svelte, "card" sporting a larger keypad and 16-line screen. In fact, as BlackBerry devices drop in price and mature in capability—performing PDA functions, and offering wireless datacomm—they are becoming strong contenders in the PDA

market. As you shop around, you will find that several cell phone service providers are—or will be—offering BlackBerry devices. Also, a cell phone currently being tested incorporates BlackBerry technology. Compaq has recently partnered with Research In Motion (RIM, the makers of BlackBerry) to market what they are calling the iPaq BlackBerry. You might want to consider these devices if you're thinking about buying a PDA. The device plus service package came from a joint initiative of RIM, Rogers AT&T (through its Mobitex network), and various service providers. In mid-September, a similar agreement was announced with Bell Mobility and its Ardis wireless network.

Circuit-switched vs. packet-switched

Regardless of which device tickles your fancy at this point, it will be connecting to one of two types of data networks in the wireless world right now: circuit-switched and packet-switched.

Circuit-switched is currently the dominant wireless data network, and is most common in cellular phones, although it works equally well with BlackBerries and any PDA that has a wireless modem kit or connects to your cellular phone for wireless data exchange.

You may already be hearing or reading about built-in browser abilities or about

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BorderWare serves files securely



Issie Rabinovitch

In a corner of my office, on a dedicated computer attached to my network, I'm running BorderWare's Document Gateway. This is a collaborative server product that's easy to install and just as easy to use. It's one of several products in

the BorderWare line, each of which is interesting.

BorderWare is a privately held Canadian company, founded in 1998 and based in Mississauga, Ont. Although it's quite new, its key people have impressive credentials and experience.

The president and chief executive officer is John Alsop, who has worked in Internet product development since the mid-'80s. In 1996, he co-founded iPass Inc., where he worked on network architecture and system software. iPass provides a system for global Internet roaming and settlement services. If your ISP is a member of the consortium, you can use your account (for an additional hourly fee) in virtually every country in the world without incurring long distance charges.

BorderWare's flagship and initial product is the BorderWare Firewall Server. In December 1999, the company introduced three additional products: the BorderWare Office Gateway, the BorderWare Mail Gateway, and the BorderWare Document Gateway.

The Office Gateway can be thought of as a simpler version of the Firewall Server. The Mail Gateway is what you would expect, and the Document Gateway is a server that simplifies the sharing of documents and information on both sides of the firewall without sacrificing security.

BorderWare describes it as an advanced Web-enabled file server that delivers a secure platform for storing, sharing and publishing files and documents over the Internet. That's

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Copyright takes a beating on Net

Corporations, governments fight back by extending copyright's reach

By Tom Venetis

Is copyright an outmoded concept that should be abandoned? Or is it an idea that is still valuable and needs to be not just defended but expanded to better take into account today's rapidly emerging digital world?

These questions being asked by more people as technologies such as Napster, Gnutella, and Freenet make exchanging everything from popular MP3 files to whole programs and applications easier—and without money changing hands between producer and consumer.

It is also being asked by a lot of music and movie industry executives. They have been

fighting a pitched battle with a variety of technologies and applications, which they see as not only violating their copyrights, but challenging the very idea of copyright itself and thereby the reason for any of these industries to exist at all.

Certainly the most famous copyright battle has been that between Napster Inc. (<http://www.napster.com>) and the music industry. Napster was started by Shawn Fanning, a dropout from Boston's Northeastern University, who figured there had to be a better way for people to find and download MP3 files from the Internet. On June 1, 1999, Fanning released a beta version of the Napster program he had developed to some people he met online. The Napster program

allowed these early users to trade MP3 music files stored on their personal hard drives. They were so impressed by Napster that they soon made it available to others. According to some reports, the Napster program was downloaded by about 4,000 people in just the first few days it was made available.

Now, all of this might not have mattered if all these people were doing was trading the music of unsigned artists or a basement demo-tape that someone wanted to share with a friend.

Instead, what caught the attention, and soon the ire, of record companies was the software's use in trading MP3 files of music by signed, commercial bands and artists. If

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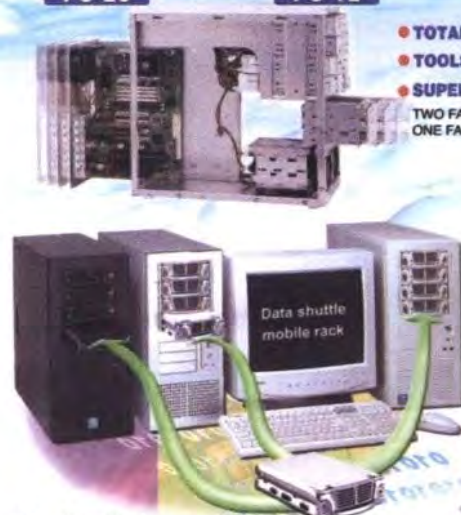
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The end of FM radio?

Canadian Netcaster ushers in new age of aural pleasure

By Stefan Dubowski

Last year Tim Martz had a vision of a Tsunami rising on the digital horizon. Martz runs Martz Communications Inc., an audio broadcasting company headquartered in San Francisco.

It's said that on the West Coast, you only have two options when faced with a big wave: run screaming or ride it.

Mr. Martz decided to ride.

On Aug. 13 FMCanada.com went live online. It's an Internet radio station with a twist: 350 audio streams geared towards each of Canada's seven largest cities: Vancouver, Edmonton, Calgary, Winnipeg, Toronto, Ottawa, and Montreal.

We're talking music—top 40, classical, jazz, reggae, alternative, easy listening, etc.—local news, weather, and traffic. It's that localness, long the property of traditional radio stations, that is being ported to the Net.

And some say traditional radio is in trouble, thanks to the move.

Oddly, Martz isn't one of them. True, he's excited about this extensive online venture. Still, he's not calling for the end of FM.

"Radio will still be profitable 10 years from now," Martz said as he took time out of his Hawaiian vacation to speak with us. "I see this like FM years ago. AM made the money. Now look at it. FM is king of the band."

Martz is well positioned to take advantage of a revolution by degrees. He has holdings in traditional broadcasting as well—nine New York AM and FM radio stations, in fact.

John Good, an instructor in Ryerson Polytechnic University's radio and television arts program, expressed excitement about FMCanada.com's capabilities. "This is pretty clever stuff," he said.

"I always believed what would save the traditional broadcaster was localness... Here the people thought that through.

"What that means is the traditional broadcaster had better do a very good job on the local level... This kind of stuff will eat them alive."

The end of FM? Hardly, says Jadd Chang, an analyst with Giga Information Group. Internet radio—local or global—has a long way to go before it can claim the broadcast crown.

Problem number one is market penetration.

Chang notes the coming of 3G (third generation), the high-speed wireless Internet, is a while off yet. And for companies like FMCanada.com, 3G counts as must-have infrastructure. With 3G, the Internet might reach our car stereos, our portable radios, our PDAs and our cell phones.

But right now Internet radio stations only reach as far as the longest telephone or coaxial cable.

"As far as I know, from the people I've spoken to in the market, they're going after the office worker," Chang said. Internet

radio should mesh well with the wired workplace.

Even there, however, Chang notes a stumbling block: radio eats bandwidth—bandwidth probably better spent sending email and memos, rather than creating an easy-listening environment.

This problem, of Internet feeds to office desktops stealing both worker productivity and network capacity, became a big issue four years ago, when the PointCast "push" information service clogged thousands of office servers.

Employers began crying about "time theft" by Web-surfing workers, and a crackdown on non-business-related Internet use began, and continues to this day.

"If everyone in the office is listening to the radio, the IT department is going to crack down," Chang said.

Still, FMCanada.com is in a unique position, poised to carry local content in what's often considered a global basket. Localness rears its head again, even in this analyst's assessment.

"This seems to be the natural evolution of online stations," Chang said. "People want to get information that's important to them. It's part of the whole personalization of the Web."

FMCanada.com goes 350 better than localness, however.

This broadcaster counts 50 music categories for seven cities. And unlike FM stations, listeners can skip and pause songs, a la CD.

Stacey Quandt, also a Giga analyst, recognizes Microsoft Corp.'s footprint, here. The software giant's Windows Media Player architecture was built for multiple broadcasts.

But even the house of Gates can't overcome FMCanada.com's initial penetration problems.

Forget 3G, what about high-speed Internet access by wire?

"There's an issue with broadband adoption," Quandt said. "It's growing, but it's not widespread. If you're looking for a limitation, that would be it."

Here's another possible limitation: FMCanada.com's sheer size might make localness costly.

Traditional broadcasters, on the other hand, often offer online broadcasts already—and compared to the cost of erecting an FM station, Internet development comes cheap.

It becomes a question of whether or not FMCanada.com can whisk advertisers away from traditional local broadcasters—broadcasters who own the captive, car-kitchen-bathroom-radio listening audience.

Will advertisers chance it with a new technology that attracts considerably fewer attendees?

Advertising isn't FMCanada.com's only line of finance. In fact, the station plans not to broadcast ads until sometime this month. But a handy click-and-buy-the-CD option means e-commerce cash.

Still, "you realize you have to get to lis-

teners in their cars," said Ken Cassavoy, who teaches in Centennial College's radio program. "You can't do that here. And until you can, it's no threat [to traditional radio]."

And FMCanada.com's Internet hedge offers no guarantees. Consider another novel technology: in the mid-1990s, audio pundits said digital audio broadcasts (DAB)—CD-quality sound through the air—would put an end to rounded airwave transmissions.

But DAB hasn't delivered. And some say it never will.

"The radio industry started out as very bullish about DAB," Good said. "Now they're saying, if there's not a lot of energy put behind it—unit sales and consumer adoption—and fast, it's toast."

On the other hand, DAB's demise could be a godsend for Internet radio. Perhaps radio stations that snapped up DAB's high-frequency bandwidth could use it for wireless Internet broadcasts, Good suggested.

"I think it's dead," Good said about DAB. "It moved so slowly that the Internet passed it by."

If content is key, FMCanada.com may have a winner. Not only does the station offer a choice of aural pleasure, Martz says it operates above Canadian content laws.

This benchmark—brought to you by the Canadian Radio-television Telecommunications Commission (CRTC) sets out the minimum percentage of Canadian songs traditional radio stations have to play.

"I'm not a big fan of quotas," Martz said. "But I believe in being a good citizen. Common sense tells you there's more Canadian music in my format."

FMCanada.com isn't limited to just rock, only opera, or nothin' but country. It

broadcasts all, and counts the collective number of Canadian artists as sufficient for the CRTC.

But the CRTC doesn't govern FMCanada.com.

This station operates online, beyond federal regulatory reach.

Oh, the irony! Traditional broadcasters have long bemoaned Can-con rules. They say Canada fosters too few quality acts to justify the numbers.

They're forced to play low-rent bands, satisfying the government at listeners' expense.

Meanwhile, an Internet radio station boasts more than average Can-con. But the CRTC has no say in the matter.

Is the old guard finished its watch? FMCanada.com had better hope so, Cassavoy says. Consider the current situation: teenagers like music, not weather reports and traffic notices. But this personalization theory speaks to older listeners—the sort less likely to purchase wireless Internet radios in the future.

FMCanada.com's best prospects, it seems, lie with the kids (who, whether they like it or not, will care someday about news, weather and traffic).

"Maybe there's that whole growth," Cassavoy said. "I guess it's like anything else. No one listened to FM when it started."

For now Martz is satisfied with the status quo. He has his traditional radio stations, and this new venture.

"I think everyone can exist. There'll just be more competition."

But that Tsunami seems to loom ever larger on the digital horizon. Martz's future? "I wouldn't want to be in the traditional radio business in five years if this is my competition."

—CanadaComputes.com

Survey claims 42 percent of employers spy on staff surfing

NEW YORK—A warning to workers: Nearly 42 percent of your bosses spy on you to find out if you're surfing the Net on company time.

If you think that's a startling statistic, take a gander at more findings in Vault.com's (<http://www.vault.com>) new survey—but do it on your own time.

Would you believe 53 percent of employees don't think their employers watch them? It's true, says report co-author Mary Rosenberger, but some of the things the average worker does online at work boggle the mind even more. Like 37 percent used the Internet at work to look for another job. "That was really astounding, to be at their job looking for another one," Rosenberger said.

Forty percent said they make purchases online while at work, 13 percent download music, four percent look at online pornography, she said. Nearly 28 percent of the workers surveyed said they take some type of precautionary measure to avoid getting caught surfing the Net for personal reasons.

Some workers argue they scan the Net looking

for sales leads and other job-related data that supervisors sometimes interpret as personal surfing, Rosenberger said. Others say the short time it takes to make a purchase on the company clock saves telephone time and allows time to stay at work longer.

The Vault.com 2000 Survey of Internet Usage at Work found that 25 percent spend more than an hour online at sites unrelated to their work, 22 percent spend 30 minutes to an hour and 25 percent spend 10 to 30 minutes. Nearly 10 percent said they never surf to sites that have nothing to do with their jobs. The study is based on responses from 451 employees and 670 employers.

Fifty-three percent of employers who watch the Web activity of their workers said they used monitoring software, while others are equipped to examine logged files, followed by restricting software, periodic screenshots, and keystroke monitoring.

And some just look over your shoulder.

—Newsbytes

Making wireless mireless*Continued from page 84*

wireless access protocol-enabled (WAP-enabled) devices and services. Using these, you dial into a specific telephone number to initiate a connection to a specific site—just as with dialup networking on your home computer. The industry calls this site your “deck” (read: same thing as your home page). From there you can scroll through a series of menu items, select what you want (for example, email, news, sports, or stock market), and select the information you want to access. Bits of information are sent through that circuit in a text-only format that will (hopeful-

ly) be legible on your phone's small screen.

But during this whole process—and while you're reading your information—the circuit is open and you're being charged for airtime as you would be for any regular voice call. In fact, depending on who your service provider is, you might be charged extra. This is where you're going to find WAP services less than ideal—you have to initiate the connection, do whatever it is you want to do, terminate the connection, then pay the bill. Also less than ideal is that, once you've hung up, your wireless datacomm services are off. There is no way of sending or receiving data unless that circuit is open.

Not only that, but you are not actually accessing the World Wide Web. You are accessing specific WAP-configured sites, which are not only limited in number (about 60,000 pages at the time of writing) but which also have been stripped down to their bare essentials in order to be viewable on your minimal screen over the minimal circuit bandwidth of less than 10Kbps total transfer rate.

“One of the disadvantages of WAP and cell phone content is that the phone screens are tiny and it's impossible to get content-rich Internet data onto them,” says Michael Moskowitz, president and general manager of

Palm Canada Inc. “That's one of the reasons WAP has been largely discounted as a standard to access wireless content.”

Which is why those in the know are anxiously awaiting the popularization and further development of the second type of wireless data network: packet-switching.

The best way to describe packet-switching is to compare it to the experience of being connected to a cable or DSL modem—the system is always on and the bandwidth is much broader, so you have access to the real data rich Internet because it can search HTML. Of course, it's still not the same Web browsing experience you would have using your home computer, but that's largely because of the limitations of the small screen on your mobile device.

However, with this technology you will be accessing clipped versions of all the real Internet sites out there in the virtual world instead of a limited set of customized pages. Some models of BlackBerry and all PDAs can best make use of this ability due to their larger (compared to cellular phones) screens. But those with only a limited need to access information might still be happy with a good cell phone on a packet-switched network.

More important to many consumers is that with packet-switching you are charged solely on the amount of information you send and receive. There is no fee for having your device on all the time because it's not actually using the network when data is not being exchanged. Your device waits for contact from the network to say there's something for you or, conversely, only sends data across the network when you want it to.

Packet-switching is currently available in major urban centres in Canada but has not yet expanded to equal the giant footprint available for voice calls. Technology is also limiting the speeds to approximately the equivalent of circuit networks, but that will be changing soon.

Yet another limitation is that, just as with cable modem systems, packet-switched networks are sort of like party lines—the carrying capacity is defined by the bandwidth, so the system gets proportionately slower in relation to the number of users at any given time. If you're lucky enough to be the only person actively exchanging data, you get maximum performance. But if every other subscriber happens to access the system at the same time, it will be appreciably slower.

Where things are going

Unfortunately, we cannot yet escape the need to carry multiple devices (and their associated batteries and chargers) if we want to be untethered but have full access to both the real and the virtual worlds. We are still stuck with BlackBerries for the best messaging, cell phones for the best phone calls, and PDAs with some sort of wireless modem kit or cell-phone connection for the best display. This means you have to think about what you really want to be able to do and how much you want to spend. If you want a great phone and great browser you need two devices. If you want a good phone and a mediocre browser then you'll be happy with a WAP phone. But WAP phones are larger than a phone alone has to be and they don't have the browsing ability of a BlackBerry or PDA.

David Robinson, vice-president of product management for AT&T Wireless, predicts that ultimately, within a couple of years, all the voice networks—which are circuit networks right now—will become packet networks so your voice and data communica-

Continued on page 90

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Making wireless mireless*Continued from page 88*

tions will be sent over the same system.

"But," he warns, "there is an important differentiation between what we [the industry] can do and what is commercially viable. You've probably heard about being able to view movies on our phones in the future, for example. Technically? Absolutely! Commercially viable? Probably not.

"[This is] because a packet network is by definition a shared network. You have a backbone, which has a certain capacity, then a distribution layer with a certain fixed bandwidth. If you want to send a stream of video,

you can send it, but it will take up a lot of available bandwidth. And with packet-switching you pay for bits. I can do it. But I don't think you'll like the bill you get when I'm done. Which is not to say you won't be sending and receiving more graphically interesting content in the near future—images and video clips, for example—but with more and more users relaying more and more data-rich content through the system, the network will remain limited until broader bandwidths become available."

1, 2, 2.5 and 3G

This is where the terms 3G, Edge and GPRS

enter the ever growing lexicon. These are developing broadband technologies that we're not likely to see for a couple of years yet. 'G' stands for a generation of wireless technology, as defined by the industry itself. 1G was the introduction of analogue cell phones. It wasn't that long ago, so most people can remember short battery life, poor quality transmission, giant phones and lots of lost calls.

2G was the more recent introduction of digital PCS—digital voice with some data service and email receiving capability. Phones got smaller, batteries lasted a lot longer and fewer calls were dropped. This is what most

people have now. 2.5G is the currently available and heavily pushed state of affairs in which wireless devices have Internet access in some form plus two-way messaging. Packet-switching technology is included.

But 3G is the much ballyhooed next step—mobile wireless Internet access and multimedia communications at speeds of up to 384Kbps when mobile and upward of 2 Mbps when stationary. Your Web experience ought then to be comparable to what you currently enjoy (or curse) on your home computer.

What we're waiting for at this point is the availability of reasonably priced network equipment and devices. It is theoretically possible to build a 3G network and sell compatible devices today, but the customer would have to be billed about \$2,000 a month, so it's not likely to be particularly popular. Beware of vendors trying to sell you 3G before it's ready.

Now this is where things get a bit technical: Habitual readers will recall that TCP did a comprehensive explanation of digital PCS a couple of years ago, explaining that three different technologies were adopted by the various carriers in Canada: CDMA, TDMA, and GSM.

If you are a Clearnet, Telus, or Bell Mobility customer, you have CDMA. If you are a Rogers AT&T customer, you have TDMA, and if you are a Fido customer, you have GSM. It is not necessary here to explain the differences in how each of these work, but it is important to understand that packet-switching is, in effect, a broadband development of CDMA technology, which is why you'll be hearing more and more about:

- Edge: the technology allowing TDMA networks to provide true packet-switch data abilities, and;
- GPRS (general packet radio service): a speed-enhanced data capability layered overtop of GSM networks to give those phones the same packet-switching abilities as the others. Where Edge is pure packet-switching technology, it is important to realize that, though GPRS is a pure packet data network, it is overlaid onto the existing GSM circuit data network.

Debra Ewenchuck, communications manager at Clearnet, anticipates 3G with enthusiasm (not surprising considering Clearnet is a CDMA service provider). Though it is not expected to be ready before 2003, she can see cell phones in particular offering a lot of new and practical services.

"For example, you'll be able to dial up a number and see your child in a daycare," she says. "They are already doing this on home computers in the U.S., but 3G will be able to add that to your phone."

She adds that people will also be able to access music files, if they really want to, but that on a more practical level, 3G will provide more sophisticated location services including maps.

Mark Langton, another Clearnet spokesperson, explains that, "What will matter to the consumer is that it's just a whole lot faster and carries a whole lot more and richer data."

He predicts that soon, we'll see networks from all the service providers that offer higher throughput speeds as well as services that are more efficient.

"What it comes down to is that all the wireless providers are heading down the same road toward that super fast bandwidth," he says. "What will eventually differentiate each company are the partnerships they manage to

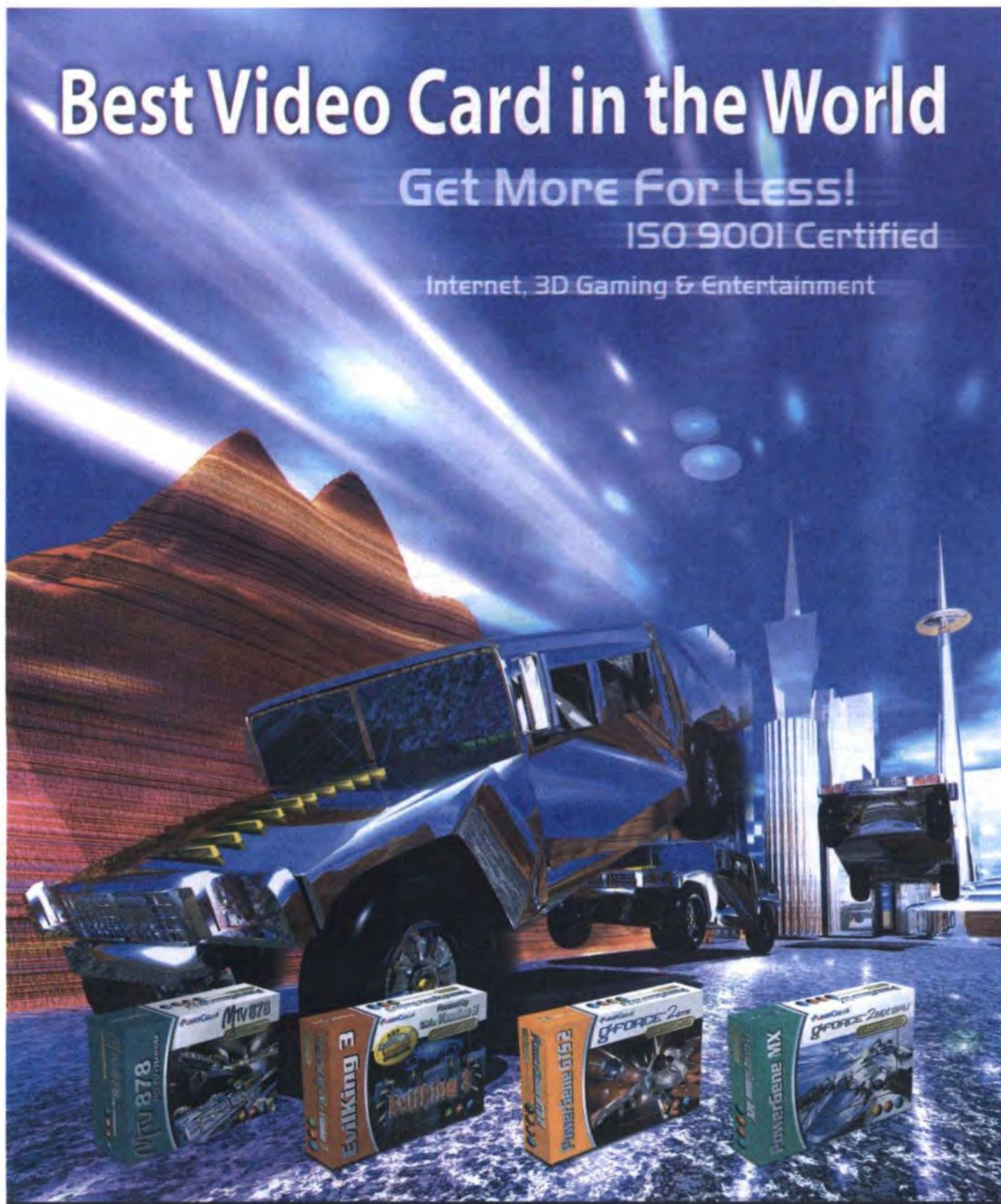
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Copyright takes a beating on Net*Continued from page 84*

someone was interested in the newest single by Madonna, all they had to do was type in the name of the song, and if it was available on someone's hard drive or server, they simply downloaded it onto a PC—without ever having to pay a cent to the copyright holder.

And people were doing this in very large numbers. It has been estimated that in the first six months after Napster became available, some nine million people were using it to find and exchange MP3 files. What makes that number impressive is that in comparison, it took AOL more than a decade to get nine million members.

It did not take long for the record industry and some artists to react to Napster. In December, the Recording Industry Association of America (RIAA) sued Napster for copyright infringement, and asked that it be paid US\$100,000 each time a copyrighted song was illegally copied. The RIAA called Napster a haven for online piracy.

In April, the rock group Metallica accused Napster of copyright infringement and demanded that people who were copying and

trading their songs using Napster be kicked off the service. To drive the point home, band member Lars Ulrich showed up at Napster's office with boxes of names of people he and the band accused of illegally copying their music.

On July 28, the RIAA won a temporary victory when the judge examining the case sided with them and demanded Napster be shut down. A U.S. federal appeals court stopped the shutdown temporarily, pending a further resolution of the case, leaving the fate of Napster under a cloud.

In a related case, the Motion Picture Association of America (MPAA), representing major movie studios, sued the famed hacker Web journal site 2600.com for posting software that broke the coding used on DVDs to prevent them from being copied. The DeCSS code would allow someone to decipher the anti-copying code on the DVDs so a movie could be copied then played on unlicensed DVD players. In this case, most users were people who had Linux-based PCs and wanted to watch DVD movies on their machines.

*Continued on page 94***Making wireless wireless***Continued from page 90*

establish and the extent of the network they are able to build."

Device convergence

A convergence of devices to reduce our pocket load is certainly in the cards at some point, as BlackBerry-type circuitry is already being built in to some cell phones, Palm technology will soon be built into other cell phones, and cell phone "jackets" are now being developed for some PDAs.

"You won't need your cell phone anymore," says Compaq Canada's product manager for Internet products and services, Pam Norton, who understandably votes for phone technology being absorbed into PDAs rather than the other way around.

Today, people expect different things from the different devices. Cell phones are expected to be small, thin, light, and have long battery life. PDAs also have to be thin and light with long battery life, but with the addition of a large bright display and more sophisticated input methods (virtual and folding portable keyboards, and stylus cursive script

recognition). BlackBerries are the slimmest and lightest and have many of the features of traditional PDAs but stand on their own as a unique device.

"There is certainly some overlap between PDAs and BlackBerry devices in that both will provide the email function, but that crossover ends when you consider the primary use you want each device for," says Compaq's Pam Norton. "If the primary use is a wearable email and messaging device, the BlackBerry is the device you want. And for an additional charge, the BlackBerry can access WAP-enabled sites but on a relatively small monochrome screen. Whereas on an iPaq Pocket PC you get a rich viewing experience through great visibility on a larger colour screen to any Web site you wish."

Well, not quite, since the consumer would still have to pay extra money to equip a Pocket PC device with a wireless data access device, plus the service package. But it is reasonable to say that a cell phone is a telephone with messaging and some limited browsing ability, a PDA is a computer that can have browsing and messaging capabilities when combined with another device (cell phone, wireless modem, or regular modem), and a BlackBerry is a pager with limited browsing and excellent messaging abilities.

Which is to say: Buy a phone if you need a phone, a PDA if you need a computer, and a BlackBerry if you need a sophisticated message centre. You'll probably end up with at least two of these three devices if you want to have comprehensive access to the current potential of wireless datacomm technology.

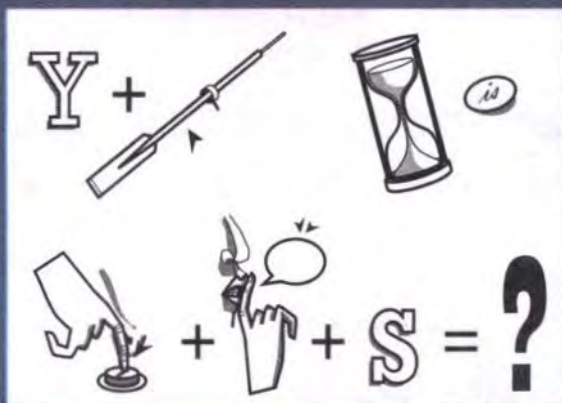
Today's picture

WAP is happening everywhere in Canada right now. If you want or need access to messaging and predetermined text-only data through your device(s), the current crop of offerings from the various service providers will probably fill your bill.

Packet data is available in limited areas but is growing fast. Those living in major urban areas can already take advantage of the richer datacomm potential through the newer devices if their service provider makes them available—but remember, you will eventually have to deal with the "party line" limitations (ask anybody who has cable Internet access at home about that).

However, coming soon is the 3G/Bluetooth combination that will make it possible to carry much of your computing and communications needs in your shirt pocket, as all three types of devices move forward. The only thing we'll have to worry about then is the bill. □

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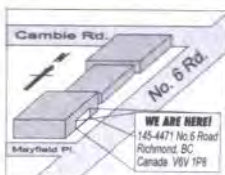
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Copyright takes a beating on Net*Continued from page 92*

As of Aug. 17, a U.S. federal judge sided with the MPAA and issued a preliminary injunction against the site, arguing that the code violated U.S. copyright law. The judge did not accept 2600.com's argument, put forth by lawyer Martin Garbus, that computer code is a protected form of expression under the First Amendment in the United States.

"Computer code is not purely expressive any more than the assassination of a political figure is purely a political statement," argued U.S. District Judge Lewis Kaplan.

Randall Davis, a professor of electrical engineering and computer science at Massachusetts Institute of Technology (MIT) in Boston, Mass. says record and movie companies are going after such technologies as Napster and the DVD descrambling code, because they make the copying and distribution of digital information, such as music and movies, instantaneous and perfect.

Copyrighted material can not only be made into perfect digital copies, but those digital copies can now be quickly delivered over the Internet by anyone to anyone.

"Most importantly, the copy of this digital form is identical to the original," Davis adds. "There is no degradation. And an interesting aspect of this is that because these copies are identical to the original, they can become seeds for new copies to be made."

But the real problem comes with the Internet, which now adds a new layer of difficulty for the idea of copyright. Copyrighted material in digital form can not only be copied perfectly, but those digital copies can be delivered quickly by anyone to anyone over the Net.

"It takes almost no capital to create and disseminate information from a Web site," Davis adds. "Digital information drastically reduces the cost and degradation of copying, networks make it possible to ship information around the world almost instantaneously, and the Web makes it possible for you to create something and let the world know about it. This is a classical technological two-

edged sword. Technology has drastically lowered the barriers to infringement."

But there is more to this than just the issue of how today's Internet and digital technology makes the delivery of copyrighted material easier. Earlier, both the record companies and movie studios have fought vigorous battles against a variety of copying and distribution technologies. The music industry fought against commercial audiotape and recording systems and the movie studios went to the U.S. government to lobby for restrictions to be placed on videotapes and home video systems.

The politics of copyright

What is different now is that these companies have come to see the Internet and digital technology as threatening their very reason for existence by the challenge these technologies pose to the idea of copyright.

The argument goes like this: Copyright is something companies use to set the ground rules for how their products, either music or a movie, can be distributed and used. Copyright then becomes the reason they exist and how they make their money. Since a record company or movie studio controls the copyright, they can control who can get access to the material, how people will see or hear it, how much they will have to pay and what people can ultimately do with it.

Because of this kind of control, record and movie companies have created sophisticated worldwide distribution mechanisms to deliver their products and to reap huge amounts of money doing so.

Now, the Internet and digital technologies like MP3 have drastically changed the rules. Each time someone downloads a piece of music or distributes video over the Internet, they are showing the world that one does not need a record company or movie studio to access, enjoy, and have direct control over what they want to see or hear.

Some artists also like what these technologies offer and some have been using them to carve a career outside of the major record or movie studio control. Many artists have groused about what they see as the almost draconian application of copyright that benefits the record companies more than it does the musicians.

And they may have a point. Last November, a U.S. congressional aide added a technical amendment to the Satellite Home Viewing Act of 1999 that redefined the relationship between musicians and record companies. This amendment would define all the music an artist or group produces while signed for a record company as "works for

hire," thereby allowing the record company to hold the copyright to the music in perpetuity.

Has copyright outlived its time?

For someone like Richard Stallman, founder of the GNU project at MIT and a proponent of the free software movement, copyright is a relic from the industrial age. Back then, information distribution of any sort was highly centralized because the technology for making copies of books or music was unavailable to the general public. Not everyone could afford or use a printing press, or own a modern recording studio.

No one goes out and photocopies a newspaper in order not to pay the 50 cents it costs to pick it up at a vendor.

"Copyright was set up in the age of the printing press when the only feasible way to copy was in mass production," Stallman says. "Copyright was an industrial regulation and was not controversial because it did not restrict the freedom of ordinary people who could read books or listen to records. Now, because technology provides everyone with an easy means of copying, the situation has changed. Now copyright is a direct attack on the freedom of everyone who reads, who listens to music or uses a computer. That is why you see battles breaking out because companies are trying to exert their control over the public and the public is mostly unaware that their rights are being stripped from them."

Stallman does not for a moment believe that artists should not be able to earn a living off their work. He has no problem if a musician wants to charge for a song or a writer a fee for a novel. What he does not agree with is the idea that in order to make money, you must restrict people's rights to copy the work and send it to friends.

"Just because a person is willing to work hard, does not entitle them to take away your freedom," he continues. "I'm one of those 'authors' and I've written programs that were years of work. But I've shared them freely with the public and I respect the freedom of people who are using the software that I wrote."

What Stallman would like to see is some kind of solution that would respect the work of the artist or programmer while at the same time allowing people the freedom to copy the

work. As an example, he suggests that when someone downloads a song from the Internet, it could be encoded in such a way that information about that artist and the work are part of the download and cannot be removed. This would ensure that no one could pass the work off as someone else's. At the same time, the song could also come with a pop-up screen that would ask them to pay a small fee for the song in order to support the artist and their work.

"I think this way you will find that musicians will find they can make a living from the direct relationships they develop with their fans," Stallman says.

And he may not be too far off in this idea. Stephen King recently began publishing an online novel called *The Plan*. Instead of paying up front to download a chapter of the novel, a reader only needs to pay a small fee after they have downloaded a chapter and liked what they have read. What King found is that people were willing to pay the small fee, even though they could download the chapters of the novel for free.

And some readers are so eager to make sure King keeps on publishing chapters of the book, they have been paying US\$20 for each chapter in order to make up for those who did not pay anything for the chapter they took.

(Editor's note: According to an Associated Press report in late September, fewer people are paying for downloads as King's serial progresses. AP says 70 percent of downloaders paid for the second installment, and King has set 75 percent as his minimum for continuing after the third installment is posted. King and his staff are also, apparently, considering different strategies for future downloads, including payment prior to downloading and raising the price.—Ed.)

MIT's Davis suggests companies should also begin looking at ways of distributing their offerings in ways that make it easier and cheaper to buy them than steal them off the Internet.

No one goes out and photocopies a newspaper in order not to pay the 50 cents it costs to pick it up at a vendor. It is too cumbersome and expensive to do so. The same thing should be done for music or movies, he argues. Right now, going online to find a favourite piece of music is a rather time-consuming process. One can never be sure if a certain song is even available online. And if it is, one often has to deal with long download times and corrupted music files.

"Make downloading a song cost \$1 and make it very fast and very easy," Davis adds.

Continued on page 96

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LG GOLDSTAR 17" 775FT/19" 995E	\$359/\$489
NEC 17" AS75F/19" AS95F	\$339/\$499
NEC 17" FE700/FE750	\$379/\$439
NEC 19" FE950 .24/22" FE1250	\$609/\$1189
OPTQUEST 17" Q71/19" Q95	\$289/\$465
SAMSUNG 15" 5505/17" 7505	\$189/\$279
SAMSUNG 17" 700NF/19" 900NF**	\$369/\$569
SAMSUNG 17" 700IFT/19" 900IFT**	\$359/\$559
SAMSUNG 17" 753DF/19" 955DF**	\$319/\$499
SONY 17" E200/G200	\$499/\$565
SONY 19" E400/21" E500	\$699/\$1279
SONY 19" G400/21" G500 .24	\$769/\$1429
VIEWSONIC 17" E771/E773	\$315/\$359
VIEWSONIC 17" EF70/PF775	\$389/\$475
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VIEWSONIC 19" PF790 .25**	\$629
VIEWSONIC 21" G810/PF815	\$1059/\$1249

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ASUS V6800 GeForce DDR/DELUXE	\$275/\$289
ASUS V7100 GeForce 2 MX PURE/DX	\$215/\$235
ASUS V7700 GeForce 2 32MB/DELUXE	\$385/\$435
ATI XPERT 98 8MB AGP	\$55
ATI XPERT 2000 32MB AGP	\$109
ATI RAGE FURY PRO 32M w/TV OUT	\$159
ATI RAGE FURY MAXX 64MB OEM	\$189
ATI RADEON 64MB w/TV OUT	\$405
ALL-IN-WONDER 128 PRO 32MB OEM	\$259
ALL-IN-WONDER RADEON 32MB OEM	\$189
CREATIVE GeForce II 32MB AGP	\$175
MATROX G400SH 16M/32M	\$139/\$189
MATROX G400DH 32M/MAX RETAIL	\$209/\$269
MATROX G450DH 16M/32M DDR	\$155/\$199
MATROX G400 MARVEL TV RETAIL	\$399
OXYGEN GVX1 32MB AGP RETAIL	\$709
OXYGEN VX1 32MB AGP RETAIL	\$269
VOODOO 3 2000/3000 16MB AGP	\$105/\$129
VOODOO 3 3500 16MB AGP w/TV BOX**	\$249
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LOGITECH QUICKCAM EXPRESS/WEB USB	\$59/\$129

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FUJITSU 4725/8725 PS2	\$59/\$119
LOGITECH CORDLESS FREEDOM KB&MOUSE	\$99
WIN98 STANDARD/INTERNET PS2 KB	\$9/\$17
MICROSOFT USB/PS2 INTELLIEYE EXPLORER	\$75
MICROSOFT USB/PS2 OPTICAL WHEEL MOUSE	\$42
LOGITECH USB&PS2 OPTICAL WHEEL MOUSE	\$42
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17"/19"/24" ATX CASE w/250W PS	\$45/\$55/\$65
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EPSON 670/C580	\$135/\$115
EPSON STYLUS 860	\$209
LEXMARK 212/Z52	\$99/\$279
LEXMARK Z32/Z42**	\$129/\$195
HP 840C/930C	\$229/\$289
HP P1100 PHOTO	\$539
HP 1100/2100 LASER	\$549/\$959
BROTHER HL-1030/1250DX	\$369/\$539
ACER 640U SCANNER	\$99
CANON 630U SCANNER	\$135
EPSON 610/1200U SCANNER	\$179/\$265
HP 3300C/3400C SCANNER	\$145/\$189
HP 5300C/6300C SCANNER	\$389/\$509
UMAX 2100U/4000U SCANNER	\$125/\$355

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Burnaby, BC V5C 2H5

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FUJITSU E6150	CEL-450/ 64MB/ 6.0GB/24xCD/14.1TFT/56K	\$2,499
TOSHIBA 2750DD	PIII-600/ 64MB/ 6.0GB/6xDVD/12.1TFT/56K	\$2,399
TOSHIBA 4330 SAT	CEL-650/ 64MB/10.0GB/6xDVD/14.1TFT/56K	\$3,029
TOSHIBA 8100 TEENA	PIII-500/ 64MB/12.0GB/6xDVD/14.1TFT/56K	\$3,669

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*Sold with system only
**Price reflect on after mail-in rebate

Merchant sites need more Flash, research firm claims

NEW YORK—Web merchants have access to technology that could make their sites more appealing and close more sales, but they are not taking advantage of it, according to a new study by Jupiter Communications (<http://www.jup.com>).

The research firm looked at 35 of the top sites in different e-commerce categories. Lydia Loizides, the primary analyst for the survey, said that, for a medium that is perceived as cutting edge, some are shockingly behind the times. The study found that less than 20 percent of retailers used such things as Java, Flash or chat functions in their Web sites.

"These online merchants need to realize that their core audience is diversifying. They are not disproportionately a new audience any more," said Loizides. "These people are not afraid to download. They are aware of Flash, Shockwave and Java applets. There is a great deal of Web-based technology that is underutilized—especially since our customer surveys show that people are willing to participate."

"What retailers need to do is become proactive and offer things like virtual dressing rooms, zoom-and-spin, Java, Flash or text-based chat to their cus-

tomers," Loizides added.

Examples of good sites abound, according to Loizides. She cited NineWest.com, a shoe retailer that made changes in order to lower its return rate. "NineWest found that many of the shoes that were coming back were because of visual issues, such as the customer thought the colour would be more fuchsia or the weave would be different. NineWest put in an MGI zoom server that allowed the users to evaluate what a shoe looks like right down to a granular level."

Loizides also complimented Furniture.com as a Web vendor with foresight that took steps to increase retention after customers bought their products. "Furniture.com's product returns were due to scale issues. When the couch or other piece of furniture arrived, the people decided that it was too big or too small and sent it back. The company developed a Flash application that allows the customer to build in the dimensions of the room they are trying to furnish. Then,



Jupiter Communications cites NineWest.com as one of the few online retailers to take advantage of new Web technologies.

they can drag and drop images of the furniture they are considering into the virtual room. The images show scale, which allows people to see how things will fit together, and it shows the outline of what a chair looks like against the wall," she said.

One of the simplest things to add to a

site that increases its value, according to Loizides, is text-based chat. "Land's End and Furniture.com let their online customers contact a customer service representative via a chat window. People can ask questions and let the customer service reps make suggestions. It adds a personal touch to product searching, and, more importantly, adds an offline touch to online shopping," she added.

Loizides said that text-based chat would help streamline the whole customer service operation.

Loizides did not want to name sites that were examples of poor use of technology, but said that out of the leading categories, such as apparel, automotive, computers and personal electronics, very few, other than some consumer electronics sites, had streaming audio or video.

"In some cases, the sites did not even have colour optimization," she said. "You would think that is basic, but it is not. Letting people see the correct colour is important for apparel and other things. It made us wonder if the executives were hesitant to include any technology for fear of angering customers who could not access it."

—Newsbytes

LAN Line

Continued from page 84

accurate. It can be used exclusively on your internal network or intranet, or it can be used to publish information and documents on the Internet. What distinguishes it from the many other ways of performing these tasks are its ease of use and the security features that are part of this product from the ground up. It also has modest hardware requirements, in part because it is based on the FreeBSD operating system.

This is an advanced version of UNIX that can be downloaded from the Internet, or obtained on CD-ROM for a nominal sum. For more information, visit <http://www.freebsd.org> and join the revolution. FreeBSD is an ideal OS for those rugged individuals who have lost respect for Linux now that it is mainstream and easier to use for newbies.

FreeBSD is popular with ISPs and others who need an ultra-stable platform that doesn't degrade under very heavy loads of hundreds or even thousands of users. BorderWare bases all of its products on hardened versions of the FreeBSD kernel. By stripping out all non-essential features from the OS, the vulnerability to attacks that can easily cripple a general purpose OS is greatly reduced. Numerous functions that can be performed on such an OS are not possible on BorderWare's hardened version of the FreeBSD kernel, which it calls S-CORE. Each S-CORE application process runs in its own isolated area without root (administrative) privileges. Should an application be attacked successfully, the attacker is trapped inside a secure area, without access to other parts of the system.

I installed an earlier version of Document Gateway a few months ago. The process was easy enough, but first I had to create two boot

floppies. Version 2.0 is able to boot into the installation procedure directly from the CD-ROM, although boot floppies are still supported. I was able to finish the installation on my 200 MHz Pentium Pro with 64 MB of RAM and a 4.3 GB SCSI disk in about 10 minutes.

If you are thinking about evaluating Document Gateway, you should be aware that it takes over the computer on which it is installed. Everything on the hard disk is removed, including partitions, as part of the installation. This is largely for security reasons. Document Gateway and S-CORE are in complete control of the computer.

I decided to limit my tests to my internal network, although making the server available on the Internet isn't much harder. At the end of the installation, I assigned an internal IP address of 192.168.1.145. To configure Document Gateway, and to populate it with data, I moved to another computer on the LAN, and typed that address in the Web browser. Then, I logged in with the default administrative account.

The first step was to change the password. Then, I created a domain. My version of Document Gateway supports up to two domains. Running two domains on a single server is the functional equivalent of running two distinct servers. Everything on one domain is completely distinct from the other domain.

After I created the domain, I designated the manager of the domain. That was me, but with a different name. I logged in as manager, and started to work. The appearance of the application is not much different from Windows Explorer. There's an admin area that consists of six icons: Profile, Subscriptions, Users, Groups, Domain, and System Files.

I chose Users, and began to add users. The main entries are user ID, password, email address, expiration date of account, and disk space quota. There are other important tasks to perform in the admin area, but I decided to leave those for later, and started to create folders and upload files.

The four commands in this area are Upload File, Create Subfolder, Subscribe to Folder, and Folder Permissions. Creating a folder is as easy as in Windows Explorer. Once that was done, I began to upload files. This must be done one at a time, since there are decisions to be made about each file.

Subscribe to Folder means that you are notified by email whenever a file is uploaded to that folder. It is the job of the manager to set permissions for each folder by users or by groups. The choices at the low end include no

rights at all and the ability to upload files to a folder, but not to list or view them. At the high end, users can be given rights comparable to the manager.

The true test of this kind of software is whether it can be managed safely and effectively by managers who are focused on the business, and not the technology. It appears that it can. There are many additional features and applications that I haven't been able to describe in this brief space. If you are at all interested, you should visit the BorderWare Web site at <http://www.borderware.com>. There you can find current prices, and much more information. If you are really interested, you can also apply for an evaluation copy of Document Gateway or any of the other servers. Evaluation copies are the real thing, but stop working after 45 days. □

Copyright takes a beating on Net

Continued from page 94

"Then copyright violation will be less likely to happen. But the problem is that changing business models is not easy. Big companies have a vested interest in maintaining how things are run. There is a lot of money tied up in how things are operating now."

And because of the money involved, companies are fighting for the preservation of copyright as never before. They are even extending it in ways that would seem to violate many other people's rights.

When the MPAA went after 2600.com, it not only wanted the site to stop posting the code that breaks DVD anti-copying restrictions, it wanted the site to stop posting links to sites that had the code as well. For many, the idea that a site could not post a link to another site strikes at the very heart of freedom of speech. When the MPAA asked for

this restriction, *The New York Times* filed a brief on behalf of 2600.com.

If companies are allowed to extend the idea of copyright to restrict online linking to sites that may contain material they don't like or have not approved, it could effectively shut down much of the Internet. The simple fear of being taken to court for copyright violation could cause many ISPs and hosting sites to simply refuse to carry Web sites with links. And it would play havoc with many sites that rely on links as part of their service. Would a newspaper or news site have to drop links to companies, sites and other information it mentions in an online article because it could violate copyright?

Considering the aggressiveness with which music and movie companies have gone after others to protect and enforce their copyrights, some say it is not an outrageous scenario. □

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WorldWide

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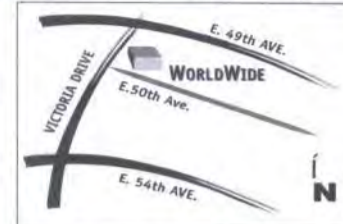
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RIVA TNT2 32MB AGP VideoCard
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Intel PIII 800EB (866EB+\$160)
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Microphone w/Stand

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Fujitsu 8725 Keyboard
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Microphone w/Stand

Bundle C: \$105
Rocklive-2000 Speaker/Subwoofer
Lite-on Internet Keyboard
Logitech 1st Mouse w/wheel & Pad
Microphone w/Stand

Bundle D: \$125
3D-105 405W Speaker w/Subwoofer
MS Internet Keyboard
M.S. Intelli-Mouse w/Wheel & Pad
Microphone w/Stand & Joystick

Bundle E: \$145
GNT 7000A Speaker w/Subwoofer
M.S. Natural Keyboard
M.S. Intelli-Mouse w/Wheel & Pad
Microphone W/Stand & Joystick

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(Extended warranty available)
Parts: Common Electronic items:
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replace; after next business day to 10th
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• Subject to Manufacturer
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BackDrive (more on web)

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Iomega / Panasonic Zip Drive Int. IDE \$99/\$69
Iomega Zip Drive Plus Ext / Int. 250MB \$call/\$143
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ATX 19" 787 Deluxe / 985B / ST4 \$50/\$55/\$52
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CD ROM (more on web)

Acer/Aopen 48x / 52x \$52/\$62
Aston 50x / 52x / Afrey 50x \$57/\$62/\$57
Creative 52x / Lite-on 48x / 52x \$60/\$56/\$59
LG 48x / 52x / SamSung 48x \$56/\$59/\$59
Panasonic 40x / 48x \$56/\$62

CDWriter (more on web)

HP8250i / 9110i / 9310i IDE \$245/\$329/\$349
HP8210E External \$web
LG 8X4X32X / 4X4X32 IDE \$267/\$237
Panasonic 8832 / Creative 8432 \$215/\$call
Sony 8x4x32 / Plextor 12x10x32 \$273/\$419
Yamaha 8832 Int IDE / SCSI \$269/\$388

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Panasonic 12x / 16x / Afrey 10x \$185/\$199/\$136
Pioneer 8x SCSI / 16x IDE Tray / Slot \$178/\$185/\$195
Samsung 12x / Creative Labs 10x \$175/\$call
Toshiba 12x / Hitachi / NEC 8x \$169/\$call/\$call

Controller Card (web: secondary price list)

Adaptec 1505 \$web
Adaptec 2940U / 2940UW \$web
Adaptec U2W \$web
Adaptec 2944 UW Differential \$web
Asus SC 200 / 875 \$web
Diamond Fire Port 40 \$web
Diamond Homeless Card \$web

CPU Processor (web P.2)

AMD K6 II 500 \$93
AMD Duron 600 / 650 / 700 \$96/\$122/\$155

AMD K7 550 / 750 / 800 \$135/\$228/\$265
AMD ThunderBird 700 / 750 / 800 \$205/\$235/\$265
AMD ThunderBird 850 / 900 \$365/\$420
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Intel PIII 500 / 550 \$web
Intel PIII 550 / 550 \$198/\$web
Intel PIII 600 / 650 / 700 \$260/\$web/\$295
Intel PIII 750 / 800 / 850 \$352/\$390/\$535
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Maxtor 30 / 40 / 60GB \$178/\$227/\$365
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Generic WIN 98 Keyboard \$10
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M.S. Natural Elite / MS USB Keyboard \$33/\$56
M.S. / Lite-On Internet Keyboard \$30/\$15
Turbo Media Enhanced Win98 Keyboard \$19

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AOpen/Acer 56k V90 SM / PM / PLM \$34/\$45/web
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Motorola 56k V90 V.F. \$23

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NEC 17" FE700 / E750 \$375/\$365
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TVM 15" / 17" \$175/\$245
Viewsonic E771 / EF70 \$323/\$290
LCD TFT Flat Monitor (many on web) \$web
Mag / Viewsonic / Optique / Panasonic \$web
Hitachi / Samsung / TVM / Sony \$web

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Abit SL6 / K7 / K7-RAID \$190/\$219/\$233
Abit ZM6 / VL6 / WX6 \$123/\$133/\$158
AOpen AX34 (Sock370) / AK33 (SockA) \$199/\$web
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Gigabyte 5AX / 5AA (AMD K6 II PC100) \$115/\$112
Gigabyte 6VX7-4X / 6VXE7+ (PC100) \$128/\$118
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Gigabyte 7VX / 72X Slot A / 6VXD7(Dual) \$183/\$175
Gigabyte 7VM / 72M Socket A (Duron) \$153/\$165
Gigabyte ZK7 / LA7 / ??? \$175/\$132/\$123
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Three routes to portable MP3

By Sean Carruthers

Though many devices can play MP3 files, the term MP3 player has come to mean the small playback devices that use onboard or removable memory modules to store music. That basic feature set will remain with us, but joining it are other mechanical designs. Here are summaries of three such designs.

RCA Lyra RD2206

From: RCA/Thomson Consumer Electronics

Tel: 800-522-0338. <http://www.lyrazone.com>

Suggested retail price: \$369.99

Key features

- CompactFlash-based. Comes with a 64 MB CF card, but no internal memory.
- Plays MP3, Windows Media, and RealAudio files for maximum flexibility.
- Four sample MP3 files from Universal Music are included on the CF card that ships with the Lyra.
- Design is a bit large. Where many other MP3 players aim for stealth, the Lyra is about the size of a cellular phone.
- Outer casing seems a bit flimsy.
- The CF card can easily be ejected while the player is running. There are no protective doors over the slot, or a lock on the eject tab. If the player is in a pocket, a jostle could theoretically damage the CF card!
- There is no "hold" selection to lock out the control buttons, which means settings may change unexpectedly if you have the player in a pocket instead of clipped to your belt.
- Larger-format headphones come with the Lyra—they're mostly a matter of personal taste, as some users still prefer in-ear models. We found the sound through the included headphones a bit muffled.
- Package comes with a couple of notable bonuses: a USB CompactFlash reader, for quick upload and download of songs, and a kit for using the Lyra with a car tape deck/cigarette lighter combination.
- Ships with MusicMatch and RealJukebox software for file encoding and management, as well as uploading to the player. However, software is not as intuitive as it could be for getting music uploaded to the CF card.
- Despite the fact that your computer gives you access to the CF card as if it was a regular drive when it is in the USB reader, you cannot just drop MP3 files onto the card—it must go through the software package.
- Powered by two standard AA batteries.

RCA's revised Lyra offers a few refinements and a few bonuses over the previous model. In this package, the bonuses prevail, including the car adapter kit and the USB CompactFlash reader.

That said, there are a number of major issues with this player that are problematic. It's utterly baffling why the package would include a USB CompactFlash reader that theoretically offers you direct access to the CF card from Windows, yet turn around and force you to upload all files through a program that encodes your MP3s in a non-standard format. Really, it's like giving you keys to a fast new car, and then forcing you to drive

from the passenger's seat.

It's perfectly OK if you start encoding your CDs using the included software as soon as you get the player, but for those who've already built up a collection, it's a total annoyance. Making this even more annoying, the setup of the MusicMatch Jukebox is overly confusing, forcing you to take songs from your existing library, move them to a playlist, then upload them to the player, instead of just giving you the option to move your MP3 files directly from the library to the CF card. RealJukebox is a little bit more intuitive, but it still forces a format conversion to .mpx, which means a bit extra time converting and uploading.

The design of the Lyra is also problematic. For a flash memory-based player, it really should be more compact to be competitive. Further, the exposed CF slot coupled with a lack of a lockout on the eject lever means you could easily eject your media even when you shouldn't be doing so (a jostle of the lever while it's in your pocket, for example). CF cards aren't cheap, and giving you an easy way to damage them is a definite liability. Even further, the lack of a button lockout/hold feature makes it almost necessary to clip the player to the outside of your person, because putting it inside a jacket pocket makes it almost inevitable that you'll hit one of the buttons inadvertently just by moving around and wind up changing tracks or turning the player off.

But there are some nice features to the player as well. The sound from the unit is very good (although we achieved best performance by using headphones from another player). Also, by using CompactFlash media instead of SmartMedia, it doubles the potential capacity of the player, provided you supply your own higher-capacity CF card. And the player's ability to handle MP3, RealAudio, and Windows streaming media right out of the box makes it one of the most flexible players currently available. Bottom line though, is that to take advantage of these pluses you have to be willing to put up with the aforementioned headaches.

Pine D'Music SM-200C

From: Samtack/Music Technology

Tel: 888-874-6372. <http://www.samtack.com>

Suggested retail price: \$299



Key features

- One of the first MP3 players that uses CD-based media instead of internal flash or removable flash, and the first we've had a chance to look at in the TCF Lab.
- The device can play either standard CD Audio, or CD-R media burned with nothing but MP3 files.
- Player ships with software for burning your own MP3 CDs, but you can use your regular CD-creation software if you prefer: just burn the disc as a plain data disc with all the MP3 files loose (no folders!) in the root directory on the CD.
- Player reads MP3 data tags, allowing you to identify the songs in the LCD window instead of forcing you to remember songs by track number alone, as with some other CD-based MP3 players (available in the U.S., at present). However, the data window is fairly small, and offers the track name but not the artist, depending on how your tags are encoded.
- Shuffle mode (hidden under "repeat" menu) is a nice feature... especially when you have a CD-R packed with over 200 songs.
- Can use two standard AA batteries, but the player comes with a rechargeable NiMH battery pack to save you some battery money. An AC adapter is included for home use and charging of the batteries.
- If your CD burner or CD media is not quite up to snuff, you may encounter short pauses during MP3 playback, as the player tries to reassemble the missing data. It's best to use high-quality blank CD media, and burn at the slowest speed, for extra assurance that your discs will provide the best playback.
- Because MP3s are a very compact data format, the CD doesn't have to spin at the same rate when playing back MP3 as when it plays back CD audio. Consequently, you achieve longer battery life when playing MP3s.
- Line-out jack allows you to plug the D'Music player into your home stereo using the included RCA jacks.
- Soft protective cover is included to prevent scuffing of the player when on the road. The only complaint here is that this item doesn't include a clip, strap, or belt-loop.

I have seen one potential future of MP3, and it is CD-based. First, you can fit 650 MB worth of MP3 files on each CD, which is at least 10 times the size of any SmartMedia

card, and maybe five times that of anything using Type I CompactFlash solutions. Even better, each blank recordable CD (CD-R) is \$3 or less, depending on the quality, which is a far cry from the hundreds of dollars for the highest-capacity flash media. (In other words, for the price of a single 128 MB CF card, you could get between 50 and 100 blank CD-Rs.)

Further, you can flip 200 new songs into the player as easily as pressing eject and putting in a new CD (elapsed time five seconds). And if you're out of MP3s, you can always pop in a regular audio CD.

The only major problem with this new format is that you're at the mercy of your PC's ability to burn CDs—if it burns them badly, then your playback will be touch and go. If your burns are top-notch, your playback will be indistinguishable from that of other MP3 players. You could also complain about the size of the unit, which takes the same form factor as a portable CD player, and can't be slipped into a shirt pocket like some of the flash-based models. For those who have carried portable CD devices around for a while, this may not be such an inconvenience... especially since you have higher capacity, and don't have to sit through a lengthy upload process every time you want to change your batch of music!

The D'Music version of this technology, though it's not the only product announced (at the very least, a version from RCA is expected), is certainly the first we've had a chance to look at, and it lives up to our expectations. With a properly burned CD, playback is excellent. There are a few quirks, like the small data window and the slightly hidden shuffle function, but these aren't enough of a problem to detract from the overall experience. With a price that's lower than flash-based models, this model is highly recommended.

Creative Nomad Jukebox

From: Creative Labs

Tel: 800-998-1000. <http://www.nomadworld.com>

Suggested retail price: \$750

Key features

- Uses a 6 GB hard drive for storage, which holds about 100 hours of music at 128Kbps encoding. Because of the mechanical nature of the disc, it tends to generate heat.
- Hard drive is shock resistant, as the heads are in physical contact with the disk at all times, which means shaking the drive won't cause damage, though a substantial fall could.
- Has a standard USB interface for reasonably fast transfers. However, it still takes about three hours to transfer 6 GB of music, and that's if you don't run into any hitches along the way, like a timeout or a duplicate song title.
- Creative's PlayCenter2 software is very powerful and

Continued on page 111

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LEXMARK Z52/Z32*/Z42*/Z12 \$286/\$116*/\$192*/\$88

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ZOLTRIX PCMCIA MODEM \$84
AOPEN 56K D/F/V PCI/ISA \$35/\$69

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SEAGATE 20G (SCSI) \$482
SEAGATE 20G TAPESTOR (IDE) \$485
ON-STEAM 30G IDE (INT) \$419
ON-STEAM 30G PAL (EXT) \$562
ON-STEAM 30G SCSI (INT) \$697
ON-STEAM 30G SCSI (EXT) \$849
ON-STEAM 50G SCSI (INT) \$972
ON-STEAM 50G SCSI (EXT) \$1,427

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CREATIVELAB 52X \$59
KENWOOD TRUE 72X CDROM \$169
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PANASONIC 48X \$65
TOSHIBA 48X \$89

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FJ 20G(72K)/13G(72K) \$227/\$211
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QT LM15G/20G/30G \$145/\$177/\$230
MAX 10.2G/15.3G/20.4G/81.9G \$121/\$128/\$149/\$486
MAX 30G(2M)/40G(2M)/61G(2M) \$176/\$236/\$377
MAX U100 7K 15G/20G/30G/40G \$146/\$168/\$221/\$302
IBM 72K 75G/60G/30G/20G/45G \$796/\$607/\$235/\$203/\$321
WD 2M 15G/10.2G/15G/20G/30G \$169/\$119/\$122/\$155/\$197

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VIEWSONIC PF775/PF790/PF795 \$471/\$666/\$788
NEC AS50/AS70/AS90/A700+ \$214/\$289/\$468/\$362
NEC FE700/FE950/P1250 \$374/\$626/\$1247
SONY E100/E200/E400/E500 \$296/\$501/\$707/\$1345
SONY G200/G400/G500 \$571/\$798/\$1458
LG 775C/775N/775FT \$372/\$288/\$375
MITSUBISHI DS50/DS70/DS73 \$260/\$360/\$406
SAMSUNG 750S/700NF*/700IFT* \$266/\$383*/\$362*
SAMSUNG 900NF*/900SL/955DF* \$600*/\$539/\$510*

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SB LIVE MP3/PLANTUM \$133/\$259

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INTEL CELERON 533/566/600/677 CALL I
AMD THUNDERBIRD 700/850/950/1G CALL I
AMD DURON 600/650/700 CALL I
64M/128M/256M SDRAM CALL I
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ASUS V6800 32M DDR PURE/DELUXE \$274/\$291
ASUS V7700 32M/64M GEFORCE II \$395/\$529
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ZIP 250M INTERNAL \$138

Notebooks

IBM ThinkPad Notebooks

Model	CPU	RAM	HDD	CD	Video Card	Display	OS	Price
1420i	C433	64M	4.3G	24X	4M	13.3"HPA	WIN98	\$1799
1421i	C466	32M	6.0G	24X	4M	13.3"HPA	WIN98	\$1764
1422i	C500	32M	6.0G	24X	4M	13.3"HPA	WIN98	\$1814
1460i	C433	64M	4.8G	DVD	8M	14.1" TFT	WIN98	\$2730
1482i	C500	64M	12G	DVD	8M	14.1" TFT	WIN98	\$3129
1492i	C500	64M	12G	DVD	8M	14.1" TFT	WIN98	\$4239

notebooks are equipped with 56k internal modem and USB port

ACER Notebooks

Model	CPU	RAM	HDD	CD	Modem	Display	OS	Price
732TLV	PIII500	128M	12G	6X DVD 5	6K+LAN	15" TFT	WIN98	\$3801
732TXV	PIII500	64M	9G	6X DVD	56K+LAN	14.1" TFT	WIN98	\$3402
734TL	PIII600	64M	12G	24X	56K+LAN	15" TFT	WIN98	\$4020
734TXV	PIII600	64M	9G	6X DVD	56K+LAN	14.1" TFT	WIN98	\$3549
735TLV	PIII650	128M	12G	6X DVD	56K+LAN	15" TFT	WIN98	\$4093
737TLV	PIII700	128M	18G	6X DVD	56K+LAN	15" TFT	WIN98	\$4385
738TLV	PIII750	128M	18G	6X DVD	56K+LAN	15" TFT	WIN98	\$5414
507DX	C466	32M	4.8G	24X	56K	12.1" HPA	WIN98	\$1669
508T	C500	64M	4.8G	24X	56K	12.1" TFT	WIN98	\$1964
521TE	PIII600	64M	6G	24X	56K	13.3" TFT	WIN98	\$2725
514TXV	C466	64M	6G	6X DVD	56K	14.1" TFT	WIN98	\$2725
521TXV	PIII600	64M	6G	6X DVD	56K	14.1" TFT	WIN98	\$3254
524TXV	PIII650	64M	12G	6X DVD	56K+LAN	14.1" TFT	WIN98	\$3705
600TER	PIII600	64M	12G	CDRW	56K+LAN	13.3" TFT	WIN98	\$3365
602TER	PIII650	128M	12G	CDRW	56K+LAN	13.3" TFT	WIN98	\$3655
603TER	PIII700	128M	12G	CDRW	56K+LAN	13.3" TFT	WIN98	\$4393

Fujitsu Notebooks

Model	CPU	RAM	HDD	CD	Display	OS	Price
B2131	C400	64M	6.4G	N/A	10.4" TFT	WIN98	\$3042
B6530A	PIII500	64M	9G	24X	14.1" TFT	WIN98	\$3649
E6150	C450	64M	6G	24X	14.1" TFT	WIN98	\$2537
E6520	PIII450	64M	6G	24X	14.1" TFT	WIN98	\$3193
E6550	PIII600	128M	12G	6X DVD	14.1" TFT	WIN98	\$4865
S4510	PIII400	64M	6.4G	24X	12.1" TFT	WIN98	\$3497

ASUS Notebooks

Model	CPU	RAM	HDD	CD	Modem	Display	OS
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Online & Connected

Internet Trends • Wired and Wireless • Online Services • Work & Play on the Web

Dialup is dead, long live broadband

Choosing between dialup and high-speed Net access is a no-brainer. But in the perennial debate between cable and high-speed phone lines, the choice is not as clearcut.

By Rod Lamirand

Broadband. Even the name is big and round like the pipes that bring the world to your computer. Broadband promises not just speed, but freedom. High-speed Internet access imbues the Web wanderer with a cavalier nonchalance compared to the cautious clicks of the dialup user. The former moves hither and yon; files, audio, video, multimedia plug-ins, absorbed, seen, used. The latter plods with apprehension, rightly fearful of the wrong click—the long wait. Yes, my friends there's gold in them there wires, sure as I'm telling you. But it's gonna cost. Yep, and you will pay.

The future is broadband

Almost three quarters of a million Canadians have decided that a fast Internet connection is worth \$500 per year, and the numbers are growing. Rogers says it has more than 266,000 high-speed cable users nationally, Shaw's financial statements indicate about the same. The telephone companies, with their digital subscriber line (DSL) "high-speed" offers show smaller numbers, but they too are growing rapidly.

As can be seen by recent television ads, the telephone companies have put their houses in

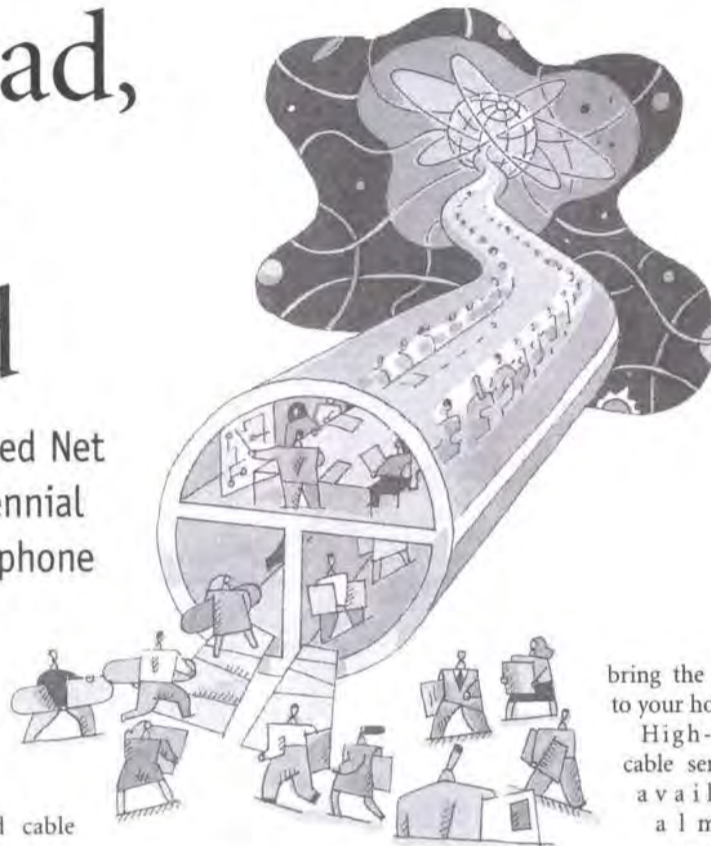
order and are now out to grab high-speed market share from the established cable operators.

Overall broadband, whether through cable or phone wire, is a hit. Everyone wants it and, even more importantly, they are willing to pay. If you do anything more than check email, you are a potential customer. This broadband primer answers your questions about broadband basics, broadband and home networking, cable versus DSL service, and offers links for further investigation.

Who, what, where?

In Canada there are primarily two ways to get broadband Internet access into your home: the cable company and the phone company. If you are not able to get these, there is also high-speed Internet access via satellite.

Cable companies use their cable television infrastructure (with considerable enhancements) to bring their service to your house via round coaxial cables. Telephone companies use various forms of DSL that run over their existing copper wire infrastructure (again with considerable enhancements) to



bring the service to your home.

High-speed cable service is available almost everywhere cable is offered—

which means practically everywhere. DSL service, in various forms, is much more limited not only to urban areas but to certain locales within urban areas depending on your precise location. This means only a small percentage of Canadians are currently able to get DSL.

How?

Your cable company will run a regular coaxial cable from the box on the side of your home to a cable modem that sits beside your computer. From the cable modem a standard Ethernet wire (10Base-T) runs to an Ethernet card (called a network interface card, or NIC).

Similarly, the telephone company will do some work to their box on the side of your house, then use your existing telephone jacks to run a wire to a DSL modem. That is unless your line isn't up to snuff, in which case they

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Peeking into online privacy

People used to feel secure in their relative anonymity online, but Web snoopers are changing that as they begin to learn more and more about us

By Tom Venetis

Remember the old *New Yorker* cartoon of the dog surfing on the Internet and turning to his dog buddy to say that on the Net, no one knows you are a dog?

It was a sentiment a lot of people indulged in when they went online. They came to believe their "real world" identities were disconnected from their online habits and personae. That certainly was the case when the Internet was largely an enthusiast's medium, unmonitored and unregulated by anyone. But once it became a place to make money, anonymity and privacy became a growing concern.

What began concerning people was that companies looking to do business over the Internet were beginning to use various means to track and profile users online. More worrisome, however, was the belief that companies were routinely monitoring people's surfing and viewing habits and deliberately not telling them about those actions.

The most publicized example of this was the DoubleClick controversy. In mid-February, the Michigan Attorney General, Jennifer Granholm, accused the company of

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Dialup is dead, long live broadband

Continued from page 100

might run a new line from the box. From their modem everything is the same with a wire going into a NIC in your computer.

That's the simple version. The truth is that neither modems are really modems but rather special routers that transform the cable of telephone signal to data your Ethernet card can understand. Optionally, if you have a network, you might run the modem into a separate box called an Internet sharing device, which then connects to a network hub. This gives all the computers on the network high speed Internet access. (See the LAN Line column in the September and October issues of *TCP* for more on Internet sharing devices for small networks.)

How fast?

How fast is a tough question to answer. First, like road traffic, a posted speed does not mean you will travel that fast. There are traffic jams and sometimes your car is not the most powerful. Second, testing your high-speed service is quite difficult, partly because at any given time there may be various bottlenecks and partly because nobody makes it easy. Even getting the numbers straight can be a real chore.

These difficulties aside, broadband is way faster than dialup service! At the very minimum broadband is four, five, or six times faster than any dialup speed you could get. More often it is 10 or 20 times faster. Sometimes even faster than that. The numbers are somewhat fuzzy in that they refer to theoretical download speeds that fluctuate drastically. The experience, however, is anything but nebulous. Most of the time, a fast connection is drop dead obvious.

The big test

For this review, my local cable operator, Rogers, and local telephone company, Telus (formerly BCTel), installed their broadband services concurrently to my test computer (a 450 MHz Pentium III-based system with 128 MB of RAM). For two months I was able to use either service simply by unplugging one cable, plugging in the other, and rebooting. During this time I tested the new services by keeping track of my experiences as a user, and by visiting bandwidth testing sites (listed below). I used both Internet Explorer and Netscape Navigator and ran Windows 98, Windows 2000, and Windows Millennium Edition. Tests were done on different days at different times as well as back to back to compare cable and DSL.

The experience

A few years back when people started talking about a convergence between the PC and the Internet, I was slow to be convinced. The conceptual shift this demanded was too much. At that time, running an application that was Web based was unheard of, and impractical with a dialup service. The idea that I would access the world as easily as I would my hard drive just seemed wrong.

Now, an epiphany—the prognosticators were right. It doesn't matter where data or applications live. Broadband retrains you. Suddenly, installing a plug-in or jetting out to pick up the latest driver is like scratching your back—an unconscious act. Data lives everywhere and is but a moment away. And PC/TV convergence?

Of course, streaming video should be on every page. Background music or other forms of push? Yes, why not? Broadband liberates; dialup is dead. That's the feeling of broad-

band.

Initially, I proposed this article as a way to find out which service to use. I assumed that there would be one clear choice. There certainly are differences between the two services, but deciding between them isn't so easy. I will tell you the decision I made in a moment, but first the factors.

The cable connection

Cable is ubiquitous and generally costs about \$40 a month. There is usually a \$100 setup fee that is sometimes waived or reduced. This is the same for DSL installations as well. With cable, you share a circuit with your neigh-

bours. This has speed and security ramifications. Some circuits have upwards of 3,000 users.

This design means you will get higher speeds if there are fewer users in your neighbourhood. Shaw has stated that it intends to add circuits so that there will be a maximum of 1,000 users per circuit, or node. Cable speed is not precisely stated on any Web pages I could find. Generally, they say, up to 100 times faster than dialup. This seems unlikely. Dialup service rated at 56 kbps (kilobits per second) generally runs at about 44Kbps, so 100 times 44Kbps would be 4.4 Mbps (megabits per second). Those number seem

< ONLINE & CONNECTED >

high to this reviewer. More likely broadband cable will deliver 1.5 to 3 Mbps.

In my tests I never obtained this speed, topping out at 1 Mbps. Friends and fellow journalists using the broadband testing sites listed at the bottom of this article said they achieved speeds of just over 2.5 Mbps. Still 2,500 Kbps is amazing. Even my experience at 1,000Kbps was light years beyond a dialup service.

DSL

DSL is called ADSL when it has different upstream and downstream speeds (the A

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Dialup is dead, long live broadband

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refers to asymmetric). All entry-level DSL is ADSL. The \$40 a month ADSL service I tested offered speeds of 1.5 Mbps downstream (the Net to you) and 256Kbps upstream (you to the Net). DSL, in its various flavours, uses a dedicated line for each subscriber (your phone line) and thus users do not share a circuit directly in the same way cable subscribers do.

DSL equipment does have finite ports, and thus you may be in the right place and still not be able to get the service. DSL architecture means you won't suffer degradation in speed caused by after-dinner Net traffic generated by your neighbours. Of course, as soon as that traffic hits that Net in general, which it does like clockwork, time zone by time zone, every day, those same people will still be online. It is sort of like a traffic bottleneck in your neighbourhood—you can avoid it, but there is still the less intensive, general traffic jam everywhere else.

The downside to the DSL design is that your speed will be compromised as you get further from the DSL node. Your maximum distance is approximately 4 km, but speed will be greater at 1 km than it will be at 2 km.

A second limitation is maximum speed. My local DSL provider has three levels of service. The slowest and cheapest service, \$40 a month, advertises a 1.5 Mbps downstream speed. The best I ever achieved was 1.3 Mbps, but usually averaged under 1 Mbps. Theoretically, ADSL can provide up to around 9 Mbps, but no consumer service in Canada is available at the top speed.

Security

Unlike dialup connections, both cable and DSL can be thought of as always connected. That means when you open your Web browser or email program and click, you are connected—no dialup to the service provider required. (The exception here is that some DSL services, Bell Sympatico HSE in Ontario and Quebec for example, use a dialup-like applet called Access Manager, which you first need to execute before you gain access to the service.)

Being always connected also means you have a higher security risk. Generally, Web sites, user groups and people I have spoken to consider cable service less secure than DSL service. I am not sure if this is completely true. I do know that a quick search of the Web yields many horror stories of broadband cable users who have had their computers ransacked.

But then again, there are a lot more high-speed cable customers. Heck, even one of the guys who installed the cable service had had his hard drive erased, twice!

I won't say which guy—I wouldn't want to get him in trouble—but one of the other installers looked knowingly when he saw I had installed a software-based firewall. Some people claim cable's use of a static IP address makes attacks more likely. On the other hand, the technician said their cable broadband can be dynamic just like DSL, although my IP address hasn't changed. DSL literature reminds customers about the importance of protection, but so does cable information.

Any way you look at it, there is no doubt you are more vulnerable to various types of attacks when using broadband. For my part, I downloaded and installed the excellent free-ware ZoneAlarm, from zonelabs.com and

have yet to have any alerts, never mind attacks. Both Symantec and McAfee also offer commercial software for this purpose.

Conclusion

Broadband is the answer. Competition between existing and new broadband providers will only bring prices down but even without it, I would still pay. One thing that seems obvious is that paying-for-speed will increasingly be the revenue model for broadband. Today your broadband decision is not really a big deal.

If you are one of the few Canadians with access to both technologies, check out DSL and see if they have a U-install option. Where I live, you can pickup a home install kit for about \$200, which allows you to sign up for the discounted rate of \$34.95. The \$5 a month saving is because you are not renting

the modem.

There are limitations to this approach (like a maximum of four outlets in your home) and you have to be able to install a NIC, as well as software and some wires. But if you are going to have the service for four years or more it makes sense.

If, on the other hand, you decide to go with cable service you are likely getting a bit more speed; and, both Shaw and Rogers have been talking about ways to increase customer satisfaction over issues of reliability. Ultimately, at this point, it doesn't matter much.

I have decided to go with DSL because I can keep the same email address I have had for five years with my dialup account. Otherwise, it would really be a toss up. Whichever way you go, you'll never go back. I'm starting to think of the Web before broadband the way I remember TV before

Broadband and networks

If you have a standard Ethernet network at home, you can plug your broadband modem into your hub and surf from two machines, but there's a catch. From the DSL provider in my neighbourhood it is as simple as directing your second computer to the customer service page, entering your user name and password and clicking on a button. Thereafter, you will have two machines using two separate IP addresses. There is no measurable speed loss.

At my broadband cable provider it is also easy, but costs an additional \$10 per month. Find further home networking information at the Web pages of 3Com, D-link, Linksys, and Cicero. (Also consult the September and October LAN Line columns, which discuss the use of Internet

sharing devices that sit between the cable or DSL modem and your network hub.)

Proxy software

Another option is to use proxy software on the primary machine, tricking the second machine and the service provider into thinking the connection is a regular one. The danger here is that this might be breaking your service agreement. Please consult your service provider before installing freely downloadable proxy software. Also, proxy software can sometimes interfere with IP functions, in particular, multi-player games. Still, this might be your only option if you run a HomePNA or wireless network.

—Rod Lamirand



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Peeking into online privacy

Continued from page 100

violating state consumer protection laws by planting "cookies" on Internet users' hard drives without their knowledge or consent. These cookies, along with IP address information, could be used to monitor a person's online behaviour (albeit without revealing the surfer's personal identity), thereby creating a detailed database of online habits.

What made DoubleClick's actions more frightening for many was that DoubleClick was also merging its online database with data from its Abacus Online division, a direct marketing company it previously acquired. The fear was that previous anonymous cookie information could be matched with personal information such as actual street addresses.

This spooked a lot of people who feared that not only were they being spied on, but that the information gathered could be used in ways they did not approve of.

In a recent study of the public's attitude towards online privacy, by the PEW Internet & American Life Project, found that many American Internet users expressed concern with the way personal data may be collected and used. The study found that some 86 percent of the respondents were concerned about businesses or people getting at personal information, and 54 percent said they were very concerned about privacy online.

Now, before anyone goes and unplugs their Internet connection, some are suggesting a bit of caution be exercised when talking about privacy on the Internet.

"There is a threat and it certainly a growing threat," says Tissa Godavitarne, founder of PrivacyScan Inc. in Washington, D.C. (<http://www.privacyscan.com>). "But I will be the first to admit that there is a considerable amount of hype surrounding the threat. It is very easy for consumers, especially those who have their finger on the pulse of the Internet and on privacy concerns, to walk away with a feeling that everywhere they go and every site they see, they are being tracked and people know what they are doing."

Godavitarne says the collection of private information and the creation of customer profiles databases are actually no different than what has been going on in the off-line world for years. Before starting PrivacyScan, Godavitarne worked as a licensed professional investigator. As part of his job, he would search through public records and databases for his clients. In the U.S. alone, there are nearly 2,000 publicly accessible databases containing a wealth of personal information about private citizens. These include local, state and federal databases right up to credit-rating services.

All the information that eventually makes its way into these databases is supplied by, ironically enough, the individuals themselves. Each time a person registers the purchase of a new home, a new vehicle, applies for a credit card, along with hundreds of other times people are asked to supply some tidbit of personal information, the information eventually makes its way into some publicly accessible database.

"What the Internet has done is provide a more effective means for disseminating and collecting the information that is already out there," Godavitarne says.

What PrivacyScan does is allow someone to do a search on these databases to see what information has already been gathered about them. All a person needs to do is supply their name and address, and with that,

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Peeking into online privacy*Continued from page 105*

PrivacyScan begins to look to see what is out there. If PrivacyScan finds anything, it produces a report for the person outlining what personal information and profiles exist.

But the Internet does more than simply allow online companies to gather information about someone in a fashion similar to the information that can be found in off-line databases.

Lance Cottrell, president of the San Diego, Calif.-based Anonymizer.com, says how online sites gather information is similar to pinning a camera on someone's jacket to track everything they do and see.

"The character of the [information gathered] is very different," Cottrell adds. "If I go into Barnes and Noble and purchase a book, one of the options I have is to pay with cash. Then you know nothing about me. If I pay with a credit card, you know what book I bought, but not the 50 other books I looked at or how long I spent with each one. So in order of magnitude, the amount of information gathered using the Internet is much larger and more detailed."

Like the information is gathered by off-line databases, the information collected online can, in many cases, also be accessed by anyone who wants it.

And it's not just marketing and sales companies looking for information about potential customers. Cottrell says it is now quite common for employers to go online looking to see what employees may be doing or saying about them. So if an employee posts an online resume or vents their spleen about the boss at ihatemyboss.com (not a real site, by the way), it could very well come back to haunt them.

"What no one knows is that everything you say on something like chat lists and discussion groups are permanently archived and accessible," Cottrell adds.

Surfers anonymous

These kinds of threats to personal privacy and easy access to personal information have given rise to a growing industry that helps people mask their online surfing and identities.

How online sites gather information is similar to pinning a camera on someone's jacket to track everything they do and see.

Anonymizer.com (<http://www.anonymizer.com>) was started in 1997 with the express purpose of giving people tools that protect their privacy online. It works by using proxy servers to act as an intermediary between a person and the sites they visit. A person goes to the Anonymizer.com site, and from there, type in the URL of a site they are interested in visiting. Each page they visit is rewritten so that any information that can be used to track and identify them is removed. These can include Java, JavaScript and Web bugs. Anonymizer.com also protects against cookies, the most common way Web sites and Internet tracking companies use to identify and trace people's Internet viewing habits. Anonymizer.com offers what it calls a "safe cookie."

"We encapsulate the cookie the Web site

gives you into one of our own cookies and encrypt it," Cottrell adds. "So if anyone tried to intercept [the cookie] or comb your hard drive, they would not be able to see what that cookie contains. The second thing we do is adjust the lifetime of the cookie so it cannot be used by someone to track you between sessions."

Privada Inc. (<http://www.privada.com/>) also started in 1997 to protect the privacy of Internet users. For one of the founders, protecting private information was something she came to know firsthand.

"My own personal situation causes me to be very interested in privacy," says Barbara Bellissimo, co-founder and vice-president of marketing for Privada in San Jose, Calif. "A while back my daughter was admitted to the hospital with a heart condition. She went into the hospital at 10 in the evening and by eight the next morning I was getting calls from organizations that had gotten my phone number from my health insurance provider. So that caused me to be concerned about what was happening with my personal information that I thought I was giving in confidence to that particular company and to be wary with how my information was used by other companies."

Privada uses a two-part solution to protect identities online. The first is the Privada Network, which is installed at an ISP and is used to mask a person's IP address. The Network also decrypts the Internet requests a user sends to the ISP from their PC, which is equipped with PrivadaControl. PrivadaControl takes a request for a Web site that a person wants to visit and breaks it down into pieces that are then encrypted. The pieces are decrypted at the ISP and only by the servers that need that particular piece of

information. A server cannot decrypt any piece that is intended for another server.

Privada also secures email by removing any identifying information from the email message that could be used to identify the person and their IP address.

Protecting people's email from those trying to scour private and confidential information is the goal of Vancouver's PrivacyX.com Solutions Inc. (<https://www.privacyx.com/>).

David Renardson, chief privacy officer for PrivacyX.com says the company was started a little over a year ago because of what he argues is the poor record of online companies in protecting people's privacy and personal information.

"Industry self-regulation in the eyes of many people is failing," Renardson quips.

In a study presented by the San Diego, Calif.-based Anonymous Corp. (<http://www.anonymous.com/>), before attendees of the Computers, Freedom and Privacy 2000 conference in Toronto, the company said it found only 23 percent of the nearly 30,000 online sites it studied had some kind of privacy policy.

What PrivacyX.com currently offers users is an anonymous email service that takes protecting a person's privacy an extra step: PrivacyX.com does not collect any personal information about the people using its email service, thereby making it even more difficult for anybody to track or steal personal information.

"We avoid the problems associated with collecting and handling personal information by striving not to handle personal information in the first place," Renardson says. "We set up the account anonymously and issue you a digital certificate so you can access your

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The new law in e-town

The days of courtrooms with robed judges, verbose lawyers, lengthy delays, and high costs may be headed the way of the Wild West shootout approach to justice—extinction

By Curtis Cook

People are taking yet another element of their lives onto the Internet: the search for justice. From arbitration of domain name conflicts to general dispute resolution or "mock trials," the Web is offering businesses with legal battles an alternative to high-priced courtroom dramas.

EResolution.ca, a Montreal-based virtual tribunal service, headed online at the beginning of the year to arbitrate Internet domain name disputes, or what has become known as "cybersquatting"—which happens when companies or individuals use domain names that fall under the trademark of another company.

Says Robert Cassius de Linval, co-founder and vice-president of legal affairs at

eResolution.ca, "cybersquatting is becoming a really significant problem. Disputes over generic domain names under ICANN [Internet Corporation for Assigned Names and Numbers] management [including addresses ending in .com, .net, and .org] could escalate into the tens of thousands."

According to Cassius de Linval, this type of problem could even extend into country domains. "In the near future we can expect disputes over national identity domains [.ca, .fr, .uk, etc]." Overall, he says, "we can expect to be handling a large number of complaints in the near future."

For US\$750, eResolution.ca will settle a basic domain name dispute in under 60 days. Its services extend beyond Canada through a partnership with Amherst, Mass.-based

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Peeking into online privacy

Continued from page 106

mailbox. That mailbox gives you encryption and digital signature features, but there is no personal information in that certificate or in the mailbox so there is no way to track back the real identity of the owner. We also remove all the information in the mail headers that could identify the users, like IP addresses and browser type. And we do not log IP addresses so we don't have information on where mail has come from."

Renardson says PrivacyX.com is particularly popular with people who are involved in support groups and human rights organization where protecting a person's identity is very important.

Still, what Renardson would like to see is privacy and identity controls built directly into today's operating systems or offered as a service from ISPs.

He would also like to see the solutions made simpler as he suspects that while people are reporting greater concern for their online privacy they are put off by the complexity of some solutions.

But until that happens, people will have to take protecting their online privacy and personal information into their own hands.

"Just like brushing your teeth everyday, you need to practice good information protection hygiene, like not entering personal information into every form that asks for it," says Anonymizer.com's Cottrell. □

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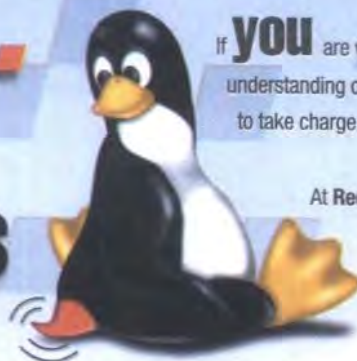
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The new law in e-town

Continued from page 107

Disputes.org. The companies have created a consortium of international experts on intellectual property and the Internet, predominantly from law faculties around the world. Says Ethan Katsh, a founding director of Disputes.org and professor of legal studies at the University of Massachusetts, "Our list of panelists is remarkable both for the depth of its expertise and its geographical scope." Currently, the consortium boasts 40 arbitrators from North and South America, Europe, and Asia.

ICANN is the organization tasked with

managing the technical coordination of the domain name system. The Disputes.org/eResolution.ca consortium was accredited to handle disputes of domain names on Jan. 1, 2000.

Dispute forms are filled out online, submitted electronically via the company's Web-based Complaint Form or by email, and the e-law case begins.

eResolution.ca also offers other types of general mediation through its Internet base. The company handles mediation and arbitration between businesses (B2B) or between businesses and consumers (B2C) online. Josee-Michelle Simard, spokesman for

eResolution.ca, says the company has been very successful in handling online disputes and building an international client base because it "rules according to ICANN and international arbitration rules." Simard adds that the company "has [also] been invited by the government of Peru to be the reference company for online legal matters."

Another Canadian company, NovaForum.com, has also taken to the Internet to provide alternative dispute resolution (ADR) faster and more efficiently than it is delivered through traditional forums. According to company officials, as more and more people work, play, and transact online,

the market is demanding dispute resolution services online. NovaForum.com says it is the first Canadian firm to offer general dispute resolution services online to Internet businesses.

Guaranteed to be resolved in 72 hours or less, and averaging about \$2,500 for both parties involved in the dispute, the NovaForum.com approach is significantly faster than traditional dispute resolution cases, which typically take 600 days to settle and on average, cost each party involved \$25,345 (according to NovaForum.com's records).

Says Teri Kirk, chief executive officer of NovaForum Inc. the online approach "is much cheaper, faster, and very applicable to the needs of the global e-business community."

Subscriptions for NovaForum.com's services start at \$12,500 and packages vary according to the number of cases a company will be filing in a year.

Mediation and arbitration are not the only legal services to take to the Net. ICourthouse provides an online version of standard courtroom procedures adapted to suit the Internet. While it has no real legal authority, the court has been "trying" cases at an alarming rate. The site gets tens of thousands of visitors per day for the more than 200 cases that it has already tried. And more cases are being added every day.

Among the cases: a biker whose Harley-Davidson tattoo has been misspelled; neighbours fighting over a property line, spurred by where a five-year-old girl buried a dead guinea pig; a claim for \$50,000 for the emotional damage incurred by a car being parked in a shared driveway, making it difficult for the plaintiff to enter his or her home (the money is supposed to be for stress that is making a heart condition worse); and other worldly affairs.

People file their complaints online, then Web surfers sign up as jurors for the case. There are no restrictions as to who can sign up, so people can enlist colleagues, friends, or family to stack the case in their favour. Not exactly courtroom-style law, but iCourthouse currently has no binding legal authority either.

The site was started in November 1999 by Clyde and Claudia Long, partners in marriage, law, and business. The wanted to put their combined 40 years of litigation and mediation expertise to work on a grander scale. Clyde Long says that "courts simply aren't able to handle many interpersonal disputes [whereas that is the real value of iCourthouse]."

Long says iCourthouse is adding a subscription element that will be especially suitable for businesses. "It will enable you to configure iCourthouse any way you want."

So companies, attorneys, or individuals will be able to select the demographic information they want for jurors, ask preselecting questions, or configure iCourthouse to suit the style of the traditional legal system. These "mock trials" would serve the same role as focus groups, which Long says usually cost businesses many thousands of dollars, much more expensive than iCourthouse's subscription service.

Will businesses looking for justice really find it on the Internet? At such an early stage in the game it is hard to say. E-law is truly in its infancy, with most of the players less than a year old. The verdict? We'll have to wait to find out. □

Curtis Cook (ccook@go-global.net) is a regular contributor to The Computer Paper.

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Canadian TV channels online

By Keith Schengili-Roberts

With summer over, we are in the midst of the new television season. Until only a year or so ago, Canadian television stations were poorly represented on the Web. But times have changed, as the following 10 sites—only a smattering of what's available now—demonstrate.

1. CBC.ca • It's impossible to do a list of Canadian TV Web sites without mentioning Canada's national public broadcaster. While not devoted exclusively to television—the site includes plenty about CBC radio too—you can find video clips from the daily news, and information about upcoming shows. The site as a whole has a patchwork quality, as evidenced by the different styles of such sections as the CBC Museum, online store, news and sports, and so on, but there's a lot there for those who want to delve into it.

<http://www.cbc.ca>

2. CTV Home Page • This is a comprehensive site for all things CTV, including information about upcoming shows, and the latest from

CTV news and sports. Learn more about your favourite CTV shows, get the latest schedule, and enter online contests.
<http://www.ctv.ca>

3. Discovery Channel's exn.ca • The Discovery Channel was one of the first Canadian cable channels to establish a Web site, and it makes the most of its online presence. Look to the site for the latest science news, show highlights, and schedule information. Fans of the channel's flagship show Discovery.ca will find extended features that provide more depth on the topics covered.

<http://www.exn.ca>

4. GlobalTV.com • This is the site of Canada's third national broadcaster. A relative newcomer to the Web, it is slowly building a unique online presence. The site includes news and weather sections, a "water cooler" where you can discuss issues and events online, regional broadcast information, plus links to handy resources like online Yellow Pages and Workopolis, a Canadian job site.

<http://www.globaltv.com>

5. CityTV.com • While not actually a national broadcaster, in some ways CityTV might as



well be, as it is the anchor station for the CHUM Ltd., which owns MuchMusic, Bravo!, MuchMoreMusic, Space, Star!, Pulse24 and The New VR television stations/channels. In addition to links to the sites for each of these, you will also find plenty of information about CityTV's unique shows like Fashion Television, Electric Circus, Movie Television, along with daily schedule and local (Toronto) news.

<http://www.citytv.com>

6. MuchMusic • Canada's first music video channel was another station that made early use of the Web as a way to reach out and interact with viewers. That development shows with the number of options and material on this site. Learn about the station's personalities, make a video request, listen to debut tracks from upcoming album releases, and plenty more.

<http://www.muchmusic.com>

7. History Television • Like the name of the channel suggests, this Web site and televi-

sion channel is devoted to history, often with a Canadian slant. In addition to a schedule and program information, there is also a "history of the day" section, along with the TimeChase online quiz game and teacher's resources.

<http://www.historytelevision.ca>

8. TV Ontario • The TVO site includes information about the English and French broadcast channels for this provincial public broadcaster. If you dig into it, you'll find lots of fun stuff and activities for kids, and information about educational programming.

<http://www.tvontario.org>

9. YTV—Keep it Weird • YTV was another cable station that recognized early on the possibilities of the Web to enhance interaction with its youth-focused audience. There's plenty to look at, click at and play with on this site. Write a caption for a cartoon, try out the Contest-o-rama machine to win prizes from sponsors, or simply feast your eyes on the lurid—but fun—graphics.

<http://www.ytv.com>

10. Food Network's FoodTV.com • If you're looking to spice up your TV watching with some fabulous food, check out the recipes being served up on the Food Network's site. Where other TV sites might have a schedule search function front and centre, FoodTV.com instead gives you its Recipe Search. It brings a whole new meaning to the idea of TV dinners. A good place for all things gustatory.

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Three routes to portable MP3

Continued from page 98

- has a few nasty kinks: although it gives you control over both left and right windows for encoding and transferring files to the device or to local playlists, it can also wipe out your entire active playlist if the software crashes (and if you have 2,000 titles in it, reconstructing it can be a total pain).
- Software is supposed to work with Mac OS, Windows 98 and Windows 2000, although we were unable to get it functional under Windows 2000 on one of our test machines. (Another Win2K bench worked just fine, though. We suspect that another media application on the first one interfered, so you may be forced to do a bit of troubleshooting with some system configurations).
- The player has a large LCD window for listing a lot of information. You can break down your files into playlists, albums, songs, or artists. This makes it relatively fast and easy to get to a particular piece of music.
- On startup, player loads its OS, and information about what is currently onboard, which means a fairly substantial pause before you can actually start using it—sometimes minutes, if your player is completely full of MP3s.
- Environmental audio settings are included onboard the player, allowing you to choose many different settings, as well as EQ adjustments.
- The player ships with two sets of AA-sized NiMH rechargeable batteries (for a total of eight). They recharge in the player, and must be charged for at least 12 hours the first time.
- Headphone band wraps around the back of your head, providing high quality, but may not fit all head shapes.
- A small softcover carrying case is included, though it would have been nicer to see it slightly wider and with a longer carrying strap, so you could wear the player instead of just toting it around between uses.
- The Jukebox is SDMI-ready, though it doesn't require your files to be secure. This means that if SDMI goes through, you'll be able to play any new files you purchase and download.
- The player's OS can be updated with new features as they become available, via the software control program.

Creative claims that you can "merge your entire collection of MP3s and CDs in one compact device" using the Nomad Jukebox, and that's probably true for all but the most avid music collectors. Even if you can't get your entire collection onboard, you can certainly get a substantial amount of music into a portable solution: at 100 hours, you could literally listen to music for more than four days straight without hearing the same song twice.

Because it holds so much music, the biggest problem with the device is uploading and management. The first time you load the full 6 GB onto the device, it'll take you three hours or more, unless you have duplicated song titles (the same song might appear on an album and a greatest hits compilation, for example, which will cause the transfer to pause and ask you to rename or skip the second track), or other small hitches that will delay the process.

The other issue is that loading 6 GB of material onto the player presents you with more material than you may be able to comfortably deal with. To make it quite a bit easier, though, Creative's interface allows you to sort by artist, album, and genre. It also lets you search and scroll.

With so much data onboard, the Nomad Jukebox's responsiveness is occasionally sluggish. Pressing "expand" to list the track titles of a currently playing album may take the better portion of a minute, but it doesn't interrupt the audio flow.

Because it's too large to comfortably fit into a shirt or jacket pocket, the Jukebox isn't

being positioned as a portable solution in the same way as the Nomad II. Instead, it's more a "briefcase" solution, allowing you to pack up a great big portion of your collection and transfer it between home and work. It's also the perfect solution for long roadtrips, with an optional car adapter kit (coming soon). That isn't to say it isn't portable, however: it's just as small as CD-R based solutions, and if you're carrying a knapsack, you're set.

One problem you'll encounter if you choose to take the device on the road, is that you'll run out of power a long time before you run out of songs. Creative has very thoughtfully included two sets of NiMH

rechargeable batteries with the Nomad Jukebox, but even two sets don't come close to the power needed to play back all of the music on this player.

The batteries charge in the player, which leaves you in a strange position: you can only charge the set in the player. Realistically, you'd probably want to charge one set while the other is in the player, so your best bet is to find a compatible external charger for the spare set.

That way you can charge both sets at the same time, or charge one while the other is in use, and just swap them at the end of the day. It is worth noting that should you run out of

power, you're not supposed to use standard alkaline batteries, which run at 1.5 volts instead of the NiMH's 1.2 volts, so you'll want to keep both sets of rechargeables fully charged for maximum runtime while you're on the road.

With the right amount of battery power, you're set, however. With the Jukebox fully loaded, we've been wandering around for weeks now, only pausing to add new CDs, and we've had a good variety of material onboard to keep us from getting bored. Sure, it's pricier than the other models, but if you've got a ton of music, it's worth the extra investment. □

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Myst				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
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Nascar Racing 3				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
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Earth 2150				Lost & Found (Full Box)		MSCE NT4 Training Kit (Box)		TaliWorks Pro 3.0 (Full Box)	
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Evolva				Lotus Smart Suite Millennium 9.5		MSCE NT4 Training Kit (Box)		Visual Technical 5.0	
FIFA 2000				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)		Visio 2000 Standard	
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Half Life Opposing Force				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
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Pinball Madness 2000				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
Quake 3				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
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Raven (PC/MAC)				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
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RCT Loopy Landscapes Expansion				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
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Sims				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
Sims: Livin' Large Expansion				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
Sim Theme Park				Macromedia Dreamweaver 3		MSCE NT4 Training Kit (Box)			
Soldier Of Fortune				Macrom					

OkiPage 8z

Tiny perfect digital LED printer

By Issie Rabinovitch

Oki Data has introduced an ultra-compact monochrome printer that is appropriate for almost any desktop, whether in the enterprise, small business, or home environment. Although it can be shared on a network, it is best thought of as a personal printer.

OkiPage 8z

From: Oki Data
<http://www.okidata.com>
 Estimated price: \$349
 Rating: 4 out of 5

Just because you're on a network, it doesn't mean you want to use a network printer. If you print a lot of sensitive material (personnel reports, financial data, etc.), and especially if your office isn't close to the shared printer, you might require a personal printer on your desk. Although Oki Data pitches the OkiPage 8z as a business printer, it can be used in the home or in the dorm just as well. It is a cost-effective solution for everyone who doesn't need colour and doesn't print more than 2,500 pages per month.

Finally, a printer for printmakers

Continued from page 112

or more. The "P" in the model name is a significant designation, referring to pigment-based, rather than dye-based, inks.

Pigments are more fade resistant than dyes, but have tended to produce duller colours that are also more prone to scratching. Epson claims to have solved both these concerns. It says the colour range and brightness of the 2000P is almost as good as its other photo inkjets.

And, because the pigment particles are embedded in a polymer, a process the company calls MicroCrystal Encapsulation, the resulting print is more resistant to surface damage.

The claims of fade resistance will have to await the test of time, but as far as colour range and resolution are concerned, we've been impressed by the 2000P's output (although it takes more than five minutes to complete a full-colour, letter-size print).

The 2000P is called an oversize tabloid

The OkiPage is small, at 32.5x34.8x27 cm (12.8x13.7x10.6 in.), and weighs about 4 kg (9 lb.), so it can fit almost anywhere, and is light enough to be thought of as a portable printer. It is easy to move from desk to desk, room to room, or even to pop into the trunk of your car. It is compatible with any version of Windows via a parallel or USB port. It also supports the Mac OS (version 8.1 or later) via USB. Neither serial nor USB cable is provided.

I connected it to the parallel port of a computer running Windows 98 SE. Clear setup instructions are provided, and the drivers are on a CD-ROM. Installation presented no challenges. Anyone who has ever installed a printer will probably manage it without having to read the instructions.

The initial purchase price of this unit is low, and the ongoing operating costs are claimed to be lower than laser printers and much lower than inkjet printers. You can do your own calculations using some numbers provided below. The OkiPage 8z looks and performs like a laser printer, but uses similar but simpler LED technology to produce printed pages.

The underlying technology is less impor-

tant than results. The OkiPage 8z is surprisingly fast and quiet. It produces printed pages with quality comparable to a true 600 dpi laser. It achieves "600 dpi class" with Oki Smoothing Technology. It has 2 MB of onboard RAM, which is more than enough for most business printing jobs.

I printed a wide variety of word processing files, Web pages, and topographical hiking maps. The results were always crisp and indistinguishable to me from printouts from laser printers costing a few hundred dollars more.

Printing a one-page word processing file took 47 seconds when the printer was in sleep mode, and 23 seconds under normal circumstances. An eight-page word processing document took 85 seconds. A fairly elaborate home page took 41 seconds to print on two pages.

The top-loading sheet feeder takes 100 pages of 20-lb. paper. In autofeed mode it can handle paper weights from 16 to 28 lb. With manual feed, it can take up to 32 lb. paper. It will take paper sizes up to 8.5x14-in. (legal size). Envelopes, and other media

types (labels, transparencies, heavy card stock, and recycled paper) are handled by the front-loading manual feed with straight-through paper path. Printed pages arrive in the small 30-page capacity output bin, located just in front of the sheet feeder.

The warranty is much better than average: a one-year limited warranty with overnight exchange in Canada and the U.S., and a five-year limited warranty on the LED printhead.

Consumables

The image drum lasts 10,000 pages at five percent density (five percent of the page is covered by ink, which is typical for a page of text) and costs \$130. The toner cartridge lasts 1,500 pages at the same density and costs \$28.74. Both of these lead to a very low cost per page. Excluding the price of paper, and assuming you use up one image drum and seven toner cartridges, it costs about \$331 in consumables to print 10,000 pages. That's about \$0.033 per page, assuming you are mostly printing text. Pages with graphi-

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933MHz \$1630	667MHz \$1050	850MHz \$1260	
1000MHz \$1990	700MHz \$1080	900MHz \$1320	

System Configurations

- Motherboard:
Aopen VIA 133MHz FSB Clock Chip Set, ATA-66, 4X AGP
 On Board 4 USB Ports, 1 4X AGP Slot, 2 Channel UDMA-66, 1 Channel Floppy Drive,
 2 Serial Ports 1 Parallel (SPP/EPP/ECP) Port, VIA AC97 CODEC 3D Sound Controller
- 64MB SDRAM 168pin DIMM PC-133
- 15GB ATA-66 Hard Disk Drive 7200rpm 2MB Cache
- 1.44MB 3.5" Floppy Disk Drive
- 48X Speed Internal CD ROM Drive
- TNT-2 M64 2D/3D Graphics Accelerator 32MB 4XAGP
- Aopen 17" Tower Case w/250W CSA Power Supply ATX 2.03 & AMD Certified
- 107 Key Win98 Enhanced Keyboard PS/2
- 2 Button Mouse w/Scroll Wheel PS/2
- 100W External Shielded Computer Speakers
- Microsoft Windows 98SE (CD, OEM)
- Free Rogers@Home Starter Kit (High Speed Internet Access)
- OR 56K Fax Modem + One Month Internet Access (By Infinit Communications Group)
- 2 Year Parts and Labour Warranty

Upgrades (from above systems): 128MB SDRAM DIMM \$90, 20/30/40GB 7200rpm HDD \$35/85/160,
 AOpen GeForce2 MX 3D Card \$85, AOpen MS810 w/Sub-Wooler Speaker System \$50, 16X DVD Drive \$135,
 Windows 2000 Professional \$60

Purchase with system only: Samsung 550S 15" 0.28 SVGA Monitor \$195, KDS 17" 0.27 SVGA Monitor \$265,
 KDS 17" 0.25 Flat Trinitron SVGA Monitor \$380, Samsung 755DF 17" Monitor 0.20(H) 1600x1200 Flat \$400,
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 AX68C(Intel BX/100) 3D Accelerator: PA256MX (GeForce 2MX 32MB) 4XAGP Case: H300(Slim Micro ATX workstation),
 HQ45(ATX2.03 AMD Certified PWR)

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< HANDS ON >

HP ScanJet 5370C

Colour scanner for photo enthusiasts and pros
 offers excellent results

By Dave Chappelle

The Hewlett Packard ScanJet 5370C colour scanner is a tool for photo enthusiasts and professionals.

ScanJet 5370C

From: Hewlett-Packard
 Tel: 800-387-3867. <http://www.scanjet.hp.com>
 Estimated street price: \$449.99

There are three significant differences between the recently reviewed ScanJet 3400Cse and ScanJet 4300Cse, which only work in Windows 95/98. The ScanJet 5370 also comes with drivers for Windows 2000 Pro, NT4, and Mac OS 8.5 and above.

The second distinction is the top-lit transparency adapter that comes with the 5370C. Negatives, slides, and transparencies can be scanned using the adapter. This is noteworthy because scanners were not initially designed to scan negatives and transparencies.

The quality of images produced from scanned colour negatives was excellent. Time restrictions prevented us from further exploring the potential results from the image-manipulation software, though it's doubtful the image quality could be improved.

In the TCP Lab, the results of scanning a transparency that was entirely text were merely passable. We weren't overly impressed by the quality of the unadjusted transparency,

suggesting the automatic exposure settings were overly bright. The document was readable, but not exceptionally clear.

Theoretically, once a document is scanned, the transparency exposure adjustment can be used to adjust shadows and brightness. Text quality should improve with adjustment.

However, our experience scanning a document consisting of plain text printed on a transparency showed the transparency adjustment tools could not be switched on, or the entire scan job would come up as vertical lines of colour. The only way to produce readable results was to treat the text as a printed-paper page and leave the transparency control settings off.

The third area in which the 5370C differs from the 3400 and 4300 is the resolution. The 5370C scans at 1,200x1,200dpi in colour, and can be improved to 1,200x2,400. Using HP software, it can be boosted to 1,200x9,600, but by then the image file would be grainy and too large to handle.

Parallel and USB cables are included in the package. Along with the ScanJet software, HP has included Boomerang Internet Design Shop Gold, Corel Print Office 2000, and Caere PageKeeper 3.

Once connected to a PC with a modem, an email box, and printer, configuring software allows one-touch scanning, copying, faxing,

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OkiPage 8z

Continued from page 113

cal elements use more toner, so would cost more to print.

The lowest price I found for this printer on the Internet was \$349.

What I like

The size and weight, speed and quality of printed pages, low initial price, low cost of consumables, quietness in operation,

Windows and Mac compatible, and USB and parallel port connectivity are all appealing features.

What I don't like

It's impossible to avoid getting your hands dirty when setting up this printer for the first time or replacing the toner cartridge. The small and inelegant output bin is also hard to like.

—CanadaComputes.com

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Symantec ports consumer features to enterprise firewall software

By Stefan Dubowski

If you told Michael Murphy that his employer, Symantec Corp., seemed to have a split personality these days, he'd probably agree.

"I think you'll see more divergence between Norton and Symantec," says Murphy, the general manager of Symantec Canada. "[Enterprise] customers want completely different applications."

Until recently, Symantec's sub-brands, the Norton line of utility, antivirus, and personal security software, and the Delrina WinFax title, tended to have a higher profile than the parent company. But that is changing, as Symantec focuses on the networked enterprise as its main opportunity for growth.

Enter Desktop Firewall 2.0, a new product from Symantec—not Norton. It's designed for corporations that want to keep their mobile workers' computers safe from viruses, worms, denial-of-service attacks, and everything else hackers have come up with.

This is the first version of Desktop Firewall. Why, then, is it pegged "2.0?"

"We decided to start off where its retail counterpart was, which is 2.0," Murphy said.

The retail version—meant for home users—is called Norton Personal Firewall 2000. Its predecessor so impressed Symantec's corporate customers that they requested a version for themselves—with a few tweaks.

Murphy said the corporate clients wanted central administration functions for developing firewall rules—what the mobile worker's notebook should and shouldn't let in. They wanted a firewall product that meshed with their current hardware and software, firewall and public key infrastructure (PKI). And it had to work with their virtual private network (VPN), whether from Cisco Systems or Nortel Networks.

Might this VPN-neutral feature bring compatibility problems? "Not so far," Murphy said. Symantec is carefully working on versions for other popular VPNs, but Cisco and Nortel were first on the list.

As with the consumer fare, this program is for the desktop (hence the name). In other words, you don't need a firewall server to run Desktop Firewall 2.0—which could make it particularly appealing to small companies where everyone counts as a mobile worker.

Home users come from a different pedigree. They want a program they can pick up at the local computer store that's easy to install and manage—"wizard" functions are a must-have. Tech support and simple updates mark Norton's products.

Murphy figures Symantec has the goods for both groups.

"Home users just want to click a button and get the next update... The enterprise customer wants

to manage the information that goes out to the desktop."

The Desktop Firewall end user need not have IT experience to benefit from the protection, Murphy said. Symantec built remote Internet deployment capability into the product. No downloads required.

The product comes with an HTML template for a Web site from which end users can install the program. It even offers a "silent installation," where-

in the IT guru installs the program through the network. The end user doesn't even have to know it's happening (but it's usually a good idea to tell them).

And the end user doesn't need to worry about creating the rules. It's up to the company's IT expert to set these up, although the end user can make amendments.

Is Desktop Firewall 2.0 completely secure? Of course not, Murphy said.

"Security, performance and cost are all functions of one another. As security gets close to 100 percent, performance degrades and costs rise."

Besides, Murphy added, "The thing about computers is you don't have to be 100 percent secure. You just have to be more secure than your neighbor."

You can find out more about Symantec and Norton products at <http://www.symantec.ca>.

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and emailing of documents using the four blue buttons on the front center of the unit. Maximum scannable document size is 8.5x11.7 in., but that increases to 8.5x14 in. when the optional automatic document sheet feeder is used.

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Recording Excel data



Helen Bradley

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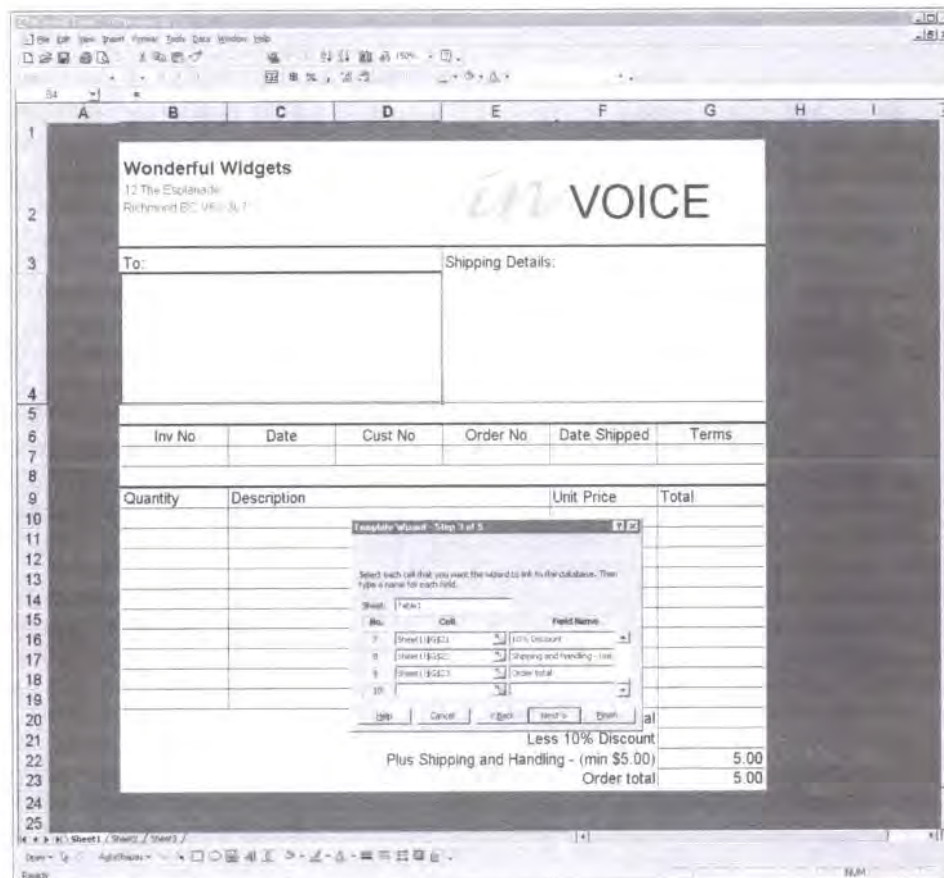
When you use Excel worksheets as invoices, purchase orders, and quotations, it's one thing to print them and send them out to customers or suppliers and it's another thing to track what they contain. Luckily an often overlooked option in Excel can help you track information stored in worksheets in a central database.

Any Excel worksheet you use regularly can be created as a template and linked to an Excel database—strictly speaking, this is just a simple Excel workbook. This way the data from a number of forms is gathered into a worksheet, allowing you to quickly view the key data and even total and summarize that information from these forms.

This month, I'll show you how to create a simple invoice template and link it to an Excel database. You'll see how, every time an invoice is created, key details (which you specify) will be saved in the database. Over time, this database will serve as a record of all the invoices created. We'll go through the process step by step, and at the end you'll be able to set up your own worksheets to achieve the same results.

Before you begin

To create this project, you'll need to make sure you have the Template Wizard add-in on your computer. To find out, select Tools, Add-



The invoice is created as an Excel template and key data from it is linked with a database file that will allow information from multiple invoices to be recorded in a single file.

Ins, and see if the Add-Ins Available list includes Template Wizard With Data Tracking. If it's there, make sure its checkbox is selected and click OK. If you're using Excel 2000, and the add-in isn't installed, you'll be

prompted to install it at this point.

If you're using Office 97 and the option is not in the list, you'll need to install it from your original Office 97 CD-ROM by selecting

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Java Tutorials: Part 3

More on Java Classes

By Jacques Surveyer

In our last tutorial we created a new class or datatype called Point and explored some of the object-oriented properties of classes like encapsulation (data hiding for more secure code) and polymorphism (allowing different forms of calculating a result for more elegant and robust programs). In this tutorial we shall create more classes utilizing the Point class and explore the basic Java classes in more detail.

But first there is the matter of explaining the "why":

```
Point Pt = new Point ( 1.2, 6.66);
Point pp = new Point(1, 1);
Pt = pp;
pp.x1 = 333333;
System.out.println("Pt " + Pt);
// The results print out as:
// Pt Point x1=333333.0 y1=1.0
```

Now why does this happen? Because we assign pp to Pt before we change the value of pp. It is because the assignment statement in Java works differently. In Java, when an object is assigned, the underlying data values are not moved—just the address of the object is assigned. So Pt has the same address that pp has; so when pp is changed, so is Pt. They both point to the same object, hence the results. We shall see more about linked objects below.

Installing the JDK

One more diversion before starting: it is essential that anyone following this series try out Java code because it is so easy and helpful to explore the language. So we will run through the process of downloading the Java JDK and setting it up. Here are the download steps:

1. Go to <http://java.sun.com/products/jdk/1.3>.
2. Move down the page and click on the link Java 2 SDK v1.3.1.0xx for Windows 95/98/NT Continue. The Security Dialog will appear, and one button is again Continue. Click it.
3. On the License & Export for Java page, press the Accept button. Then, when the Security Dialog appears again, click Continue. (These Security Dialogs may not appear depending on the browser version you are using and settings you have selected.)
4. On the download page, choose the FTP site closest to your location and click the appropriate button. (Using a 56Kbps modem it will take slightly less two hours to download the 20MB JDK file.)
5. Execute the downloaded file winjdk_122.exe. (This name has changed in the past, so it may be different.) The setup program runs through a standard install.

You are now ready to run Java. To run the Java Hello program from our first tutorial switch to MS DOS. Switch to the directory

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Linux for Newbies: Part 16

Shell scripting

By Gene Wilburn



Now that we've looked at Linux shells and some of their characteristics, let's put our knowledge to work. Shell scripting, one of the bedrock skills of Unix and Linux system administration, is a large topic—you can find entire books devoted to the subject. It would be impossible to do justice to all the features of shell scripting in so short a column, so what we'll do here is take a look at two real-world scripts created to assist with the administration of a Linux-based Web site. Perhaps these scripts will whet your appetite for

more.

Learning to write shell scripts is a great way to explore the richness of the Linux toolkit. It's also an enjoyable way to learn programming concepts. It's satisfying to be able to create your own custom utility programs with just a few lines of code.

Script 1: lcf (lowercase filenames)

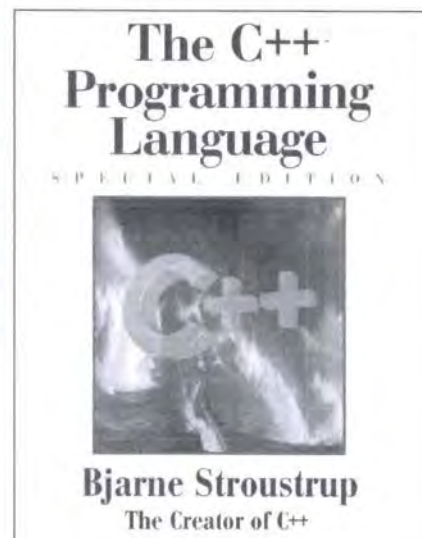
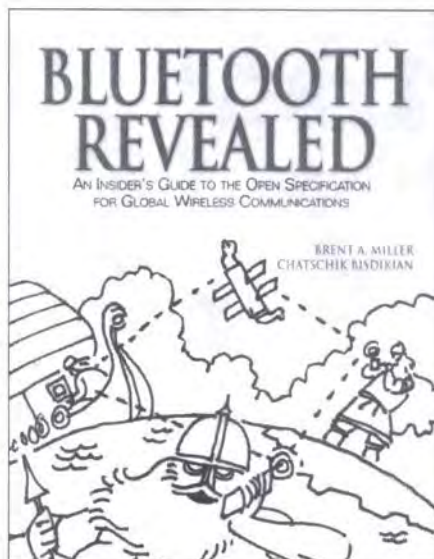
The scenario behind both of the scripts in this column is that you're sysadmin'ing an Apache Web server on Linux. Typically, your users are creating HTML pages on their Windows and Mac computers and transferring their completed pages to your Linux Web site, either by FTP or via Samba. Windows and Mac OS are both case-insensitive operating systems where the pages named MyPage.HTML and mypage.html refer to the same file. In Linux, of course, these are two different files.

Internally the page creators should use lower case only in all their HREF's (make that a rule from day one!), but the software programs they use to create their pages often capitalize the first letters, as well as other letters, of the filenames.

When these files arrive in Linux, with uppercase characters in their names, they create havoc: the pages don't resolve. Manually renaming a lot of filenames to lower case can be annoying, particularly if you have to do it frequently. Shell scripting to the rescue!

Here's a script I wrote called lcf that will lowercase any filenames in a given directory. (Note: In these scripts the line numbers followed by a colon, have been added for reference—the actual scripts do not contain line numbers.) To make this script available to all users, place it in a common directory, such as

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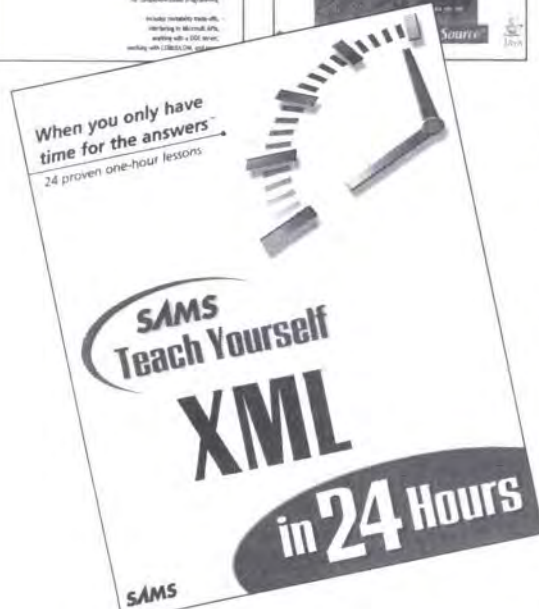
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Recording Excel data

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Setup. From the Options list, select Microsoft Excel, then the Change Option button. Select Add-ins, the Change Option button, and pick the checkbox beside Template Wizard With Data Tracking, and click OK, then OK again, and continue with the install.

The basic invoice

To create the basic invoice, start with a new workbook and add these entries into these cells:

B3 To:
E3 Shipping Details:
B6 Inv No
C6 Date
D6 Cust No
E6 Order No

F6 Date Shipped
G6 Terms
B9 Quantity
C9 Description
F9 Unit Price
G9 Total
C20 Sub total
C21 Less 10% Discount
C22 Plus Shipping and Handling—(min \$5.00)
C23 Order total
G10 =F10*B10
G20 =SUM(G10:G19)
G21 =G20*0.1
G22 5.00
G23 =G20-G21+G22

Finish off the worksheet by first merging the cells from column C to column F in rows 20 to 23 and copy the formula from cell G10 to cells G11:G19.

Format cells C7 and F7 to date format; cells F10:G19 and G20:G23 to number format with two decimal places and format cells B10:B19, B7, D7 and E7 to whole numbers. Format the remainder of the invoice neatly and save the invoice when you're done calling it TCPInvoice.xls.

Making the template

Now that you have created your invoice, you can use the Template Wizard to convert it into a template and link it to a database file. With the file TCPInvoice.xls open on the screen, begin by selecting Data, then Template Wizard. In the first Wizard screen (Step 1 of 5), leave the entries as they are if the name of the workbook you are creating the template from is already set to TCPInvoice.xls and the name of the template is TCPInvoice. If not, make these changes to

the entries in the dialogue. In front of the template name, Excel will have created a path to its own template directory, so leave this as it is and choose Next to continue.

In the Step 2 of the Wizard, ensure that the type of database is set to Microsoft Excel Workbook (Excel 97 only), and that the name and location of the database file is where you want to store it. You should alter the name and path of this file to suit your needs. Take note of the filename and path you've chosen so you can find the file later. Click Next to continue.

This third step is a little confusing so take it slowly. What you need to do is specify the cells on the invoice worksheet you want to be included in your database file. You'll do this by selecting the first cell textbox and entering a cell reference in it. You can either type the

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DEALER INQUIRIES ONLY

Recording Excel data*Continued from page 118*

cell reference manually or collapse the dialogue box so that you can select a cell by pointing. This later method is the most sensible way. For each cell, Excel will guess an appropriate Field Name, which you can either accept or replace with your own.

To set up the invoice template so that key data will be stored in the database, select each of these cells from the invoice to include in your data file. Make sure the Field Names are as shown (or alter them if they are not the same), then choose Next to continue:

Cell	Field Name
B4	Customer
B7	Invoice Number
C7	Date
D7	Customer Number
G7	Terms
G20	Sub total
G21	10% Discount
G22	Shipping and Handling
G23	Order total

When you're prompted with "Would you like to add information from existing workbooks to the database?" select "No, skip it" and click Next. In the final step of the Wizard, simply select Finish. Excel will now create your template and the database file into which the data from each invoice will be stored.

Using the template

Now you've created the invoice template and database, you're ready to use it and see how it all works. Open a workbook based on your new template by selecting File, New, locate the template file TCPInvoice.xlt in your list of templates, and click OK. This will open a new file based on your template.

Enter this sample data into your invoice (Hint: to create new lines when you're entering the data in cell B4, press Alt + Enter):

Cell	Sample data
B4	SSU Purchasing, 445 Thomas St, Vancouver, BC V6H 1G7
B7	2001
C7	20-Sep-00
D7	56897
E7	3001
F7	29-Sep-00
G7	30 days
B10	3
C10	small widgets
F10	25
B11	4
C11	medium widgets
D11	35
B12	1
C12	large widget
F12	50

When this is done, save your completed invoice using File, Save. You will see the prompts Create A New Record, or Continue Without Updating, this is Excel asking you if you want to add the details from this invoice to your database file. You do, so choose the Create A New Record button and click OK. The Save As dialogue box will appear after which you can save your newly created invoice as you would any other file. The data from the invoice has been added to the database automatically.

If you later alter an invoice that you previously added to the database, you'll get an additional choice when you save: Update The Existing Record. Choose this so the invoice details will show the updated information.

Before you go further, create one or two additional invoices so you have some more sample data in the database file when you go to look at it.

Viewing the data

Now you've got something to see, so it's time to open the database Excel has been storing the data to you what's there. To do this you simply open the database file as you would any other Excel file. The file name and location of your database file will be those Excel created for you (or the ones you chose) in Step 2 of the Template Wizard (and which you should have written down). If you've followed these steps exactly, the file will be called TCPInvoice Database.xls and it should be in the same directory as your original TCPInvoice.xls file. Open the database file using File, then Open.

You'll notice the database is simply a worksheet containing one line of information for each invoice you have created. Not all the information from each invoice appears in the database, in fact the only information that appears is the information you set up in Step 3. Now that you have the database file open you can neatly format the cells and even print the worksheet. If you wish to analyze the data, you can, for example use the =AVERAGE function to calculate your average sale value.

Adapting the process

Any time you use a form to record information—whether you send it to a customer or keep it for your own use—you can link the form to a database to quickly and accurately record the details from many forms in one file.

For example, a teacher could create a form to record information for a student for a subject and store a summary as a record in a database for the entire class. Salespeople can have a spreadsheet for each sale and record summary information as a record in a database containing information on all sales. Anyone who records data about anything for the current month can keep key information from this file as a record in a database storing similar details for the full year. The uses for this tool are limited only by your imagination.

Breakout box

If you're using Office 97, you can easily create databases in formats other than the Microsoft Excel Workbook format I've used in this example. To do this you must have Data Access Objects for Visual Basic installed. You can install them from your original Office 97 CD-ROM. Start the Setup program and select Data Access from the Options list, then select Change Option. If the Data Access Objects for Visual Basic checkbox is not selected, then pick it, click OK, and continue to install it. If the checkbox is selected, then the Data Access Objects should be installed on your system, so exit install.

In Step 2 of the Template Wizard, you can choose from a range of database formats to store information from your template. Of course, you'll need a database program capable of reading this database file to make use of it.

Hot formatting tips!

Here are some neat techniques you can use to format your invoice worksheet.

- Merge cells by selecting the cells you want to merge, then choose Format, Cells, the

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Shell scripting

Continued from page 116

the time-honoured /usr/local/bin directory and, as root, type "chmod a+x lcf" so everyone on the system can use it. The script is invoked as "lcf *" to check all file names in

the current directory:

```
1: #!/bin/sh
2: # lowercase any filenames with uppercase chars
3: for file in $*
4: do
```

```
5: if [ -f $file ]
6: then
7:   lcfile=$(echo $file | tr [:upper:] [:lower:])
8:   if [ $file != $lcfile ]
9:   then
10:    mv $file $lcfile
11:   fi
12: fi
13: done
```

Let's examine what this small script does. Line 1 contains the shebang path #!/bin/sh that instructs the operating system to run this program using the sh program (bash in the case of Linux). Line 2 is a comment. Comments in shell scripts are preceded with a hash mark (#). Line 3 starts a for loop that sequentially assigns the variable file each filename passed to the lcf script. The \$* symbol holds a list of the filenames. The full extent of the for loop is contained between do (line 4) and done (line 13).

Line 5 begins the first if statement, ending with fi (if spelled backwards) on line 12. This forms the outer conditional. The brackets ([]) in line 5 indicate a test. What we're testing is whether or not the name we're examining is a file (-f). We only want to lowercase filenames, not directory names. If the condition is true, we go to the then statement, line 6. An explicit then is required in shell scripting.

Line 7 (lcfile=...) forms the heart of the script. We pipe the current filename in the list (\$file) through the Linux tr (translate) utility, translating any uppercase characters to lowercase ([:upper:] [:lower:]). This is assigned to the shell variable lcfile using the equal sign. Note that in shell scripting there is no white space allowed around the equal

sign as there is in C or Perl. Note also that the script requires backticks (`) to execute the command `echo \$file | tr [:upper:] [:lower:]`. Surrounding an executable command string with backticks makes it possible to assign the results of a command to a shell variable.

The inner conditional begins on line 8 (if [\$file != \$lcfile]) and ends on line 11 (fi). This time we test to see if there is any difference between the original filename (\$file) and the lowercased filename (\$lcfile).

Notice that shell scripts prepend the dollar sign (\$) to variable names to access the contents of the variable, e.g., \$lcfile to access the value of lcfile. (This can also be written, more conservatively as \${lcfile}, using braces to protect the variable from being affected by other expansion characters.) If the two variables are not equal, it means that the original filename contained some uppercase characters and we should proceed to rename the file to its lowercased counterpart. This we do in line 10 with the mv command—"mv \$file \$lcfile."

Script 2: rotate-apachelogs-

Our second shell-scripting example is very typical of sysadmin scripts in which you want to run a sequence of steps at an appointed time every day. In this case we want to rotate our Web site log files on a daily basis, resolve IP addresses into names, date-stamp each day's log files, move them to an archive directory, then compress them. In addition, in this scenario, we're using the excellent Web stats program Webalizer, which we've already configured to work with incremental updates. It reads the file

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Recording Excel data

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- Alignment tab, then select the Merge cells checkbox.
- Hide gridlines using Tools, Options, then select the View tab, deselect the Gridlines checkbox, and click OK.
- Format text in a single cell in different ways by double-clicking the cell and selecting the portion of text you want to alter, then apply the desired format.
- To render the entire background of a worksheet a solid colour, select the worksheet by pressing Ctrl + A, then choose Format, Cells, and set the Pattern to a solid colour. Pick out the area covered by the Invoice and set its Pattern to solid white, no pattern, or another colour.
- Adjust the height of a row by selecting a cell in the row and use Format, Row, then

Height.

- Vertically align data in a large cell with the top of the cell using Format, Cells, choose the Alignment tab, and from the Vertical list box select Top.
- To put two or three lines of text in one cell, use Alt + Enter at the end of each line.
- Hide zeros in the unused lines of the invoice by formatting G10:G23 using a custom format. Highlight the cells and select Format, Cells, choose the Number tab, and from the Category list, select Custom and in the Type text box insert '#,##0.00;-#;##0.00;'. □

Helen Bradley specializes in writing hands-on tutorials. Her columns appear regularly in a number of publications in the U.S., the U.K., and Australia. Contact Helen at helen@helenbradley.com.

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Shell scripting

Continued from page 120

/var/log/httpd/access_log.res on a daily basis to update the stats with the previous day's hits. We run this script at midnight, briefly shutting down Apache, then restarting it a few seconds later once we've rotated the logs.

Although rotate-apachelogs is a longer script than lcf, it's a simpler script. There are no conditionals or loops—just a straight sequence of commands.

```
1: #!/bin/sh
2: # Rotate Apache access_log, error_log
3: # and (optionally) run webalizer stats
4: # Set today's date variable in yyyymmdd format
5: tdy="date +%Y%m%d"
6: # Stop Apache momentarily
7: /etc/rc.d/init.d/httpd stop
8: # While Apache is stopped ...
9: # Copy access_log to access_log.tmp
10: cp /var/log/httpd/access_log \
/var/log/httpd/access_log.tmp
11: # Copy error_log to archive directory
12: cp /var/log/httpd/error_log \
/var/log/httpd/log-
archive
13: # Null out access_log and error_log
14: cat /dev/null > /var/log/httpd/access_log
15: cat /dev/null > /var/log/httpd/error_log
16: # ... restart Apache
17: /etc/rc.d/init.d/httpd start
18: # Resolve IP addresses with logresolve
19: /usr/sbin/logresolve \
/var/log/httpd/access_log \
>
/var/log/httpd/access_log.res
20: # Datestamp and archive old access log
21: mv /var/log/httpd/access_log.tmp \
/var/log/httpd/log-archive/access_log.$tdy
22: # Datestamp old error log
23: mv /var/log/httpd/log-archive/error_log \
/var/log/httpd/log-archive/error_log.$tdy
24: # Compress the archived log files
25: gzip /var/log/httpd/log-archive/*.$tdy
26: # Run webalizer (values: /etc/webalizer.conf)
27: webalizer
```

Line 1 is the shebang line, telling Linux to use sh (bash) to run this script. Lines 3-5 are comments. Line 6 uses the Linux date command to assign today's date in "yyyymmdd" format to the shell variable tdy. This variable gets used later to datestamp log files. Notice the backticks, just as we used in the previous script lcf. Line 7 (on Red Hat Linux systems) shuts down Apache so that no new entries are being logged while we're copying the log file.

Line 10 copies the current log file, access_log, to a temporary file, access_log.tmp. Line 12 puts a copy of the current error log file, error_log, into the archive directory, /var/log/httpd/log-archive. Lines 14 and 15 then reset the current log files to null (empties them out). At this point we're ready to restart Apache, line 17.

For efficiency, Apache is normally configured to log only IP addresses. Normal practice is to resolve the addresses into names later, in batch mode during non-peak hours. Apache provides the filter program logresolve to do the job of resolving names. We invoke this program in line 19, with access_log.tmp as input and access_log.res as output, using standard shell redirection. Webalizer has been configured to use the resolved log file (access_log.res) for statistics.

Now the majority of the work is done and we just need to finish things up. Lines 21 and 23 add the datestamp (\$tdy) to the access and error logs we want to preserve and store in the archive directory. All that's left is to compress them with gzip, which we do in line 25. Our final files in the archive directory for the date of October 15, 2000, look like this:

access_log.20001015.gz error_log.20001015.gz

Finally, in line 27, we run Webalizer. If you use a different stats program, adjust this line accordingly. To have this script run at midnight, we add it to cron. Let's assume it resides in /root. The crontab entry is:

```
0 0 * * * /root/rotate-apachelogs
```

Shell scripts such as rotate-apachelogs are sometimes referred to as "cron jobs." They are the backbone of Linux system administration.

Further study

Shell scripts can be simple, like these two examples, or very sophisticated. If scripting catches your fancy, there are some excellent resources available for further study. One of the best places to look for models is in your Red Hat Linux /etc/rc.d/init.d directory. The start/stop/restart scripts in this directory are filled with excellent working examples of conditional and branching logic. These scripts provide many instances of for loops and case statements as well as extensive use of shell variables.

Many Linux books contain chapters on

< CAREERS & TRAINING >

shell scripting and, as mentioned previously, there are specialized books devoted to the topic. Your search needn't be limited to books specifically on Linux. Any Unix-oriented book can be useful. Some popular books on scripting include *Unix Shells by Example, Second Edition*, by Ellie Quigley, Prentice Hall, 1999 (ISBN: 0130212229, price \$75); *Learning the Bash Shell, Second Edition*, by Cameron Newham and Bill Rosenblatt, O'Reilly, 1998 (ISBN: 1565923472, price \$42.95); *Sams Teach Yourself Shell Programming in 24 Hours*, by Sriranga Veeraraghavan, Sams, 1999 (ISBN:

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More on Java classes

Continued from page 116

(or create a new one) in which you want to develop your Java test programs. Run Edit (the DOS text editor). Type in the Helloprogram. Save it as Helloprogram.java. Remember that Java is case sensitive, so maintain capital letters where you see them. Exit from Edit. In DOS, run the following two commands:

```
javac Helloprogram.java
java Helloprogram
```

These steps compile the Helloprogram into bytecode that is stored in the file Helloprogram.class. The second step then runs the Helloprogram.class file using the java, which is the JVM (Java Virtual Machine).

The JVM is an interpreter that has been ported to literally hundreds of different operating systems and hardware environs from all the versions of Windows through all flavours of Unix up to IBM's various OS/390 versions. It is the presence of a JVM on a system that makes Java portable. Sun only produces JVM's for Solaris and the various versions of Windows. All other JVMs are developed by OS and machine vendors (not always the same as in the case of BeOS, which runs on Mac and x86 hardware).

One of the things you will really like about running in DOS is the speed of operations. It is refreshingly quick, so it makes it easy to try a lot of variations on your Java programs. But, if you want to run all your Java operations from Windows, go to <http://www.download.com> and look up anyone of the popular shareware Windows editors like Textpad.exe or WinEdit.exe.



Fig. 1: A lot of fast and easy Java coding can be done in DOS.

More Java classes

In our program we want to create two additional classes or datatypes: Line and Circle. In object-oriented programming, this phase of the design process is called abstraction. It's where we try to extract the essential entities and objects (and some of their key properties and functionality in turn) of a system. A whole literature and set of methodologies—including Unified Modeling Language (UML)—has grown up to help with the design and abstraction processes (see Resources for readings below). With Point already defined, it is easier to create the new datatypes or classes:

```
class Line{
// Note once we have declared Point we can use it in other
// class definitions
Point start = new Point(0,0); Point ender = new Point(1,1);
// For Line we take advantage of having many different
// constructors for initialization.
// Constructor 1 is the so called Unit line and is derived
// from Line as originally defined
Line(){
// Constructor 2 defines a Line with two Points
Line(Point fst, Point snd)
// Note this links Line with Points fst and snd
```

```
// so any changes to Points fst or
// snd also change the Line
start = fst;
ender = snd;
// if you want the Line to be inde-
// pendent of the Points use
Constructor 5:
```

```
// Line(fstx1, fsty1, sndx1, sndy1)
}
//Constructor 3 defines a Line with
// start coordinates and end Point
Line(double xx, double yy, Point
// snd){
startx1 = xx; starty1 = yy;
```

```
// Again if you do not want Point snd linked with the Line
// use Constructor 5
ender = snd;
}
```

```
//Constructor 4 defines a Line with start point and end
// coordinates
Line(Point fst, double xx, double yy){
```

```
start = fst;
enderx1 = xx; endery1 = yy;
}
```

```
//Constructor 5 defines a Line with start and end coordi-
// nates
Line(double xx, double yy, double x2, double y2){
```

```
startx1 = xx; starty1 = yy;
enderx1 = x2; endery1 = y2;
}
```

```
// Now define the method length of a line which would
// be called as follows:
```

```
// Line ll = new Line(0,0, 33,44); System.out.println("The
// length of Line ll is : " + ll.length() );
```

```
public double length(){
return Math.sqrt((this.startx1 - this.enderx1)*(this.startx1
- this.enderx1) + (this.starty1 - this.endery1)*(this.starty1
- this.endery1));
}
```

```
// toString() is so useful we define it as
public String toString(Line ll){
```

```
return "Line starts at " + this.start + " and ends at " +
this.ender;
//Note this toString() works only because we defined a
toString() for Point
}
```

In examining the code above, many C or C++ coders will be familiar with most of the syntax. For a function or method like length(), Java follows the same rules as most programming languages. Give the return value of the routine, double, the name of the routine followed by the parameter in parentheses. In this case there are no parameters. Finally the body of the routine begins with { (open brace) and at the very end closes with a } (close brace). As in C or C++, braces or bracket pairs enclose groups of statements also known as code blocks. In the next two or three tutorials we will learn the datatypes and statements that are allowed in those code blocks.

In the meantime, we add some code to create a Circle class and produce the Circledemo program as follows:

```
class Circle {
Line radius = new Line(0,0,1,1); Point center = new
Point(0,0);
//Again we have several Circle constructors
Circle(Line rad, Point ctr){
radius = rad; center = ctr;
}
Circle(Line diameter){
radius.startx1 = diameter.startx1; radius.starty1=diamete-
ter.starty1;
radius.enderx1 = center.x1 = diameter.startx1 + (diamo-
ter.enderx1-diameter.startx1)/2;
radius.endery1 = center.y1 = diameter.starty1 + (diamo-
```

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More on Java classes

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```
ter.ender.y1-diameter.start.y1)/2;
}
// Find area of circle here
area() {
    return Math.PI * this.radius.length() * this.radius.length();
}
public String toString() {
    return "Circle is centered at " + this.center + " with
    radius=" + this.radius.length()
}
}
class Cirdedemo {
    public static void main(String arg[]) {
        Point origin = new Point(); Point upLeft = new Point(5,5);
        Point upRite = new Point(-2, 8);
        Line k1 = new Line(origin, upLeft); Line k2 = new Line(
        upLeft, upRite);
```

Resources

Beginning Java 2

Author: Ivor Horton
From: Wrox Press
ISBN: 1861002238
Estimated price: \$74.95
• Has a good discussion of initialization and Constructors on pages 172-192.

Java 1.2 for C/C++ Programmers

Authors: Al Saganich, Eric Monk, Mike Daconta
From: J.Wiley
ISBN: 0471327190
Estimated price: \$93.50
• Discusses similar issues on pages 112-122.

Three references for UML and Java program patterns and design are:

Teach Yourself UML in 24 Hours

Author: Schuller Joseph
From: Sams Books
ISBN: 0672316366
Estimated price: \$37.95
• The best introduction to UML modeling around.

Java Design, Second Edition

Author: Peter Coad, et al
From: Prentice Hall
ISBN: 0139111816
Estimated price: \$63
• Shows how to use UML with Java and design patterns.

Process Patterns

Author: Scott Ambler,
From: Cambridge Press
ISBN: 0521645689
Estimated price: \$44.95
• More advanced and thorough treatment of program design and patterns.

Shell scripting

Continued from page 121

0672314819, price \$28.95).

Through the grace of portable GNU software, you can even study shell scripting on a Windows computer. By installing the Cygwin user tools on Windows 95/98/NT, you can invoke the Bash shell interpreter and a large set of GNU utilities, including awk, grep, find, tr, and wc. If you also add a copy of vim for Windows, to give yourself a solid vi editor, you can create a Unix-like environment in Windows that is useful, comforting and familiar. Cygwin downloads can be located at <http://www.sources.redhat.com/cygwin/>. To obtain vim for Windows, visit <http://www.vim.org>. □

Gene Wilburn (gwilburn@home.com) is a Toronto-based IT manager, musician and writer who operates a small farm of Linux servers. Back issues of this series are available on his Web site at <http://www.northernjourney.com>.

```
Line k3 = new Line(1,3, origin);
Circle atOrigin = new Circle(origin, k3); Circle aRound =
new Circle(k2);
double areaC = atOrigin.area() + aRound.area();
System.out.println(k1);
System.out.println(k2);
System.out.println(k3);
System.out.println(atOrigin + " 2nd " + aRound);
System.out.println("Area atOrigin="+atOrigin.area()+ " plus
Area aRound " + aRound.area() + " equals " + areaC);
}
}
```

< CAREERS & TRAINING >

After running the Cirdedemo, there are several important points to note. First, despite the fact that the classes Point, Line, Circle and Cirdedemo are all contained in the file Cirdedemo.java, the Java compiler splits them out into separate Point.class, Line.class, Circle.class, and Cirdedemo.class files. In short, quite a number of class files and other resources can accumulate even for a modest-sized program. Java provides for this by allowing .class and other resources to be collected into a .jar file that can then be

Continued on page 124

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Creating a VBA wizard, Part II

By Jacques Surveyer

What puts the polish on many graphical user interface-based (GUI-based) programs is their use of wizards to help users through a rough spot in running the program.

In this second of two tutorials on Visual Basic for Applications (VBA) wizards, we show all the details on how to make a professional wizard using all the Microsoft GUI tricks.

At the same time, readers will get a solid review of methods that help in the development of any VBA userform or VB windowing applications. Finally, a copy of the code is available on the author's Web site.

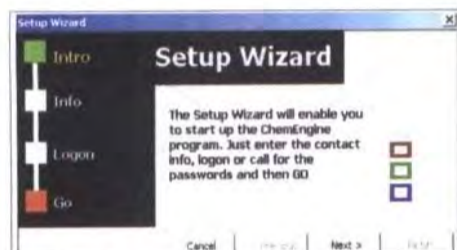


Fig. 1: The final look of the Setup Wizard.

In our last tutorial we developed the first half of our Setup Wizard: the Command buttons and Multipage tab controls. In this tutorial we develop a navigation aid, which Microsoft calls a Subway Map, that shows



Fig. 2: Where we left off in the last tutorial.

each step of the wizard—in our case, the Intro, Info, Logon, and Go steps or phases of the Setup Wizard. At the same time, we hide the tabs of the Multipage control (and this is the key trick) because the pages are activated by the Command Buttons (Next and Previous) or the Subway Map.

Fig. 2 shows where we left off in our last tutorial with the Command Buttons and Multipage Tabs working plus the blank black background image for the Subway Map. Next we need to add four small Image controls from the toolbox to the subway map and rename the Image controls Imintro, Iminfo, Imlogo, and Imgo respectively. Make the BackColor property of the Imintro green and the BackColor property of the Imgo image red.

This follows the Microsoft convention for Subway Maps—the starting “subway station” or step is green, the final destination step is red.

Next, using the Format menuitems, line up the subway stations as shown in Fig. 1 (see

our previous tutorial for the details of how to do this). Add a single narrow image connecting all the Image subway stations. You will need to use the FORMAT | ORDER | SEND TO BACK menu option to get the right look. Finally, add four labels and make their

(Name)s and Captions respectively equal to:

Lintro - Intro
Linfo - Infor
Llogo - Logon

Continued on page 125

More on Java classes

Continued from page 123

used by the runtime JVM directly. A Jar file is just a Zip file with a two extra files added in: a manifest file describing all the resources in the jar file; and a signatures file used for security purposes. We shall discuss Jar files in more detail in later tutorials on deployment.

The next important topic is Java object syntax. Throughout the program we use objects like Circle and Point using a distinctive form called dot syntax. The rules are simple: any reference to an object's instance variables (like double x1 or double y1 in Point) are in the form Object.variable as in Pt.x1. For Object hierarchies containing Point, as in the case of Line k1, start the syntax is OuterObject.InnerObject.variable as in k1.start.y1. Likewise, when invoking an object's methods the syntax is Object.method() as in aRound.area(). C++ programmers should be familiar and comfortable with this syntax. C and Visual Basic programmers might expect to see area(aRound).

Finally, from time to time we use a special

object identifier, this. It is used to identify an object used in a method—most often in constructors. For example, in the Circle class the area() method has the following line of code: `return Math.PI * this.radius.length() * this.radius.length();`. When the method is invoked as in `aRound.area()`, this represents the object `aRound`. If you removed this from the above code it would still work because this is the default for unqualified variables; but for the sake of clarity, this is often explicitly used.

Now that we have three Java programs and the basic outlines of the language under our belt we shall find out more of the details of coding in Java. Datatypes are our next topic of interest because Java has eight primitive datatypes. Any additional datatypes, such as Complex or our Point, have to be defined by the end user. We will see that Java's huge JDK resources include some additional classes that might be thought of as datatypes including Date, String, and Thread. □

Jacques Surveyer is a consultant. For customized training, contact him at jbsurv@inforamp.net.

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Creating a VBA wizard, Part II
Continued from page 124
Lgo - Go

Normally I am very casual about following naming conventions for controls—whatever is memorable and works for you. But here, we need consistency in the naming of the Image and Label controls because we are going to use another VBA coding trick to help navigate the Subway Map. So please follow our naming conventions here.

In fact, the next step is to click on the Subway Map images and labels (eight times in all) and add the following one line of code each time:

```
for Imintro_Click() and Lintro_Click() add => Tabs.Value = 0  
for Iminfo_Click() and Linfo_Click() add => Tabs.Value = 1
```

```
for Imlogo_Click() and Llogo_Click() add => Tabs.Value = 2  
for Imintro_Click() and Lintro_Click() add => Tabs.Value = 3
```

What these eight subroutines do is activate the correct tab on the Multipage control depending on what "subway stop" has been collected. But just as we did in the case of the Command Buttons we have to make sure the converse is true: if the Info tab of the Multipage is activated (perhaps using the Next button), then the Subway map is updated as well.

```
Public Sub setSubwayMap()  
REM First restore the labels to default color and size  
Controls("L" & curStep).ForeColor = vbWhite  
Controls("L" & curStep).FontSize = 11
```

REM - depending on Tab value set curStep- current step

```
Select Case Tabs.Value  
Case 0  
curStep = "intro"  
Case 1  
curStep = "info"  
Case 2  
curStep = "logon"  
Case 3  
curStep = "go"  
End Select
```

REM - Now with new value of curStep highlight active Subway Stop
REM - by making its label bigger and yellow in color
Controls("L" & curStep).ForeColor = vbYellow
Controls("L" & curStep).FontSize = 12
End Sub

Note to make this all work we must add the

< CAREERS & TRAINING >

following line to the top of our code Dim curStep as String and then the following line of code call setSubwayMap to the top of the Sub Tabs_Change() procedure. Finally, we shall cover up the Multipage Tabs and use the complete area of the Tab for our various Wizard steps/pages. To do so, highlight the Mutipage Tabs and set its Style property to 2-fmTabStyleNone. Then set the Picture property of the Intro Page to Start.bmp, which is just a white rectangle created in Microsoft Paint equal in size to the MultiPage control (just use the Height and Width properties of the Multipage when creating Start.bmp in Paint using IMAGE | ATTRIBUTE menu item).

One final setting will ensure that the picture fits exactly over the surface of the Intro page. Set the PictureSizeMode property to 1-

Continued on page 127

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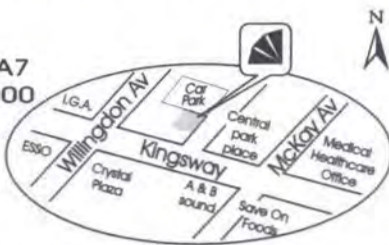
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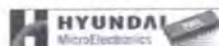
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PaintShop Pro

By Helen Bradley

Jasc's PaintShop Pro is a thrifty computer user's PhotoShop. It does just about everything that PhotoShop does at a fraction of the price. Here are some helpful hints for getting the most out of this image editing/creativity software.

Get the program

If you haven't got PaintShop Pro, or you want to upgrade to Version 7, visit <http://www.jasc.com> and download it.

Using selections as action boundaries

When you're painting, using flood fill or the colour changer, you can limit the area affected by the tool by selecting the area first. Now, when you use the tool, it can only be applied within the selected area—if only colouring had been that easy when you were a kid!

Color Replacer tool

The Color Replacer tool is a quick way to change colours in clipart images. Pick up the colour to replace using the Magic Wand tool and the right-mouse button, then set the foreground colour to the replacement colour. Click the Color Replacer

tool and use the left-mouse button to paint the foreground colour over the background colour.

Understanding the PSP format

PaintShop Pro's own format, PSP, includes a large range of information about your image including layers and channels. When you're working on a multilayer image, one with masks or channels, save the file using the PSP format. Only when the project is complete should you save it in the final presentation format.

Cookie cutter images

Using odd shape selections, you can cut images into shapes. Begin by drawing a shape, a maple leaf for example, then scan it in (or find in a clipart collection). Use the selection tools to pick the shape and choose Selections, Save To Disk, and give the selection a name. Then, open the photo, choose Selections, Load From Disk, and choose the selection you saved. You now have a maple leaf shape selection in your second image and you can invert it and delete the excess image to get a maple leaf shape photo.

Altering size on the fly

When the size of a copied selection is larger than the image you want to put it into (or larger than you want it to appear in the image), you can

either go back and resize the source image or alter its size as you paste. To paste at a fixed size, select the area in the target image to paste the clipboard contents into, then paste by choosing Edit, Paste, and Into Selection.

Using Invert

The Selections, Invert option takes the current selection and inverts it so everything what was selected will be deselected and vice versa.

JPEG woes

Each time you save an image as a JPEG file, you lose some image quality because this is a lossy format. To protect against damaging an image, save it as JPEG only when you are finished working on it. If you import a JPEG file from a scanner, digital camera, or other source, save it in BMP or TIFF format before you begin manipulating it so there is no further loss of quality.

Quick mask effects

Add visual interest to a photo by erasing over the straight edges to create a more subtle look using a mask. Choose Masks, New, Hide All to create a mask. Now choose Masks, View Mask, then Masks, Edit. Now paint on the mask. Using white paint will remove the mask and reveal the image underneath. Using black paint will hide

the image—the opposite of using white paint. Painting with grey will give you an opaque look that will vary in intensity depending on the shade of grey. When you're done, choose Mask, then View Mask to see the final image. To finish, select Mask, then Edit.

Screen captures

Screen captures, which are handy for illustrating manuals, are easy to create. Choose Capture, Setup, then select a hot key from the list to activate the capture. Ensure that this isn't a key that is used by the application you're trying to get an image of or it may not work. From the Capture selections, select the area to capture (choose Full screen if you're unsure) and select Include Cursor and Multiple Captures if required. Click Capture Now to enable the capture command. Organize the screen to display what you want to capture and press the screen capture hot key you selected. When you return to Paint Shop Pro the images will be there and you can crop, edit, and save them as required. □

Helen Bradley specializes in writing hands-on tutorials. Her columns appear regularly in a number of publications in the U.S., the U.K., and Australia. Contact Helen at helen@helenbradley.com.

Handbook provides valuable overview of Web usability

By Lucilla Madamba

In *Web Site Usability Handbook*, the author's objective is "to train people to perform usability evaluations of Web sites." By finding a way to balance detail with breadth, Mark Pearrow has written a book that can teach the practice of Web usability to those with no prior experience.

Web Site Usability Handbook

Author: Mark Pearrow

From: Charles River Media Inc., July 2000

350 pages Includes CD-ROM

ISBN: 1584500263

Price: \$74.95

If you're an aspiring Web designer looking for one book to introduce you to the practice of Web usability, this text is for you—likewise, if you're in Web development, marketing or project management and need an orientation to usability concepts. What this book will not do is be that one reference book that gives you a solid grounding in designing usability studies. However, it should be part of a larger usability and user interface design library.

What differentiates *Web Site Usability Handbook* from other Web design/development books is that it addresses the topic of usability as a process. Rather than concentrating on particular techniques, it provides a blueprint of the "comprehensive usability plan" within the context of the project life cycle as it relates to business strategy and customer requirements. It provides a good understanding of when to use certain types of testing and when to perform a more thorough study.

The practice of usability places the

user at the centre of the development process. Through various techniques and methods, usability specialists attempt to identify the representative users of the Web site or application and their characteristics. They ask what sort of tasks are people likely to do, what their goals are, and how they do work. By finding answers to these types of questions, developers and designers can make the design fit the users, their tasks, and their environments, as opposed to making the users fit the design that the team has decided upon.

The book originated from a university-level course on Web site usability taught by the author. The structure of the book reflects a theoretical/practical approach. Each chapter begins with an overview of concepts and methodologies, and ends with a summary, hands-on exercises, and a series of questions for discussion.

The core of the book, Chapters 5 through 8, cover the following:

- Chapter 5, Design Guidelines, identifies the truisms of Web design that can determine how usable a site is, such as guidelines on page and content layout, navigation, language and labelling, and user interface, just to list a few.
- Chapter 6, Heuristic Evaluation, describes a process of evaluating the state of usability of a site quickly and inexpensively with a small group of



two to five expert evaluators. (A heuristic is defined as a rule of thumb.)

- Chapter 7, Usability Lab Setup, demystifies the requirements of setting up a lab by providing an excellent overview of the necessary electronic equipment and how it should be laid out.
- Chapter 8, Usability Testing, describes the logical steps of a usability test plan, beginning with a statement of purpose, identifying problems, profiling the representative users, outlining methods, creating a checklist of equipment and test crew, writing usability goals and metrics, and executing the plan.

An appendix provides useful templates that can be easily modified when you are ready to conduct your own usability study. The book also comes with a CD-ROM containing tools and templates for usability testing and Web site analysis.

Overall, *Web Site Usability Handbook* is an excellent introduction to this topic. The bibliography also lists other books on usability that will supplement this text. The only negative is that, at \$74.95, it is over-priced for an introductory-level book. □

Lucilla Madamba is a former site usability specialist with CanadaComputes.com.

Useful usability links

Usability Methods Toolbox:

<http://www.best.com/~jthorn/usability/>

Jakob Nielsen's articles on usability:

<http://www.useit.com>

Keith Instone's Web site of usability links:

<http://www.usableweb.com>

Creating a VBA wizard, Part II

Continued from page 125

fmPictureSizeModeStretch. And voila, our Wizard is half-baked!

Fig. 3 shows the final result. In our last tutorial on Wizards we get to do the fun part—make the Setup Wizard work. In the meantime, keep in mind our VBA Wizard contest. Readers are encouraged to create their own VBA wizards using this half-baked design as a template. Use any application program that supports VBA. Send those entries to us at the email address below. If we have enough entries, the top three wizards will be published in this column and the designers



Fig. 3: Subway Map fully enabled.

will receive a small prize. □

Jacques Surveyer is a consultant and writer. He can be reached at jbsurv@inforamp.net.

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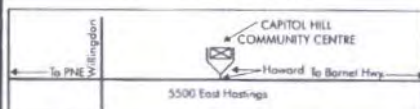
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Multifunctions and onboard fax

We've found that many of the newer inkjet-based units forego the fax component, for a few reasons.

First, most new PCs come with an onboard fax-modem, which would mean unnecessary duplication.

Secondly, email is taking over from fax as the way to get documents from one place to another (without quality degradations, to boot). Certainly the fax must be waning, right?

Not so fast. There are still a number of appli-

cations for the fax machine, most notable of which is probably transmission of documents that don't exist solely in digital form, especially anything that requires a signature. There are also a number of businesses that do not have PCs, and rely on the fax machine for ordering and receiving new product information. To the tech-savvy, this may seem archaic, but the cost of a fax machine is still far lower than the cost of maintaining a PC and training the staff to use it.

The need for a fax component on the multifunction unit seems unnecessary considering the number of fax modems currently installed in PCs, but this may not be the case forever, as more users are opting for Ethernet cards and high-bandwidth Internet connections. If you are one of these users, and have opted to ditch your onboard modem, make sure you're getting a multifunction unit that has the fax onboard, if you plan to send faxes regularly.

—Sean Carruthers

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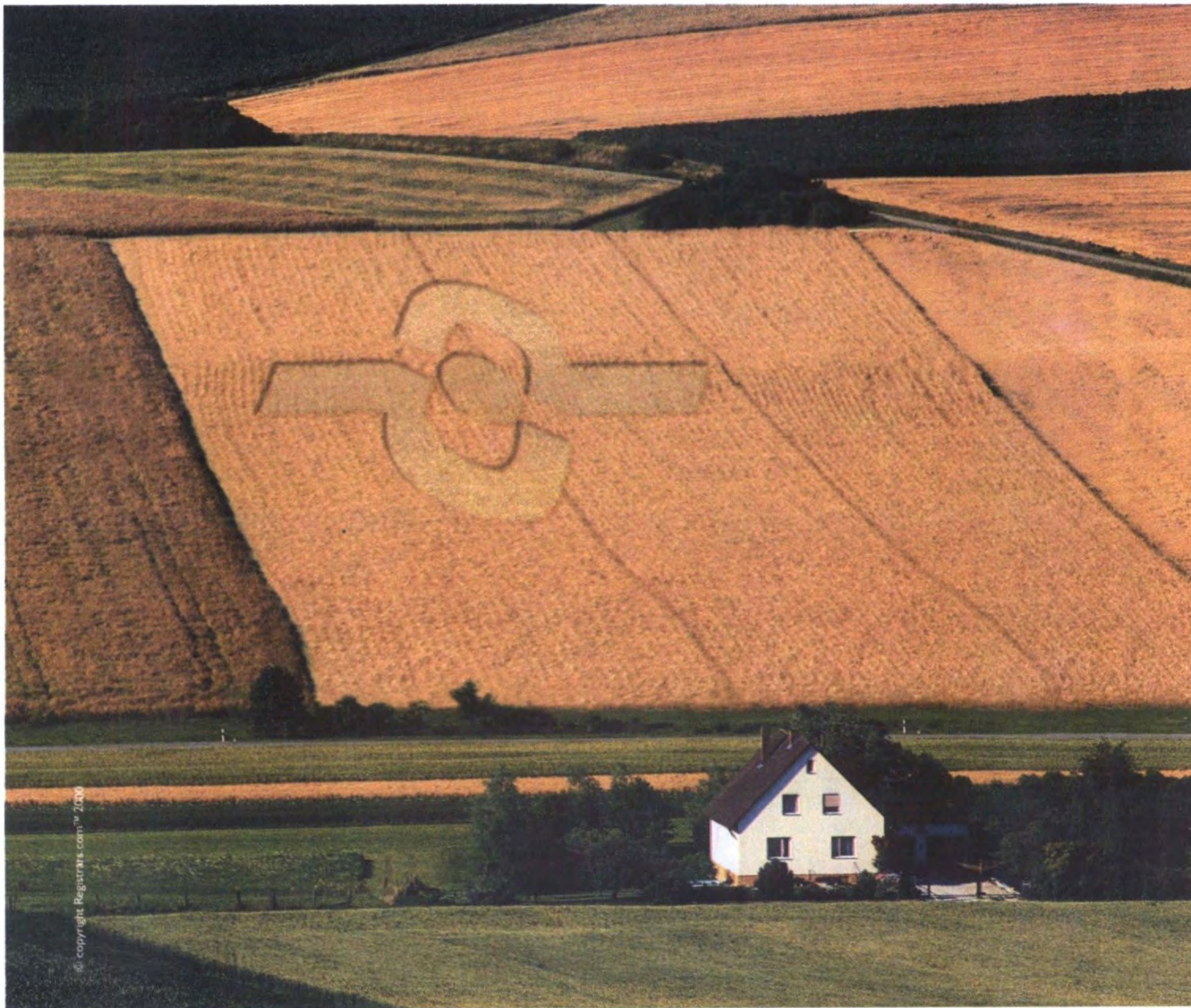
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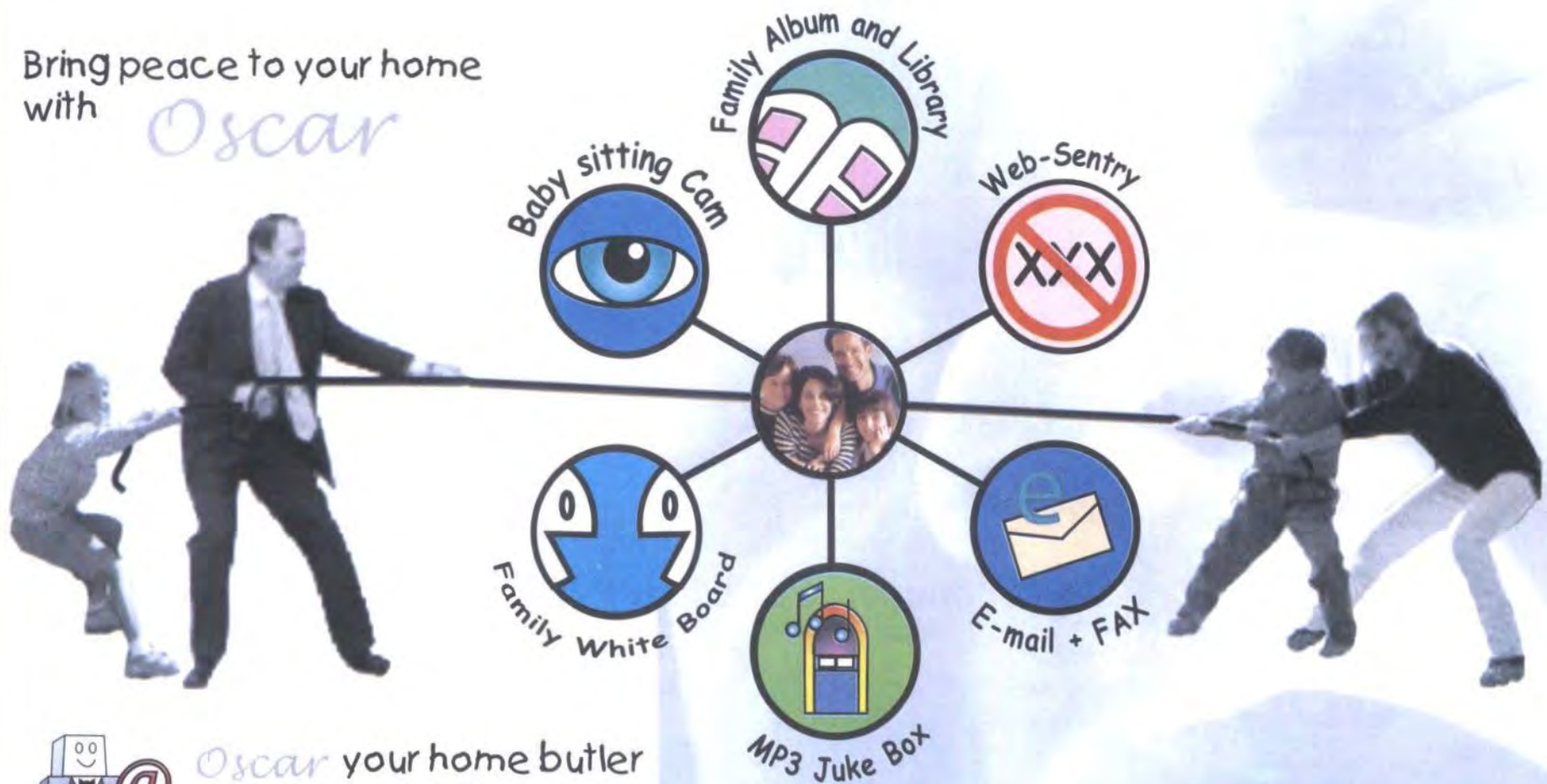
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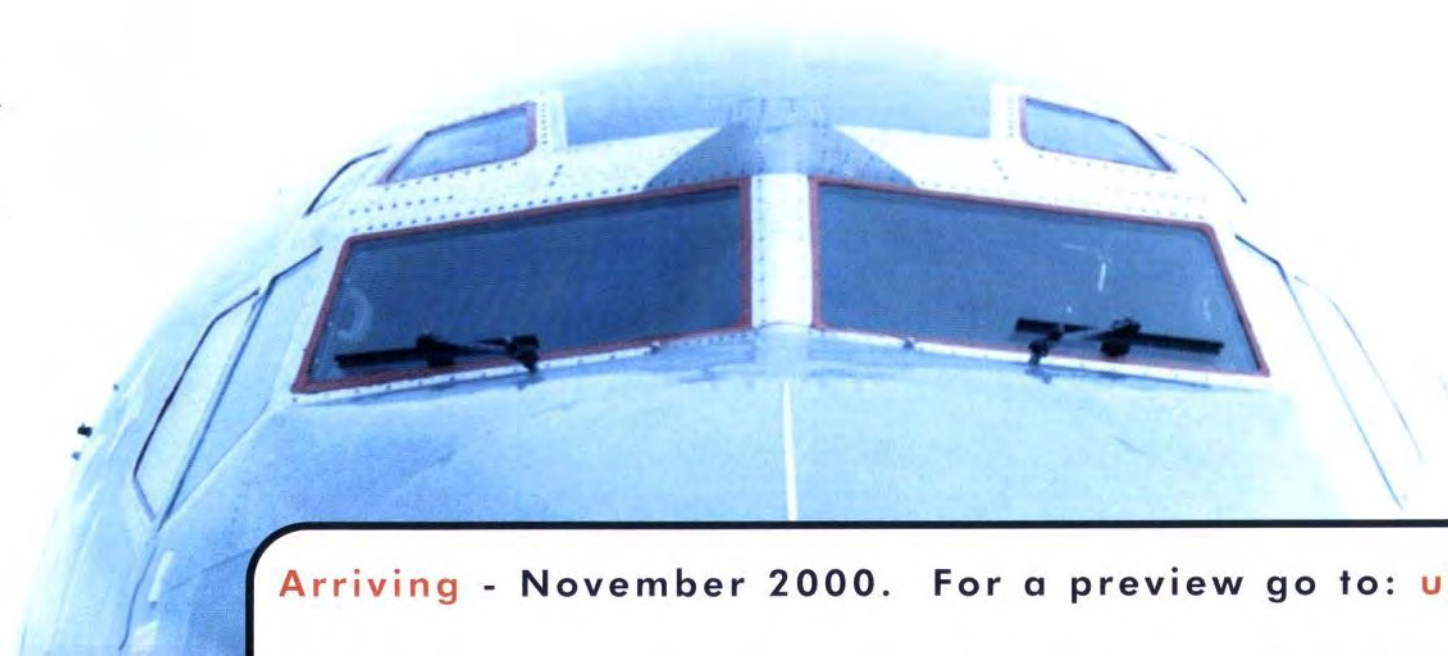
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